ATTACHMENT A

ATTACHMENT A: STANDARD CONDITIONS OF APPROVAL COMPLIANCE

The purpose of the City of Oakland Standard Conditions of Approval (SCA) is to briefly describe the roles and responsibilities of government agencies in implementing and enforcing the adopted SCAs identified in the Infill Environmental Checklist prepared for the Aspire ERES Academy International Boulevard Project (proposed project).

The SCAs incorporate development policies and standards from various adopted plans, policies, and ordinances (such as the Oakland Planning and Municipal Codes, Oakland Creek Protection, Stormwater Management and Discharge Control Ordinance, Oakland Tree Protection Ordinance, Oakland Grading Regulations, National Pollutant Discharge Elimination System (NPDES) permit requirements, Housing Element-related mitigation measures, Green Building Ordinance, historic/landmark status, California Building Code, and Uniform Fire Code, among others), which have been found to substantially mitigate environmental impacts. These SCAs are incorporated into projects as conditions of approval, regardless of the determination of a project's environmental impacts. As applicable, the SCAs are adopted as requirements of an individual project when it is approved by the City, and are designed to, and would, avoid or substantially reduce a project's environmental effects.

The City and its contractors will be required to comply with the SCAs in all respects. In any instance where non-compliance occurs, the City-designated environmental monitors will issue a warning to the party responsible for implementation and the City's Project Manager. Any decisions to halt work due to non-compliance will be made by the City. The City's designated environmental monitors will keep records of any incidents that are non-compliant with the SCAs. Copies of these documents will be supplied to the City.

The following SCA compliance matrix includes the applicable SCAs identified in the Infill Environmental Checklist, prepared for the proposed project. The purpose of the compliance table is to provide the City with a comprehensive list of the SCAs. The SCAs will be implemented through the verification of required approvals by City staff. The compliance matrix consists of the following components:

- The first column identifies the SCA applicable to the resource category in the Infill Checklist document.
- The second column identifies the monitoring schedule or timing applicable to the proposed project.
- The third column identifies the party responsible for initial approval of the required action for the proposed project.
- The fourth column identifies the party responsible for monitoring the required action for the proposed project.

The City will be responsible for ensuring compliance with the SCAs applicable to the proposed project. Staff will prepare, or require preparation of reports which identify compliance with the SCAs. Once construction has begun and is underway, the City will carry out monitoring of the SCAs associated with construction. The SCA compliance matrix will be maintained in the City's files for use in construction and operation of the proposed project.

The SCAs included in the Infill Exemption document and this Appendix are numbered sequentially, and referred by an abbreviation for the environmental topic area. In addition, the SCA number that corresponds to the City's master SCA list is included with each SCA for reference (e.g., **SCA AIR-1 (#19)**, **SCA AIR-2 (#20)**, etc.).

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Section 7.1: Aesthetics			
SCA AES-1 (#17): Landscape Plan a. *Landscape Plan Required* Requirement: The project applicant shall submit a final Landscape Plan for City review and approval that is consistent with the approved Landscape Plan. The Landscape Plan shall be included with the set of drawings submitted for the construction-related permit and shall comply with the landscape requirements of chapter 17.124 of the Planning Code. b. *Landscape Installation* Requirement: The project applicant shall implement the approved Landscape Plan unless a bond, cash deposit, letter of credit, or other equivalent instrument acceptable to the Director of City Planning, is provided. The financial instrument shall equal the greater of $2,500 or the estimated cost of implementing the Landscape Plan based on a licensed contractor's bid. c. *Landscape Maintenance* Requirement: All required planting shall be permanently maintained in good growing condition and, whenever necessary, replaced with new plant materials to ensure continued compliance with applicable landscaping requirements. The property owner shall be responsible for maintaining planting in adjacent public rights-of-way. All required fences, walls, and irrigation systems shall be permanently maintained in good condition and, whenever necessary, repaired or replaced.	a. Prior to approval of construction-related permit. b. Prior to final building permit. c. Ongoing.	a. Bureau of Planning b. Bureau of Planning c. N/A	a. N/A b. Bureau of Building c. Bureau of Building
SCA AES-2 (#18): Lighting Requirement: Proposed new exterior lighting fixtures shall be adequately shielded to a point below the light bulb	Prior to final building permit.	N/A	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
and reflector to prevent unnecessary glare onto adjacent properties.			
SCA AES-3 (#16): Graffiti Control Requirement: a) During construction and operation of the project, the project applicant shall incorporate best management practices reasonably related to the control of graffiti and/or the mitigation of the impacts of graffiti. Such best management practices may include, without limitation: i. Installation and maintenance of landscaping to discourage defacement of and/or protect likely graffiti-attracting surfaces. ii. Installation and maintenance of lighting to protect likely graffiti-attracting surfaces. iii. Use of paint with anti-graffiti coating. iv. Incorporation of architectural or design elements or features to discourage graffiti defacement in accordance with the principles of Crime Prevention Through Environmental Design (CPTED). v. Other practices approved by the City to deter, protect, or reduce the potential for graffiti defacement. b) The project applicant shall remove graffiti by appropriate means within seventy-two (72) hours. Appropriate means include the following: i. Removal through scrubbing, washing, sanding, and/or scraping (or similar method)	Ongoing	N/A	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
without damaging the surface and without discharging wash water or cleaning detergents into the City storm drain system. ii. Covering with new paint to match the color of the surrounding surface. iii. Replacing with new surfacing (with City permits if required).			
Section 7.2: Agriculture and Forestry Resources			
There are no SCAs pertaining to agriculture and forestry resources applicable to the proposed project.			
Section 7.3: Air Quality			
SCA ADMIN-1 (#13): Construction Management Plan Prior to the issuance of the first construction-related permit, the project applicant and his/her general contractor shall submit a Construction Management Plan (CMP) for review and approval by the Bureau of Planning, Bureau of Building, and other relevant City departments such as the Fire Department and the Public Works Department as directed. The CMP shall contain measures to minimize potential construction impacts including measures to comply with all construction-related Conditions of Approval (and mitigation measures if applicable) such as dust control, construction emissions, hazardous materials, construction days/hours, construction traffic control, waste reduction and recycling, stormwater pollution prevention, noise control, complaint management, and cultural resource management (see applicable Conditions below). The CMP shall provide project-specific information including descriptive procedures, approval documentation, and drawings (such as a site logistics plan, fire safety plan, construction phasing plan, proposed truck routes, traffic control plan, complaint management plan, construction worker parking plan, and litter/debris clean-up plan) that specify how potential construction impacts will be minimized and how each construction-related requirement will be	--	--	--

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
satisfied throughout construction of the project.			
SCA AIR-1 (#19): Construction Related Air Pollution Controls (Dust and Equipment Emissions) Requirement: The project applicant shall implement all of the following applicable air pollution control measures during construction of the project: a. Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible. b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. d. Pave all roadways, driveways, sidewalks, etc. within one month of site grading or as soon as feasible. In addition, building pads should be laid within one month of grading or as soon as feasible unless seeding or soil binders are used. e. Enclose, cover, water twice daily, or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.). f. Limit vehicle speeds on unpaved roads to 15 miles per hour. g. Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by	During construction.	N/A	Bureau of Building

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shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations). Clear signage to this effect shall be provided for construction workers at all access points. h. Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations"). i. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. j. Portable equipment shall be powered by electricity if available. If electricity is not available, propane or natural gas shall be used if feasible. Diesel engines shall only be used if electricity is not available and it is not feasible to use propane or natural gas. k. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe. l. All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph.			

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m. Install sandbags or other erosion control measures to prevent silt runoff to public roadways. n. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more). o. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. p. Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize wind blown dust. Wind breaks must have a maximum 50 percent air porosity. q. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. r. Activities such as excavation, grading, and other ground-disturbing construction activities shall be phased to minimize the amount of disturbed surface area at any one time. s. All trucks and equipment, including tires, shall be washed off prior to leaving the site. t. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel. u. All equipment to be used on the construction site and subject to the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road			

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Diesel Regulations") must meet emissions and performance requirements one year in advance of any fleet deadlines. Upon request by the City, the project applicant shall provide written documentation that fleet requirements have been met. v. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings). w. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NOx and PM. x. Off-road heavy diesel engines shall meet the California Air Resources Board's most recent certification standard. y. Post a publicly-visible large on-site sign that includes the contact name and phone number for the project complaint manager responsible for responding to dust complaints and the telephone numbers of the City's Code Enforcement unit and the Bay Area Air Quality Management District. When contacted, the project complaint manager shall respond and take corrective action within 48 hours.			
Section 7.4: Biological Resources			
SCA BIO-1 (#26): Tree Removal During Bird Breeding Season Requirement: To the extent feasible, removal of any tree and/or other vegetation suitable for nesting of birds shall not occur during the bird breeding season of February 1 to August 15 (or during December 15 to August 15 for trees located in or near marsh, wetland, or aquatic habitats). If tree removal must occur during the bird breeding season, all trees to be removed shall be surveyed	Prior to removal of trees.	Bureau of Building	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
by a qualified biologist to verify the presence or absence of nesting raptors or other birds. Pre-removal surveys shall be conducted within 15 days prior to the start of work and shall be submitted to the City for review and approval. If the survey indicates the potential presence of nesting raptors or other birds, the biologist shall determine an appropriately sized buffer around the nest in which no work will be allowed until the young have successfully fledged. The size of the nest buffer will be determined by the biologist in consultation with the California Department of Fish and Wildlife, and will be based to a large extent on the nesting species and its sensitivity to disturbance. In general, buffer sizes of 200 feet for raptors and 50 feet for other birds should suffice to prevent disturbance to birds nesting in the urban environment, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.			
SCA BIO-2 (#27): Tree Permit a. *Tree Permit Required* Requirement: Pursuant to the City's Tree Protection Ordinance (OMC chapter 12.36), the project applicant shall obtain a tree permit and abide by the conditions of that permit. b. *Tree Protection During Construction* Requirement: Adequate protection shall be provided during the construction period for any trees which are to remain standing, including the following, plus any recommendations of an arborist: i. Before the start of any clearing, excavation, construction, or other work on the site, every protected tree deemed to be potentially endangered by said site work shall be securely fenced off at a distance from the base of the tree to be determined by the project's consulting arborist. Such fences shall remain in place for duration of all such work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of logs, brush, earth and	a. Prior to approval of construction-related permit. b. During Construction. c. Prior to final building permit.	a. Permit approval by Public Works Department, Tree Division; evidence of approval submitted to Bureau of Building b. Public Works Department, Tree Division c. Public Works Department, Tree Division	a. Bureau of Building b. Bureau of Building c. Bureau of Building

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other debris which will avoid injury to any protected tree. ii. Where proposed development or other site work is to encroach upon the protected perimeter of any protected tree, special measures shall be incorporated to allow the roots to breathe and obtain water and nutrients. Any excavation, cutting, filing, or compaction of the existing ground surface within the protected perimeter shall be minimized. No change in existing ground level shall occur within a distance to be determined by the project's consulting arborist from the base of any protected tree at any time. No burning or use of equipment with an open flame shall occur near or within the protected perimeter of any protected tree. iii. No storage or dumping of oil, gas, chemicals, or other substances that may be harmful to trees shall occur within the distance to be determined by the project's consulting arborist from the base of any protected trees, or any other location on the site from which such substances might enter the protected perimeter. No heavy construction equipment or construction materials shall be operated or stored within a distance from the base of any protected trees to be determined by the project's consulting arborist. Wires, ropes, or other devices shall not be attached to any protected tree, except as needed for support of the tree. No sign, other than a tag showing the botanical classification, shall be attached to any protected tree. iv. Periodically during construction, the leaves of protected trees shall be thoroughly sprayed with water to prevent buildup of dust and other pollution that would inhibit leaf transpiration. v. If any damage to a protected tree should occur during or as a result of work on the site, the project applicant shall immediately notify the			

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Public Works Department and the project's consulting arborist shall make a recommendation to the City Tree Reviewer as to whether the damaged tree can be preserved. If, in the professional opinion of the Tree Reviewer, such tree cannot be preserved in a healthy state, the Tree Reviewer shall require replacement of any tree removed with another tree or trees on the same site deemed adequate by the Tree Reviewer to compensate for the loss of the tree that is removed. vi. All debris created as a result of any tree removal work shall be removed by the project applicant from the property within two weeks of debris creation, and such debris shall be properly disposed of by the project applicant in accordance with all applicable laws, ordinances, and regulations. c. *Tree Replacement Plantings* *<u>Requirement</u>: Replacement plantings shall be required for tree removals for the purposes of erosion control, groundwater replenishment, visual screening, wildlife habitat, and preventing excessive loss of shade, in accordance with the following criteria:* *i. No tree replacement shall be required for the removal of nonnative species, for the removal of trees which is required for the benefit of remaining trees, or where insufficient planting area exists for a mature tree of the species being considered.* *ii. Replacement tree species shall consist of Sequoia sempervirens (Coast Redwood), Quercus agrifolia (Coast Live Oak), Arbutus menziesii (Madrone), Aesculus californica (California Buckeye), Umbellularia californica (California Bay Laurel), or other tree species acceptable to the Tree Division.* *iii. Replacement trees shall be at least twenty-four (24) inch box size, unless a smaller size is recommended by the arborist, except that three fifteen (15)*			

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gallon size trees may be substituted for each twenty-four (24) inch box size tree where appropriate. *iv. Minimum planting areas must be available on site as follows:* • *For Sequoia sempervirens, three hundred fifteen (315) square feet per tree;* • *For other species listed, seven hundred (700) square feet per tree.* *v. In the event that replacement trees are required but cannot be planted due to site constraints, an in lieu fee in accordance with the City's Master Fee Schedule may be substituted for required replacement plantings, with all such revenues applied toward tree planting in city parks, streets and medians.* *vi. The project applicant shall install the plantings and maintain the plantings until established. The Tree Reviewer of the Tree Division of the Public Works Department may require a landscape plan showing the replacement plantings and the method of irrigation. Any replacement plantings which fail to become established within one year of planting shall be replanted at the project applicant's expense.*			
Section 7.5: Cultural Resources			
SCA CUL-1 (#29): Archaeological and Paleontological Resources- Discovery During Construction Requirement: Pursuant to CEQA Guidelines section 15064.5(f), in the event that any historic or prehistoric subsurface cultural resources are discovered during ground disturbing activities, all work within 50 feet of the resources shall be halted and the project applicant shall notify the City and consult with a qualified archaeologist or paleontologist, as applicable, to assess the significance of the find. In the case of discovery of paleontological resources, the assessment shall be done in accordance with the Society of Vertebrate Paleontology standards. If any find is determined to be significant, appropriate	During construction.	N/A	Bureau of Building

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avoidance measures recommended by the consultant and approved by the City must be followed unless avoidance is determined unnecessary or infeasible by the City. Feasibility of avoidance shall be determined with consideration of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is unnecessary or infeasible, other appropriate measures (e.g., data recovery, excavation) shall be instituted. Work may proceed on other parts of the project site while measures for the cultural resources are implemented. In the event of data recovery of archaeological resources, the project applicant shall submit an Archaeological Research Design and Treatment Plan (ARDTP) prepared by a qualified archaeologist for review and approval by the City. The ARDTP is required to identify how the proposed data recovery program would preserve the significant information the archaeological resource is expected to contain. The ARDTP shall identify the scientific/historic research questions applicable to the expected resource, the data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. The ARDTP shall include the analysis and specify the curation and storage methods. Data recovery, in general, shall be limited to the portions of the archaeological resource that could be impacted by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if nondestructive methods are practicable. Because the intent of the ARDTP is to save as much of the archaeological resource as possible, including moving the resource, if feasible, preparation and implementation of the ARDTP would reduce the potential adverse impact to less than significant. The project applicant shall implement the ARDTP at his/her expense. In the event of excavation of paleontological resources, the project applicant shall submit an excavation			

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plan prepared by a qualified paleontologist to the City for review and approval. All significant cultural materials recovered shall be subject to scientific analysis, professional museum curation, and/or a report prepared by a qualified paleontologist, as appropriate, according to current professional standards and at the expense of the project applicant.			
SCA CUL-2 (#31): Human Remains- Discovery During Construction Requirement: Pursuant to CEQA Guidelines section 15064.5(e)(1), in the event that human skeletal remains are uncovered at the project site during construction activities, all work shall immediately halt and the project applicant shall notify the City and the Alameda County Coroner. If the County Coroner determines that an investigation of the cause of death is required or that the remains are Native American, all work shall cease within 50 feet of the remains until appropriate arrangements are made. In the event that the remains are Native American, the City shall contact the California Native American Heritage Commission (NAHC), pursuant to subdivision (c) of section 7050.5 of the California Health and Safety Code. If the agencies determine that avoidance is not feasible, then an alternative plan shall be prepared with specific steps and timeframe required to resume construction activities. Monitoring, data recovery, determination of significance, and avoidance measures (if applicable) shall be completed expeditiously and at the expense of the project applicant.	During construction.	N/A	Bureau of Building
Section 7.6: Geology and Soils			
SCA GEO-1 (#33): Construction- Related Permit(s) Requirement: The project applicant shall obtain all required construction-related permits/approvals from the City. The project shall comply with all standards, requirements and conditions contained in construction-related codes, including but not limited to the Oakland Building Code and the Oakland Grading Regulations, to ensure structural integrity and safe construction.	Prior to approval of construction-related permit.	Bureau of Building	Bureau of Building

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SCA GEO-2 (#36): Seismic Hazards Zone (Landslide/Liquefaction) Requirement: The project applicant shall submit a site-specific geotechnical report, consistent with California Geological Survey Special Publication 117 (as amended), prepared by a registered geotechnical engineer for City review and approval containing at a minimum a description of the geological and geotechnical conditions at the site, an evaluation of site-specific seismic hazards based on geological and geotechnical conditions, and recommended measures to reduce potential impacts related to liquefaction and/or slope stability hazards. The project applicant shall implement the recommendations contained in the approved report during project design and construction. ***To further implement the SCA The project applicant shall implement all recommended measures from the geotechnical report.***	Prior to approval of construction-related permit.	Bureau of Building	Bureau of Building
The project is also required to comply with **SCA HYD-1 (#45)**, Erosion and Sedimentation Control Plan for Construction; and **SCA HYD-2 (#50)**; NPDES C.3 Stormwater Requirements for Regulation Projects. See Section 7.9, Hydrology and Water Quality, for full descriptions of these SCAs.			
Section 7.7: Greenhouse Gases			
The proposed project is subject to City's SCAs, some of which reduce GHG emissions. These include but are not limited to **SCA TRAN-1 (#71),** Transportation and Parking Demand Management; **SCA UTIL-3 (#74),** Construction and Demolition Waste Reduction and Recycling; and **SCA UTIL-4 (#76),** Recycling Collection and Storage Space. See Section 7.16, Traffic and Transportation, and Section 7.17, Utilities and Service Systems, for full descriptions of these applicable SCAs.			
Section 7.8: Hazards and Hazardous Materials			
SCA HAZ-1 (#40) Hazardous Building Materials and Site Contamination a. *Hazardous Building Materials Assessment* Requirement: The project applicant shall submit a comprehensive assessment report to the Bureau of Building, signed by a qualified environmental professional, documenting the presence or lack thereof of asbestos-containing materials (ACMs), lead-based paint, polychlorinated biphenyls (PCBs), and any other building materials or stored	a. Prior to approval of demolition, grading, or building permits. b. Prior to approval of construction-related permit. c. Prior to approval of construction-related permit. d. During construction.	a. Bureau of Building b. Applicable regulatory agency with jurisdiction c. Bureau of Building d. N/A	a. Burau of Building b. Applicable regulatory agency with jurisdiction c. Bureau of Building d. Bureau of Building

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materials classified as hazardous materials by State or federal law. If lead-based paint, ACMs, PCBs, or any other building materials or stored materials classified as hazardous materials are present, the project applicant shall submit specifications prepared and signed by a qualified environmental professional, for the stabilization and/or removal of the identified hazardous materials in accordance with all applicable laws and regulations. The project applicant shall implement the approved recommendations and submit to the City evidence of approval for any proposed remedial action and required clearances by the applicable local, state, or federal regulatory agency. b. *Environmental Site Assessment Required* Requirement: The project applicant shall submit a Phase I Environmental Site Assessment report, and Phase II Environmental Site Assessment report if warranted by the Phase I report, for the project site for review and approval by the City. The report(s) shall be prepared by a qualified environmental assessment professional and include recommendations for remedial action, as appropriate, for hazardous materials. The project applicant shall implement the approved recommendations and submit to the City evidence of approval for any proposed remedial action and required clearances by the applicable local, state, or federal regulatory agency. c. *Health and Safety Plan Required* Requirement: The project applicant shall submit a Health and Safety Plan for the review and approval by the City in order to protect project construction workers from risks associated with hazardous materials. The project applicant shall implement the approved Plan. d. *Best Management Practices (BMPs) Required for Contaminated Sites* Requirement: The project applicant shall ensure that Best Management Practices (BMPs) are implemented by the contractor during construction to			

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minimize potential soil and groundwater hazards. These shall include the following: i. Soil generated by construction activities shall be stockpiled on-site in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste must be adequately profiled (sampled) prior to acceptable reuse or disposal at an appropriate off-site facility. Specific sampling and handling and transport procedures for reuse or disposal shall be in accordance with applicable local, state, and federal requirements. ii. Groundwater pumped from the subsurface shall be contained on-site in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable laws and policies. Engineering controls shall be utilized, which include impermeable barriers to prohibit groundwater and vapor intrusion into the building.			
SCA HAZ-2 (#39): Hazardous Materials Related to Construction Requirement: The project applicant shall ensure that Best Management Practices (BMPs) are implemented by the contractor during construction to minimize potential negative effects on groundwater, soils, and human health. These shall include, at a minimum, the following: a. Follow manufacture's recommendations for use, storage, and disposal of chemical products used in construction; b. Avoid overtopping construction equipment fuel gas tanks; c. During routine maintenance of construction equipment, properly contain and remove grease and oils; d. Properly dispose of discarded containers of fuels and other chemicals;	During construction.	N/A	Bureau of Building

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e. Implement lead-safe work practices and comply with all local, regional, state, and federal requirements concerning lead (for more information refer to the Alameda County Lead Poisoning Prevention Program); and f. If soil, groundwater, or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), the project applicant shall cease work in the vicinity of the suspect material, the area shall be secured as necessary, and the applicant shall take all appropriate measures to protect human health and the environment. Appropriate measures shall include notifying the City and applicable regulatory agency(ies) and implementation of the actions described in the City's Standard Conditions of Approval, as necessary, to identify the nature and extent of contamination. Work shall not resume in the area(s) affected until the measures have been implemented under the oversight of the City or regulatory agency, as appropriate.			
SCA GEN-1 (#15): Regulatory Permits and Authorizations from Other Agencies The project applicant shall obtain all necessary regulatory permits and authorizations from applicable resource/regulatory agencies including, but not limited to, the Regional Water Quality Control Board, Bay Area Air Quality Management District, Bay Conservation and Development Commission, California Department of Fish and Wildlife, U. S. Fish and Wildlife Service, and Army Corps of Engineers and shall comply with all requirements and conditions of the permits/authorizations. The project applicant shall submit evidence of the	Prior to activity requiring permit/authorization from regulatory agency	Approval by applicable regulatory agency with jurisdiction; evidence of approval submitted to Bureau of Planning	Applicable regulatory agency with jurisdiction

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approved permits/authorizations to the City, along with evidence demonstrating compliance with any regulatory permit/authorization conditions of approval.			
The proposed project is also required to comply with **SCA ADMIN-1 (#13)**, Construction Management Plan. See Section 7.3: Air Quality, for a full description of this applicable SCA.			
Section 7.9: Hydrology and Water Quality			
SCA HYD-1 (#45): Erosion and Sedimentation Control Plan for Construction a. *Erosion and Sedimentation Control Plan Required* Requirement: The project applicant shall submit an Erosion and Sedimentation Control Plan to the City for review and approval. The Erosion and Sedimentation Control Plan shall include all necessary measures to be taken to prevent excessive stormwater runoff or carrying by stormwater runoff of solid materials on to lands of adjacent property owners, public streets, or to creeks as a result of conditions created by grading and/or construction operations. The Plan shall include, but not be limited to, such measures as short-term erosion control planting, waterproof slope covering, check dams, interceptor ditches, benches, storm drains, dissipation structures, diversion dikes, retarding berms and barriers, devices to trap, store and filter out sediment, and stormwater retention basins. Off-site work by the project applicant may be necessary. The project applicant shall obtain permission or easements necessary for off-site work. There shall be a clear notation that the plan is subject to changes as changing conditions occur. Calculations of anticipated stormwater runoff and sediment volumes shall be included, if required by the City. The Plan shall specify that, after construction is complete, the project applicant shall ensure that the storm drain system shall be inspected and that the project applicant shall clear the system of any debris or sediment.	a. Prior to approval of construction-related permit. b. During Construction.	a. Bureau of Building b. N/A	a. N/A b. Bureau of Building

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b. *Erosion and Sedimentation Control During Construction* Requirement: The project applicant shall implement the approved Erosion and Sedimentation Control Plan. No grading shall occur during the wet weather season (October 15 through April 15) unless specifically authorized in writing by the Bureau of Building.			
SCA HYD-2 (#50): NPDES C.3 Stormwater Requirements for Regulated Projects a. *Post-Construction Stormwater Management Plan Required* Requirement: The project applicant shall comply with the requirements of Provision C.3 of the Municipal Regional Stormwater Permit issued under the National Pollutant Discharge Elimination System (NPDES). The project applicant shall submit a Post-Construction Stormwater Management Plan to the City for review and approval with the project drawings submitted for site improvements, and shall implement the approved Plan during construction. The Post-Construction Stormwater Management Plan shall include and identify the following: i. Location and size of new and replaced impervious surface; ii. Directional surface flow of stormwater runoff; iii. Location of proposed on-site storm drain lines; iv. Site design measures to reduce the amount of impervious surface area; v. Source control measures to limit stormwater pollution; vi. Stormwater treatment measures to remove pollutants from stormwater runoff, including the method used to hydraulically size the treatment measures; and vii. Hydromodification management measures, if required by Provision C.3, so that post-project stormwater runoff flow and duration match pre-project runoff. b. *Maintenance Agreement Required* Requirement: The project applicant shall enter into a maintenance agreement	a. Prior to approval of construction-related permit. b. Prior to final building permit.	a. Bureau of Planning; Bureau of Building b. Bureau of Building	a. Bureau of Building b. Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
with the City, based on the Standard City of Oakland Stormwater Treatment Measures Maintenance Agreement, in accordance with Provision C.3, which provides, in part, for the following: i. The project applicant accepting responsibility for the adequate installation/construction, operation, maintenance, inspection, and reporting of any on-site stormwater treatment measures being incorporated into the project until the responsibility is legally transferred to another entity; and ii. Legal access to the on-site stormwater treatment measures for representatives of the City, the local vector control district, and staff of the Regional Water Quality Control Board, San Francisco Region, for the purpose of verifying the implementation, operation, and maintenance of the on-site stormwater treatment measures and to take corrective action if necessary. The maintenance agreement shall be recorded at the County Recorder's Office at the applicant's expense.			
Section 7.10: Land Use and Planning			
There are no SCAs pertaining to land use and planning applicable to the proposed project.			
Section 7.11: Mineral Resources			
There are no SCAs pertaining to mineral resources applicable to the proposed project.			
Section 7.12: Noise			
SCA NOI-1 (#61): Project-Specific Construction Noise Reduction Measures Requirement: The project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction noise impacts. The project applicant shall	Prior to approval of construction-related permit	Bureau of Building	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
implement the approved Plan during construction.			
SCA NOI-2 (#58): Construction Days/Hours Requirement: The project applicant shall comply with the following restrictions concerning construction days and hours: a. Construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except that pier drilling and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m. b. Construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Saturday. In residential zones and within 300 feet of a residential zone, construction activities are allowed from 9:00 a.m. to 5:00 p.m. only within the interior of the building with the doors and windows closed. No pier drilling or other extreme noise generating activities greater than 90 dBA are allowed on Saturday. c. No construction is allowed on Sunday or federal holidays. Construction activities include, but are not limited to, truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area. Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis by the City, with criteria including the urgency/emergency nature of the work, the proximity of residential or other sensitive uses, and a consideration of nearby residents'/occupants' preferences. The project applicant shall notify property owners and occupants located within 300 feet at least 14	During construction.	N/A	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
calendar days prior to construction activity proposed outside of the above days/hours. When submitting a request to the City to allow construction activity outside of the above days/hours, the project applicant shall submit information concerning the type and duration of proposed construction activity and the draft public notice for City review and approval prior to distribution of the public notice.			
SCA NOI-3 (#59): Construction Noise Requirement: The project applicant shall implement noise reduction measures to reduce noise impacts due to construction. Noise reduction measures include, but are not limited to, the following: a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) wherever feasible. b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are	During construction.	N/A	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
available and consistent with construction procedures. c. Applicant shall use temporary power poles instead of generators where feasible. d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.			
SCA NOI-4 (#60): Extreme Construction Noise **a. Construction Noise Management Plan Required** Requirement: Prior to any extreme noise generating construction activities (e.g., pier drilling, pile driving and other activities generating greater than 90dBA), the project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction impacts associated with extreme noise generating activities. The project applicant shall implement the approved Plan during construction. Potential attenuation measures include, but are not limited to, the following: i. Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings; ii. Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one	Prior to approval of construction-related permit and during construction.	Bureau of Building	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions; iii. Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site; iv. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example and implement such measure if such measures are feasible and would noticeably reduce noise impacts; and v. Monitor the effectiveness of noise attenuation measures by taking noise measurements. **b. Public Notification Required** Requirement: The project applicant shall notify property owners and occupants located within 300 feet of the construction activities at least 14 calendar days prior to commencing extreme noise generating activities. Prior to providing the notice, the project applicant shall submit to the City for review and approval the proposed type and duration of extreme noise generating activities and the proposed public notice. The public notice shall provide the estimated start and end dates of the extreme noise generating activities and describe noise attenuation measures to be implemented.			
SCA NOI-5 (#62): Construction Noise Complaints Requirement: The project applicant shall submit to the City for review and	Prior to approval of construction-related permits.	Bureau of Building	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
approval a set of procedures for responding to and tracking complaints received pertaining to construction noise, and shall implement the procedures during construction. At a minimum, the procedures shall include: a. Designation of an on-site construction complaint and enforcement manager for the project; b. A large on-site sign near the public right-of-way containing permitted construction days/hours, complaint procedures, and phone numbers for the project complaint manager and City Code Enforcement unit; c. Protocols for receiving, responding to, and tracking received complaints; and Maintenance of a complaint log that records received complaints and how complaints were addressed, which shall be submitted to the City for review upon the City's request.			
SCA NOI-6 (#64): Operational Noise Requirement: Noise levels from the project site after completion of the project (i.e., during project operation) shall comply with the performance standards of chapter 17.120 of the Oakland Planning Code and chapter 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.	Ongoing.	N/A	Bureau of Building
SCA NOI-7 (#63): Exposure to Community Noise Requirement: The project applicant shall submit a Noise Reduction Plan prepared by a qualified acoustical engineer for City review and approval that contains noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level in accordance with the land use compatibility guidelines of the Noise Element of the Oakland General Plan. The applicant shall implement the	Prior to approval of construction-related permit.	Bureau of Planning	Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
approved Plan during construction. To the maximum extent practicable, interior noise levels shall not exceed the following: a. 45 dBA: Residential activities, civic activities, hotels b. 50 dBA: Administrative offices; group assembly activities c. 55 dBA: Commercial activities d. 65 dBA: Industrial activities.			
Section 7.13: Population and Housing			
There are no SCAs pertaining to population and housing applicable to the proposed project.			
Section 7.14: Public Services			
There are no SCAs pertaining to public services applicable to the proposed project.			
Section 7.15: Recreation			
There are no SCAs pertaining to recreation applicable to the proposed project.			
Section 7.16: Traffic and Transportation			
SCA TRAN-1 (#71): Transportation and Parking Demand Management a. *Transportation and Parking Demand Management (TDM) Plan Required* <u>Requirement</u>: The project applicant shall submit a Transportation and Parking Demand Management (TDM) Plan for review and approval by the City. i. The goals of the TDM Plan shall be the following: • Reduce vehicle traffic and parking demand generated by the project to the maximum extent practicable, consistent with the potential traffic and parking impacts of the project. • Achieve the following project vehicle trip reductions (VTR): o Projects generating 50-99 net new a.m. or p.m. peak hour vehicle trips: 10 percent VTR o Projects generating 100 or more net new a.m. or	a. Prior to approval of construction-related permit b. Prior to final building permit. c. Ongoing.	a. Bureau of Planning b. Bureau of Building c. Bureau of Planning	a. N/A b. Bureau of Building c. Bureau of Planning

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
p.m. peak hour vehicle trips: 20 percent VTR • Increase pedestrian, bicycle, transit, and carpool/vanpool modes of travel. All four modes of travel shall be considered, as appropriate. • Enhance the City's transportation system, consistent with City policies and programs. ii. TDM strategies to consider include, but are not limited to, the following: • Inclusion of additional long-term and short-term bicycle parking that meets the design standards set forth in chapter five of the Bicycle Master Plan and the Bicycle Parking Ordinance (chapter 17.117 of the Oakland Planning Code), and shower and locker facilities in commercial developments that exceed the requirement. • Construction of and/or access to bikeways per the Bicycle Master Plan; construction of priority bikeways, on-site signage and bike lane striping. • Installation of safety elements per the Pedestrian Master Plan (such as crosswalk striping, curb ramps, count down signals, bulb outs, etc.) to encourage convenient and safe crossing at arterials, in addition to safety elements required to address safety impacts of the project. • Installation of amenities such as lighting, street trees, and trash receptacles per the Pedestrian Master Plan and any applicable streetscape plan. • Construction and development of transit			

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
stops/shelters, pedestrian access, way finding signage, and lighting around transit stops per transit agency plans or negotiated improvements. • Direct on-site sales of transit passes purchased and sold at a bulk group rate (through programs such as AC Transit Easy Pass or a similar program through another transit agency). • Provision of a transit subsidy to employees or residents, determined by the project applicant and subject to review by the City, if employees or residents use transit or commute by other alternative modes. • Provision of an ongoing contribution to transit service to the area between the project and nearest mass transit station prioritized as follows: 1) Contribution to AC Transit bus service; 2) Contribution to an existing area shuttle service; and 3) Establishment of new shuttle service. The amount of contribution (for any of the above scenarios) would be based upon the cost of establishing new shuttle service (Scenario 3). • Guaranteed ride home program for employees, either through 511.org or through separate program. • Pre-tax commuter benefits (commuter checks) for employees. • Free designated parking spaces for on-site car-sharing program (such as City Car Share, Zip Car, etc.) and/or car-share membership for employees or tenants.			

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
• On-site carpooling and/or vanpool program that includes preferential (discounted or free) parking for carpools and vanpools. • Distribution of information concerning alternative transportation options. • Parking spaces sold/leased separately for residential units. Charge employees for parking, or provide a cash incentive or transit pass alternative to a free parking space in commercial properties. • Parking management strategies including attendant/valet parking and shared parking spaces. • Requiring tenants to provide opportunities and the ability to work off-site. • Allow employees or residents to adjust their work schedule in order to complete the basic work requirement of five eight-hour workdays by adjusting their schedule to reduce vehicle trips to the worksite (e.g., working four, ten-hour days; allowing employees to work from home two days per week). • Provide or require tenants to provide employees with staggered work hours involving a shift in the set work hours of all employees at the workplace or flexible work hours involving individually determined work hours. The TDM Plan shall indicate the estimated VTR for each strategy, based on published research or guidelines where feasible. For TDM Plans containing ongoing operational VTR strategies, the Plan shall include an ongoing monitoring and enforcement program to ensure the Plan is implemented on an ongoing basis			

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
during project operation. If an annual compliance report is required, as explained below, the TDM Plan shall also specify the topics to be addressed in the annual report. b. *TDM Implementation – Physical Improvements* Requirement: For VTR strategies involving physical improvements, the project applicant shall obtain the necessary permits/approvals from the City and install the improvements prior to the completion of the project. c. *TDM Implementation – Operational Strategies* Requirement: For projects that generate 100 or more net new a.m. or p.m. peak hour vehicle trips and contain ongoing operational VTR strategies, the project applicant shall submit an annual compliance report for the first five years following completion of the project (or completion of each phase for phased projects) for review and approval by the City. The annual report shall document the status and effectiveness of the TDM program, including the actual VTR achieved by the project during operation. If deemed necessary, the City may elect to have a peer review consultant, paid for by the project applicant, review the annual report. If timely reports are not submitted and/or the annual reports indicate that the project applicant has failed to implement the TDM Plan, the project will be considered in violation of the Conditions of Approval and the City may initiate enforcement action as provided for in these Conditions of Approval. The project shall not be considered in violation of this Condition if the TDM Plan is implemented but the VTR goal is not achieved.			
SCA TRAN-2 (#68): Construction Activity in the Public Right-of-Way a. *Obstruction Permit Required* Requirement: The project applicant shall obtain an obstruction permit from the City prior to placing any temporary	a. Prior to approval of construction related permit. b. Prior to approval of	a. Bureau of Building b. Public Works Department, Transportation	a. Bureau of Building b. Bureau of Building

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
construction-related obstruction in the public right-of-way, including City streets and sidewalks. b. *Traffic Control Plan Required* Requirement: In the event of obstructions to vehicle or bicycle travel lanes, the project applicant shall submit a Traffic Control Plan to the City for review and approval prior to obtaining an obstruction permit. The project applicant shall submit evidence of City approval of the Traffic Control Plan with the application for an obstruction permit. The Traffic Control Plan shall contain a set of comprehensive traffic control measures for auto, transit, bicycle, and pedestrian detours, including detour signs if required, lane closure procedures, signs, cones for drivers, and designated construction access routes. The project applicant shall implement the approved Plan during construction. c. *Repair of City Streets* Requirement: The project applicant shall repair any damage to the public right-of way, including streets and sidewalks caused by project construction at his/her expense within one week of the occurrence of the damage (or excessive wear), unless further damage/excessive wear may continue; in such case, repair shall occur prior to approval of the final inspection of the construction-related permit. All damage that is a threat to public health or safety shall be repaired immediately.	construction related permit. c. Prior to final building permit.	Services Division c. N/A	c. Bureau of Building
SCA TRAN-3 (#69): Bicycle Parking Requirement: The project applicant shall comply with the City of Oakland Bicycle Parking Requirements (chapter 17.118 of the Oakland Planning Code). The project drawings submitted for construction-related permits shall demonstrate compliance with the requirements.	Prior to approval of construction-related permit.	Bureau of Planning	Bureau of Building
Section 7.17: Utilities and Service Systems			
SCA UTIL-1 (#79): Sanitary Sewer System Requirement: The project applicant shall prepare and submit a Sanitary Sewer Impact Analysis to the City for review and	Prior to approval of construction-related permit.	Public Works Department, Department of	N/A

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
approval in accordance with the City of Oakland Sanitary Sewer Design Guidelines. The Impact Analysis shall include an estimate of pre-project and post-project wastewater flow from the project site. In the event that the Impact Analysis indicates that the net increase in project wastewater flow exceeds City-projected increases in wastewater flow in the sanitary sewer system, the project applicant shall pay the Sanitary Sewer Impact Fee in accordance with the City's Master Fee Schedule for funding improvements to the sanitary sewer system.		Engineering and Construction	
SCA UTIL-2 (#80): Storm Drain System Requirement: The project storm drainage system shall be designed in accordance with the City of Oakland's Storm Drainage Design Guidelines. To the maximum extent practicable, peak stormwater runoff from the project site shall be reduced by at least 25 percent compared to the pre-project condition.	Prior to approval of construction-related permit.	Bureau of Building	Bureau of Building
SCA UTIL-3 (#74): Construction and Demolition Waste Reduction and Recycling Requirement: The project applicant shall comply with the City of Oakland Construction and Demolition Waste Reduction and Recycling Ordinance (chapter 15.34 of the Oakland Municipal Code) by submitting a Construction and Demolition Waste Reduction and Recycling Plan (WRRP) for City review and approval, and shall implement the approved WRRP. Projects subject to these requirements include all new construction, renovations/alterations/modifications with construction values of $50,000 or more (except R-3 type construction), and all demolition (including soft demolition) except demolition of type R-3 construction. The WRRP must specify the methods by which the project will divert construction and demolition debris waste from landfill disposal in accordance with current City requirements. The WRRP may be submitted electronically at www.greenhalosystems.com or manually at the City's Green Building Resource Center. Current standards, FAQs, and	Prior to approval of construction-related permit.	Public Works Department, Environmental Services Division	Public Works Department, Environmental Services Division

Standard Conditions of Approval	When Required	Initial Approval	Monitoring/ Inspection
forms are available on the City's website and in the Green Building Resource Center.			
SCA UTIL-4 (#76): Recycling Collection and Storage Space Requirement: The project applicant shall comply with the City of Oakland Recycling Space Allocation Ordinance (chapter 17.118 of the Oakland Planning Code). The project drawings submitted for construction-related permits shall contain recycling collection and storage areas in compliance with the Ordinance. For residential projects, at least two cubic feet of storage and collection space per residential unit is required, with a minimum of ten cubic feet. For nonresidential projects, at least two cubic feet of storage and collection space per 1,000 square feet of building floor area is required, with a minimum of ten cubic feet.	Prior to approval of construction-related permit.	Bureau of Planning	Bureau of Building
SCA UTIL-5 (#75): Underground Utilities Requirement: The project applicant shall place underground all new utilities serving the project and under the control of the project applicant and the City, including all new gas, electric, cable, and telephone facilities, fire alarm conduits, street light wiring, and other wiring, conduits, and similar facilities. The new facilities shall be placed underground along the project's street frontage and from the project structures to the point of service. Utilities under the control of other agencies, such as PG&E, shall be placed underground if feasible. All utilities shall be installed in accordance with standard specifications of the serving utilities.	During construction.	N/A	Bureau of Building
The proposed project is also required to comply with **SCA HYD-1 (#45)**, Erosion and Sedimentation Control Plan for Construction; and **HYD-2 (#50)**, NPDES C.3 Stormwater Requirements for Regulation Projects. See Section 7.9, Hydrology and Water Quality, for full descriptions of these applicable SCAs.			

ATTACHMENT B

ATTACHMENT B: PROJECT CONSISTENCY WITH COMMUNITY PLANS OR ZONING, PER CEQA GUIDELINES SECTION 15183

Section 15183(a) of the California Environmental Quality Act (CEQA) Guidelines states that "projects which are consistent with the development density established by the existing zoning, community plan, or general plan policies for which an Environmental Impact Report (EIR) was certified shall not require additional environmental review, except as may be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site."

Project: The proposed project is located in the City of Oakland General Plan area. It includes construction of a three-story education center that provides education to a kindergarten through eighth (K-8th) grade public charter school. The proposed project would include construction of a three-story campus building with a total floor area of 48,559 square feet. The first floor area would be 18,297 square feet and would include kindergarten through second grade classrooms, as well as a multi-purpose room, kitchen, storage areas, and reception/front offices, and restrooms; the second floor area would be 15,744 square feet and would include third through fifth grade classrooms, administrative offices, restrooms, storage areas, art classroom, group activities room, teacher lounge, reading room, learning center, storage, and restrooms; and, the third floor area would be 11,901 square feet and would include sixth through eighth grade classrooms, administrative offices, elective flex space, science lab, restrooms, and an exterior recreation area. The third-floor rooftop outdoor recreation area would be 2,617 square feet. In addition to the three-story structure, the proposed project would include a 9,500 square-foot outdoor play/recreation area; complete with a green live-wall, play structure, and synthetic turf area, a 3,013 square-foot multi-purpose room, and the 2,617 square-foot rooftop outdoor recreation area. At full capacity, the proposed project would accommodate no more than 620 K-8th grade students and a staff of up to 51 employees. The proposed education center building would be constructed at a maximum height of 49 feet. The proposed project would require a Major Conditional Use Permit (CUP).

Project Consistency

The City of Oakland completed an update of the General Plan Land Use and Transportation Element (LUTE) in March 1998. The LUTE includes the City's current Land Use and Transportation Diagram as well as strategies, policies, and priorities for Oakland's development and enhancement during a two-decade period. The EIR certified for the LUTE is used to simplify the task of preparing environmental documents on later projects that occur as a result of LUTE implementation. Cumulative environmental effects identified in the LUTE's EIR as (a) significant and unavoidable or (b) significant but can be reduced to less than significant through mitigation, are limited to the following topics: aesthetics/winds, cultural resources, hazards/hazardous materials, land use/planning, transportation/circulation, population/housing, and public services. The following analysis provides substantial evidence to support a conclusion that the proposed project qualifies for an exemption under CEQA Guidelines Section 15183 as a project consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified.

Criterion §15183(a): General Plan & Zoning Consistency

Yes	No	
☒	☐	**The Project is consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified.**

General Plan-- Land Use and Transportation Element

The project site is largely designated as Mixed Housing Type Residential while a small portion at the southern boundary of the site closer to International Boulevard is designated as Community Commercial.

The Mixed Housing Type Residential classification is intended to create, maintain and enhance residential areas typically near the City's major arterials and characterized by a mix of single-family homes, townhouses, small multi-unit buildings and neighborhood businesses where appropriate. Future development within this classification should be primarily residential in character, with live-work types of development, and small commercial enterprises, schools and other small civic uses in appropriate locations.

The Community Commercial classification is intended to identify, create, maintain and enhance areas suitable for a wide variety of commercial and institutional operations along the City's major corridors and in shopping districts or centers. The desired character may include neighborhood center uses and larger scale retail and commercial uses, such as auto elated business, business and personal services, health services and medical uses, educational facilities, and entertainment uses.

Central City East Redevelopment Plan

The City certified the EIR for the Central City East Redevelopment Plan (CCERP) in April 2003. While the redevelopment areas are dissolved (Assembly Bill No. 26) the plan still remains applicable. The CCERP is intended to be consistent with and assist in further implementation of specific improvement strategies identified in the LUTE for each subarea within the CCERP Area. The project site lies within the Fruitvale Subarea. The CCERP strategies as contained in the LUTE are intended to strengthen multiple-unit neighborhoods and preserve maintain and strengthen single family areas through zoning, housing rehabilitation, and code enforcement. These strategies also include bringing vacant and underutilized properties back into productive use to increase employment opportunities and improve economic vitality. The proposed project includes development of a school that would revitalize underutilized parcels as well as create employment opportunities. The primary policies regarding development and redevelopment within the CCERP Area are included in LUTE.

1. **The Project is aligned with policies set forth in the LUTE and CCERP as listed below:**

   - **Policy N1.8** Making Compatible Development. The height and bulk of commercial development in "Neighborhood Mixed-Use Center" and "Community Commercial" areas should be compatible with that which is allowed for residential development.
   - **Policy N3.2 Encouraging Infill Development.** In order to facilitate the construction of needed housing units, infill development that is consistent with the General Plan should take place throughout the City of Oakland.
   - **Policy N12.2 Making Schools Available.** Adequate public school capacity should be available to meet the needs of Oakland's growing community. The City and the Oakland Unified School District (OUSD) should work together to establish a continuing procedure for coordinating residential and commercial development and exploring residential and commercial development and exploring the imposition of mutually agreed upon reasonable and feasible strategies to provide for adequate school capacity. The City and

OUSD should jointly consider where feasible and appropriate, finding mechanisms such as assessment districts, Redevelopment Agency funding (AB 1290), use of surplus, City owned land, bond issues, and adjacent or shared use of land or school facilities with recreation, libraries, child care and other public uses.

The proposed project is consistent with the above General Plan policies for the following reasons:

- The proposed project would be generally compatible with the surrounding land uses that include a mix of medical building, multi-family residential, and commercial land uses. The proposed project would result in a taller structure (subject to a Variance) than allowed under the zoning ordinance, however, there are two- to four-story buildings adjacent to the project site.
- The project site is currently vacant lots and underutilized. The proposed project would not provide infill housing, but it would result in utilization of an infill parcel for a public charter school that complies with the City's design standards and respects the surrounding streetscape, as specified in the Planning Code, and subject to the City's design review process.
- The proposed project would develop a public charter school and would be consistent with this policy of accommodating Oakland's growing community.

2. The Project is consistent with the development density established by existing Zoning, Community Plan or General Plan policies.

The proposed project would require a Major Conditional Use Permit (CUP) to build a non-residential development over 25,000 square feet (48,559 square feet of floor area) on 38,700 square foot (0.88 acre) site as required by Chapter 17.134 of the Municipal Code. The proposed project would require Minor Variances to exceed the maximum height of 35 feet (45-foot roof height and 49-foot parapet height) and exceed the maximum fence height of 8 feet (up to 23-foot green live-wall height).

The project site is zoned Mixed Housing Type Residential District -4 (RM-4). The intent of the RM-4 Zone is to create, maintain, and enhance residential areas typically located on or near the City's major arterials and characterized by a mix of single family homes, townhouses, small multi-unit buildings at somewhat higher densities than RM-3, and neighborhood businesses where appropriate. An educational use in this District is conditionally permitted.

The proposed project would be consistent with the development density/intensity in the Planning Code for RM-4 Zone upon approval of a CUP. The height limit for RM-4 zone is 35 feet. The proposed project would require a variance to exceed the 35 feet height. The increased height would be compatible with the surrounding land uses as there are two to six story structures in the project area.

Therefore, the proposed project adheres to the criteria of CEQA Guidelines Section 15183(a) as being consistent with both the General Plan and applicable zoning regulations for the site. Since the proposed project is consistent with the development assumptions for the site as provided under the LUTE EIR and CCERP, the proposed project's potential contribution to cumulatively significant effects has already been addressed in these prior EIRs.

Therefore, the proposed project is eligible for consideration of an exemption under California Public Resources Code Section 21083.3 and Section 15183 of the CEQA Guidelines; the proposed project is consistent with existing zoning, community plan or General Plan policies for which an EIR was certified (i.e., the LUTE and CCERP), and the proposed project qualifies as a Project Consistent with a Community Plan or Zoning pursuant to CEQA Guidelines Section 15183.

ATTACHMENT C

ATTACHMENT C: INFILL PERFORMANCE STANDARDS PER CEQA GUIDELINES SECTION 15183.3

Based on California Environmental Quality Act (CEQA) Guidelines Section 15183.3(d)(1), the Lead Agency must examine an eligible infill project in light of the prior EIR to determine whether the infill project would cause any effects that require additional review under CEQA. This evaluation shall:

a) Document whether the infill project satisfies the applicable performance standards in Appendix M.

b) Explain whether the effects of the infill project were analyzed in a prior Environmental Impact Report (EIR).

c) Explain whether the infill project will cause new specific effects (defined as "an effect that was not addressed in the prior EIR and that is specific to the infill project or the infill project site").

d) Explain whether substantial new information shows that the adverse environmental effects of the infill project are more significant (defined as "substantially more severe") than described in the prior EIR.

e) If the infill project will cause new specific effects or more significant effects, the evaluation should indicate whether uniformly applicable development policies or standards will substantially mitigate those effects.

The following information demonstrates that the proposed project is eligible for permit streamlining pursuant to CEQA Guidelines Section 15183.3 as a qualified infill project, and fulfills the review requirements of its provisions.

Appendix M Performance Standards

The following analysis demonstrates that the proposed project is located in an urban area on a site that has been previously developed; satisfies the performance standards provided in CEQA Guidelines Appendix M; and is consistent with the General Plan land use designation, density, building intensity and applicable policies. As such, this environmental review is limited to an assessment of whether the proposed project may cause any project-specific effects, and relies on uniformly applicable development policies or standards to substantially mitigate cumulative effects.

Project Infill Eligibility		
CEQA Eligibility Criteria		**Eligible / Notes for Proposed Project**
1	Be located in an urban area on a site that either has been previously developed or that adjoins existing qualified urban uses on at least seventy-five percent of the site's perimeter. For the purpose of this subdivision "adjoin" means the infill project is immediately adjacent to qualified urban uses, or is only separated from such uses by an improved public right-of-way?	**Yes.** The project site is located in an urban area of Oakland and consists of existing parking lot. The project site is surrounded by medical buildings by a variety of urban land uses, which include a medical and multi-family residential building to the north, commercial and medical buildings to the south, multi-family residential and medical uses to the west, and multi-family residential to the east.
2	Satisfy the performance standards provided in Appendix M. (CEQA Guidelines Section 15183.3[b][2]) as presented in 2a and 2b below)	
2a	*2a Performance Standards Related to Project Design. All Projects must implement all of the following:*	
	Non-Residential Projects. All nonresidential Projects shall include onsite renewable power generation, such as solar photovoltaic, solar thermal, and wind power generation, or clean back-up power supplies, where feasible. **Residential Projects.** Residential Projects are also encouraged to include such onsite renewable power generation	**Yes.** The proposed project would include a renewable energy component that could consist of but not limited to rooftop solar, and/or solar site parking lot lamps, and/or an onsite battery energy storage system. Additionally, the proposed project would meet the strict energy efficiency requirements of California's Title 24 (CALGreen) Building Code (Chapter 5 for non-residential uses), and Title 18 of the City's Building Construction Code for green buildings. These policies and implementation programs encourage energy efficient technologies in new construction and support the goals similar to renewable and alternative energy sources. The proposed project is also subject to the State licensing process and the project design of the school is licensed by Division of the State Architect (DSA); design requirements are set forth by DSA.
	Soil and Water Remediation. If the Project site is included on any list compiled pursuant to Section 65962.5 of the Government Code, the Project shall document how it has remediated the site, if remediation is completed. Alternatively, the Project shall implement the recommendations provided in a preliminary endangerment assessment or comparable document that identifies remediation appropriate for the site.	**Yes.** A Preliminary Environmental Assessment (PEA) was prepared for the site that concluded that Department of Toxic Substance Control's (DTSC's) Removal Action Workplan (RAW) process would need to be completed prior to redevelopment of the Site. On September 6, 2016, Aspire Public Schools executed a School Cleanup Agreement with DTSC for review and approval of a RAW. Construction of the proposed project is subject to implementation of the RAW. A RAW was prepared November 10, 2016, and approved by DTSC on June 30, 2017. The RAW presents removal action objectives, evaluates alternatives, and describes the

Project Infill Eligibility		
CEQA Eligibility Criteria		**Eligible / Notes for Proposed Project**
		proposed alternative for the project site. In compliance with CEQA exemption, DTSC has prepared a Notice of Exemption having determined that the proposed project, after implementing the RAW has no potential for a significant impact on the environment. The RAW describes the nature and extent of chemicals of concern, and remedial alternatives and is included as Attachment C.
	Residential Units Near High-Volume Roadways and Stationary Sources. If a Project includes residential units located within 500 feet, or other distance determined to be appropriate by the local agency or air district based on local conditions, of a high volume roadway or other significant sources of air pollution, the Project shall comply with any policies and standards identified in the local general plan, specific plan, zoning code, or community risk reduction plan for the protection of public health from such sources of air pollution. If the local government has not adopted such plans or policies, the Project shall include measures, such as enhanced air filtration and Project design, that the lead agency finds, based on substantial evidence, will promote the protection of public health from sources of air pollution. Those measures may include, among others, the recommendations of the California Air Resources Board, air districts, and the California Air Pollution Control Officers Association.	**Not Applicable.**
2b	*Additional Performance Standards by Project Type. In addition to implementing all the features described in criterion 2a above, the Project must meet eligibility requirements provided below by Project type.*	
	Residential. A residential Project must meet one of the following: A. Projects achieving below average regional per capita vehicle miles traveled. A residential Project is eligible if it is located in a "low vehicle travel area" within the region; B. Projects located within ½ mile of an Existing Major Transit Stop or High Quality Transit Corridor. A residential Project is eligible if it is located within ½ mile of an existing major transit stop or an existing stop along a high quality transit corridor (A major transit stop is defined as "a site containing... the intersection	**Not Applicable.**

Project Infill Eligibility		
CEQA Eligibility Criteria		**Eligible / Notes for Proposed Project**
	of two or more major bus routes with frequencies of service intervals of 15 minutes or less during the morning and afternoon peak commute periods"); or C. Low – Income Housing. A residential or mixed-use Project consisting of 300 or fewer residential units all of which are affordable to low income households is eligible if the developer of the development Project provides sufficient legal commitments to the lead agency to ensure the continued availability and use of the housing units for lower income households, as defined in Section 50079.5 of the Health and Safety Code, for a period of at least 30 years, at monthly housing costs, as determined pursuant to Section 50053 of the Health and Safety Code.	
	Commercial/Retail. A commercial/retail Project must meet one of the following: A. Regional Location. A commercial Project with no single-building floor-plate greater than 50,000 square feet is eligible if it locates in a "low vehicle travel area"; or B. Proximity to Households. A Project with no single building floor-plate greater than 50,000 square feet located within ½ mile of 1,800 households is eligible.	**Not Applicable.**
	Office Building. An office building Project must meeting one of the following: A. Regional Location. Office buildings, both commercial and public, are eligible if they locate in a low vehicle travel area; or B. Proximity to a Major Transit Stop. Office buildings, both commercial and public, within ½ mile of an existing major transit stop, or ¼ mile of an existing stop along a high quality transit corridor, are eligible.	**Not Applicable.**
	Schools. Elementary schools within 1 mile of 50 percent of the Projected student population are eligible. Middle schools and high schools within 2 miles of 50 percent of the Projected student population are eligible. Alternatively, any school within ½ mile of an existing major transit stop or an existing stop along a high quality transit corridor is eligible. Additionally, to be eligible, all schools shall provide parking and storage for bicycles and scooters, and	As discussed in Eligibility Criterion 2 above, a PEA was prepared for the project site that concluded that DTSC's RAW process would need to be completed prior to redevelopment of the site. A RAW was prepared November 10, 2016, and approved by DTSC on June 30, 2017. The RAW presents removal action objectives, evaluates alternatives, and describes the proposed alternative for the project site. In compliance with CEQA exemption, DTSC has prepared a

Project Infill Eligibility		
CEQA Eligibility Criteria		**Eligible / Notes for Proposed Project**
	shall comply with the requirements of Sections 17213, 17213.1, and 17213.2 of the California Education Code.	Notice of Exemption having determined that the proposed project after implementing the RAW has no potential for a significant impact on the environment. The RAW is included as Attachment C. In the City of Oakland, the biggest challenge facing the Oakland Unified School District (OUSD) is to find available land in appropriate areas to serve residents. Existing school facilities are already overcrowded, contributing to a cumulatively considerable classroom capacity deficit. The proposed project would bring a new K-8th public charter school to the area which would serve residents in the local neighborhood and reduce impacts to existing OUSD school facilities. Additionally, the proposed project is located within the Fruitvale/International Transit Priority Area, and located within 0.50 mile of the Fruitvale BART Station, which offers regional transit service (Figure 2.0-3). The proposed project provides 36 short-term bicycle parking spots and 31 long-term bicycle parking spots, as required in Chapter 17.117 of the Oakland Municipal Code.
	Transit. Transit stations, as defined in Section 15183.3(e)(1), are eligible.	**Not Applicable.**
	Small Walkable Community Projects. Small walkable community Projects, as defined in Section 15183.3, subdivision (f)(5), that implement the Project features in 2a above are eligible.	**Not Applicable.**
3	Be consistent with the general use designation, density, building intensity, and applicable policies specified for the Project area in either a sustainable communities strategy or an alternative planning strategy, except as provided in CEQA Guidelines Sections 15183.3(b)(3)(A) or (b)(3)(B). (CEQA Guidelines Section 15183.3[b][3])?	**Yes.** The adopted Plan Bay Area (2017) serves as the sustainable communities strategy for the Bay Area, per Senate Bill 375. Plan Bay Area identified Priority Development Areas (PDAs), where new development will support the needs of residents and workers in a pedestrian-friendly environment served by transit. As identified in the Oakland Housing Element 2015–2023, the project site is located within the Fruitvale and Diamond Area Priority Development Area. The General Plan land use designation for the site is Mixed Housing Type Residential, with a small portion of the site at the southern boundary designated Community Commercial. Future development within the Mixed Housing Type Residential designation should be primarily residential in character, with live-work types of development,

Project Infill Eligibility		
CEQA Eligibility Criteria		**Eligible / Notes for Proposed Project**
		and small commercial enterprises, schools, and other small civic uses in appropriate locations. The desired character of uses within the Community Commercial designation includes neighborhood center uses and larger scale retail and commercial uses, such as auto related business, business and personal services, health services and medical uses, educational facilities, and entertainment uses. The proposed project would be consistent with both land use designations.

ATTACHMENT D

Aspire ERES Academy
International Boulevard Project-
Air Quality and Greenhouse Gas
Technical Report

City of Oakland, California

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March 12, 2018

Sign-off Sheet

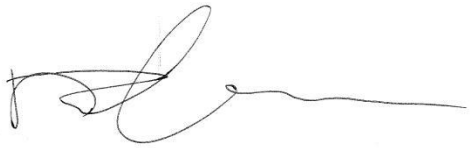
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ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
ARB	California Air Resources Board
AQP	Air Quality Plan
BAAQMD	Bay Area Air Quality Management District
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
EPA	Environmental Protection Agency
FCAA	Federal Clean Air Act
GHG	Greenhouse gas
MTC	Metropolitan Transportation Commission
N_2O	Nitrous oxide
NO_x	Nitrogen Oxides
O_3	Ozone
Pb	Lead
PM_{10}, $PM_{2.5}$	Particulate matter SO_2
SCA	Standard Conditions of Approval
SFBAAB	San Francisco Bay Area Air Basin
SO_2	Sulfur dioxide
TACs	Toxic Air Contaminants

1.0 EXECUTIVE SUMMARY

1.1 PURPOSE AND METHODS OF ANALYSIS

The following air quality and greenhouse gas (GHG) analysis was prepared to evaluate whether the estimated criteria air pollutant and GHG emissions generated from the Aspire ERES Academy International Boulevard Project (project) would cause significant impacts to air resources in the project area. This assessment was conducted within the context of the California Environmental Quality Act (CEQA, California Public Resources Code Sections 21000, et seq.). The methodology follows the CEQA Air Quality Guidelines prepared by the Bay Area Air Quality Management District (BAAQMD) for quantification of emissions and evaluation of potential impacts to air resources (BAAQMD 2010). Methodology for air quality and greenhouse gas impacts, as set forth in the BAAQMD's Guidelines are utilized in this analysis. The 2010 Guidelines provide the most up to date methodology for evaluating air quality and greenhouse gas impacts. The assessment and dispersion modeling methodologies used in the preparation of this report included all relevant and appropriate procedures developed by the US Environmental Protection Agency (EPA) and the latest guidance on conducting health risk assessments from OEHHA (2015).

1.2 PROJECT DESCRIPTION AND LOCATION

Aspire Public Schools proposes to construct a new 620-student charter school for kindergarten through 8th grade on an approximately 0.88-acre site that is located at 2956 International Boulevard in the City of Oakland, California. The project includes a 3-story classroom building with an associated parking lot, landscaping, and play area. The building square footage is 44,186 square feet with an additional classroom and corridor comprising an additional 1,258 square feet and a rooftop deck of 2,490 square feet. In order to provide a conservative estimate of air quality and greenhouse gas impacts 50,000 square feet of building was used in the analysis.

The site is currently occupied by paved parking areas, and a 2-story multi-unit residential building. The proposed school site will be bounded to the north by Fruitvale Health Care Center Nursing Home, to the east by Derby Avenue, to the south by a multi-story office building and parking lot, and to the west by an apartment complex and a historic house museum (Cohen-Bray House). The project site is about 600 feet northeast of an elevated Bay Area Rapid Transit (BART) light rail line along East 12th Street and approximately 1,000 feet northeast of an Amtrak and Union Pacific (UP) railroad right-of-way.

1.3 RESULTS SUMMARY

The following is a summary of the analysis results. As shown below, the project would result in less than significant impacts for all air quality and greenhouse gas (GHG) impact criteria analyzed.

Impact AIR-1: The project would not conflict with or obstruct implementation of the applicable air quality plan. **Less Than Significant.**

Impact AIR-2: The project would not violate air quality standards or contribute substantially to an existing or projected air quality violation. **Less Than Significant Impact.**

Impact AIR-3: The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors). **Less Than Significant Impact.**

Impact AIR-4: The project would not expose sensitive receptors to substantial pollutant concentrations. **Less Than Significant.**

Impact AIR-5: The project would not create objectionable odors affecting a substantial number of people. **Less Than Significant Impact.**

Impact GHG-1: The project would not generate direct or indirect greenhouse gas emissions that would result in a significant impact on the environment. **Less Than Significant Impact.**

Impact GHG-2: The project would not conflict with any applicable plan, policy or regulation of an agency adopted to reduce the emissions of greenhouse gases. **Less Than Significant Impact.**

1.4 STANDARD CONDITIONS

The following City of Oakland Standard Conditions of Approval (SCA)– General Administrative Conditions of Approval would apply to the project. The project would comply with the Standard Conditions of Approval and no additional measures are required.

Table 1: City of Oakland Standard Conditions of Approval

Condition #	Name	Requirement
13	Construction Management Plan	Prior to the issuance of the first construction-related permit, the project applicant and his/her general contractor shall submit a Construction Management Plan (CMP) for review and approval by the Bureau of Planning, Bureau of Building, and other relevant City departments such as the Fire Department and the Public Works Department as directed. The CMP shall contain measures to minimize potential construction impacts including measures to comply

Condition #	Name	Requirement
		with all construction-related Conditions of Approval (and mitigation measures if applicable) such as dust control, construction emissions, hazardous materials, construction days/hours, construction traffic control, waste reduction and recycling, stormwater pollution prevention, noise control, complaint management, and cultural resource management (see applicable Conditions below). The CMP shall provide project-specific information including descriptive procedures, approval documentation, and drawings (such as a site logistics plan, fire safety plan, construction phasing plan, proposed truck routes, traffic control plan, complaint management plan, construction worker parking plan, and litter/debris clean-up plan) that specify how potential construction impacts will be minimized and how each construction-related requirement will be satisfied throughout construction of the project.
19	Construction-Related Air Pollution Controls (Dust and Equipment Emissions)	Requirement: The project applicant shall implement all of the following applicable air pollution control measures during construction of the project: a. Water all exposed surfaces of active construction areas at least twice daily. Watering should be sufficient to prevent airborne dust from leaving the site. Increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour. Reclaimed water should be used whenever feasible. b. Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer). c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. d. Pave all roadways, driveways, sidewalks, etc. within one month of site grading or as soon as feasible. In addition, building pads should be laid within one month of grading or as soon as feasible unless seeding or soil binders are used. e. Enclose, cover, water twice daily, or apply (non-toxic) soil stabilizers to exposed stockpiles (dirt, sand, etc.). f. Limit vehicle speeds on unpaved roads to 15 miles per hour. g. Idling times on all diesel-fueled commercial vehicles over 10,000 lbs. shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five

Condition #	Name	Requirement
		minutes (as required by the California airborne toxics control measure Title 13, Section 2485, of the California Code of Regulations). Clear signage to this effect shall be provided for construction workers at all access points. h. Idling times on all diesel-fueled off-road vehicles over 25 horsepower shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes and fleet operators must develop a written policy as required by Title 23, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations"). i. All construction equipment shall be maintained and properly tuned in accordance with the manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. j. Portable equipment shall be powered by electricity if available. If electricity is not available, propane or natural gas shall be used if feasible. Diesel engines shall only be used if electricity is not available and it is not feasible to use propane or natural gas. k. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe. l. All excavation, grading, and demolition activities shall be suspended when average wind speeds exceed 20 mph. m. Install sandbags or other erosion control measures to prevent silt runoff to public roadways. n. Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for one month or more). o. Designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. p. Install appropriate wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of the construction site to minimize windblown dust. Wind breaks must have a maximum 50 percent air porosity.

Condition #	Name	Requirement
		q. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established. r. Activities such as excavation, grading, and other ground-disturbing construction activities shall be phased to minimize the amount of disturbed surface area at any one time. s. All trucks and equipment, including tires, shall be washed off prior to leaving the site. t. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel. u. All equipment to be used on the construction site and subject to the requirements of Title 13, Section 2449, of the California Code of Regulations ("California Air Resources Board Off-Road Diesel Regulations") must meet emissions and performance requirements one year in advance of any fleet deadlines. Upon request by the City, the project applicant shall provide written documentation that fleet requirements have been met. v. Use low VOC (i.e., ROG) coatings beyond the local requirements (i.e., BAAQMD Regulation 8, Rule 3: Architectural Coatings). w. All construction equipment, diesel trucks, and generators shall be equipped with Best Available Control Technology for emission reductions of NOx and PM. x. Off-road heavy diesel engines shall meet the California Air Resources Board's most recent certification standard. y. Post a publicly-visible large on-site sign that includes the contact name and phone number for the project complaint manager responsible for responding to dust complaints and the telephone numbers of the City's Code Enforcement unit and the Bay Area Air Quality Management District. When contacted, the project complaint manager shall respond and take corrective action within 48 hours. When Required: During construction Initial Approval: N/A Monitoring/Inspection: Bureau of Building
20	Exposure to Air Pollution (Toxic Air Contaminants)	a. Health Risk Reduction Measures Requirement: The project applicant shall incorporate appropriate measures into the project

Condition #	Name	Requirement
		design in order to reduce the potential health risk due to exposure to toxic air contaminants. The project applicant shall choose one of the following methods: i. The project applicant shall retain a qualified air quality consultant to prepare a Health Risk Assessment (HRA) in accordance with California Air Resources Board (CARB) and Office of Environmental Health and Hazard Assessment requirements to determine the health risk of exposure of project residents/occupants/users to air pollutants. The HRA shall be submitted to the City for review and approval. If the HRA concludes that the health risk is at or below acceptable levels, then health risk reduction measures are not required. If the HRA concludes that the health risk exceeds acceptable levels, health risk reduction measures shall be identified to reduce the health risk to acceptable levels. Identified risk reduction measures shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City. -or- i. The project applicant shall incorporate the following health risk reduction measures into the project. These features shall be submitted to the City for review and approval and be included on the project drawings submitted for the construction-related permit or on other documentation submitted to the City: • Installation of air filtration to reduce cancer risks and Particulate Matter (PM) exposure for residents and other sensitive populations in the project that are in close proximity to sources of air pollution. Air filter devices shall be rated MERV-13 or higher. As part of implementing this measure, an ongoing maintenance plan for the building's HVAC air filtration system shall be required. • Where appropriate, install passive electrostatic filtering systems, especially those with low air velocities (i.e., 1 mph). • Phasing of residential developments when proposed within 500 feet of freeways such that homes nearest the freeway are built last, if feasible. • The project shall be designed to locate sensitive receptors as far away as feasible from the source(s) of air pollution. Operable

Condition #	Name	Requirement
		windows, balconies, and building air intakes shall be located as far away from these sources as feasible. If near a distribution center, residents shall be located as far away as feasible from a loading dock or where trucks concentrate to deliver goods. • Sensitive receptors shall be located on the upper floors of buildings, if feasible. • Planting trees and/or vegetation between sensitive receptors and pollution source, if feasible. Trees that are best suited to trapping PM shall be planted, including one or more of the following: Pine (Pinus nigra var. maritima), Cypress (X Cupressocyparis leylandii), Hybrid popular (Populus deltoids X trichocarpa), and Redwood (Sequoia sempervirens). • Sensitive receptors shall be located as far away from truck activity areas, such as loading docks and delivery areas, as feasible. • Existing and new diesel generators shall meet CARB's Tier 4 emission standards, if feasible. • Emissions from diesel trucks shall be reduced through implementing the following measures, if feasible: • Installing electrical hook-ups for diesel trucks at loading docks. • Requiring trucks to use Transportation Refrigeration Units (TRU) that meet Tier 4 emission standards. • Requiring truck-intensive projects to use advanced exhaust technology (e.g., hybrid) or alternative fuels. • Prohibiting trucks from idling for more than two minutes. • Establishing truck routes to avoid sensitive receptors in the project. A truck route program, along with truck calming, parking, and delivery restrictions, shall be implemented. • When Required: Prior to approval of construction-related permit • Initial Approval: Bureau of Planning • Monitoring/Inspection: Bureau of Building When Required: Prior to approval of construction-related permit

Condition #	Name	Requirement
		Initial Approval: Bureau of Planning Monitoring/Inspection: Bureau of Building
23	Asbestos in Structures	Requirement: The project applicant shall comply with all applicable laws and regulations regarding demolition and renovation of Asbestos Containing Materials (ACM), including but not limited to California Code of Regulations, Title 8; California Business and Professions Code, Division 3; California Health and Safety Code sections 25915-25919.7; and Bay Area Air Quality Management District, Regulation 11, Rule 2, as may be amended. Evidence of compliance shall be submitted to the City upon request. When Required: Prior to approval of construction-related permit Initial Approval: Applicable regulatory agency with jurisdiction Monitoring/Inspection: Applicable regulatory agency with jurisdiction

2.0 REGULATORY SETTING FOR CRITERIA POLLUTANTS

The Project site is within the San Francisco Bay Area Air Basin and is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD), the California Air Resources Board (ARB), and the Environmental Protection Agency (EPA).

2.1 FEDERAL CLEAN AIR ACT

The Federal Clean Air Act (FCAA) establishes the framework for modern air pollution control. The FCAA, enacted in 1970 and amended in 1990, directs the EPA to establish ambient air quality standards (see Table 2). These standards are divided into primary and secondary standards, the former is set to protect human health, the latter are set to protect environmental values, such as plant and animal life. Standards have been established for the following six pollutants:

- Ozone (O_3): According to ARB, ozone is a pollutant that forms in the atmosphere through complex reactions between chemicals directly emitted from vehicles, industrial plants, and many other sources. Key pollutants involved in ozone formation are hydrocarbon and nitrogen oxide gases. Ozone is a highly reactive and unstable gas capable of damaging the linings of the respiratory tract. Exposure to levels of ozone above the current ambient air quality standard can lead to human health effects such as lung inflammation and tissue damage and impaired lung functioning. Ozone exposure is also associated with symptoms such as coughing, chest tightness, shortness of breath, and the worsening of asthma symptoms. The greatest risk for harmful health effects belongs to outdoor workers, athletes, children and others who spend greater amounts of time outdoors during smoggy periods. Elevated ozone levels can reduce crop and timber yields, as well as damage native plants (ARB 2009).

- Carbon monoxide (CO): According to the EPA, "CO is a colorless, odorless gas emitted from combustion processes. Nationally and, particularly in urban areas, the majority of CO emissions to ambient air come from mobile sources. CO can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. At extremely high levels, CO can cause death. EPA first set air quality standards for CO in 1971. For protection of both public health and welfare, EPA set an 8-hour primary standard at 9 parts per million (ppm) and a 1-hour primary standard at 35 ppm. In a review of the standards completed in 1985, EPA revoked the secondary standards (for public welfare) due to a lack of evidence of adverse effects on public welfare at or near ambient concentrations. The last review of the CO National Ambient Air Quality Standards (NAAQS) was completed in 1994 and the Agency chose not to revise the standards at that time" (EPA 2014).

- Lead (Pb): According to the EPA, "Lead can be found in all parts of our environment – the air, the soil, the water, and even inside our homes. Much of our exposure comes from

human activities including the use of fossil fuels including past use of leaded gasoline, some types of industrial facilities, and past use of lead-based paint in homes. Lead and lead compounds have been used in a wide variety of products found in and around our homes, including paint, ceramics, pipes and plumbing materials, solders, gasoline, batteries, ammunition, and cosmetics." (EPA 2016). Lead may enter the environment from these past and current uses. Lead can also be emitted into the environment from industrial sources and contaminated sites, such as former lead smelters. While natural levels of lead in soil range between 50 and 400 parts per million, mining, smelting, and refining activities have resulted in substantial increases in lead levels in the environment, especially near mining and smelting sites.

- Nitrogen Oxides (NO_x): According to ARB, "NO_2 is a reactive, oxidizing gas capable of damaging cells lining the respiratory tract. This pollutant is also an essential ingredient in the formation of ground-level ozone pollution. NO_2 is one of the nitrogen oxides emitted from high-temperature combustion processes, such as those occurring in trucks, cars and power plants. In the presence of sunlight, complex reactions of nitrogen oxides with ozone and other air pollutants produce the majority of NO_2 in the atmosphere. Indoors, home heaters and gas stoves also produce substantial amounts of NO_2. Exposure to NO_2 along with other traffic-related pollutants, is associated with respiratory symptoms, episodes of respiratory illness and impaired lung functioning. Studies in animals have reported biochemical, structural, and cellular changes in the lung when exposed to NO_2 above the level of the current California air quality standard. Clinical studies of human subjects suggest that NO_2 exposure to levels near the current standard may worsen the effect of allergens in allergic asthmatics, especially in children" (ARB 2011).

- Particulate matter (PM_{10}, $PM_{2.5}$): According to ARB, "PM is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, and dust. Particles 10 microns or less in diameter are defined as "respirable particulate matter" or "PM_{10}." Fine particles are 2.5 microns or less in diameter or "$PM_{2.5}$" and can contribute significantly to regional haze and reduction of visibility in California. Extensive research indicates that exposure to outdoor PM_{10} and $PM_{2.5}$ levels exceeding current air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature deaths, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function and increased respiratory symptoms and illnesses. Besides reducing visibility, the acidic portion of PM (nitrates, sulfates) can harm crops, forests, aquatic and other ecosystems" (ARB 2005a).

- Sulfur dioxide (SO_2): According to the EPA, "SO_2 is one of a group of highly reactive gasses known as "oxides of sulfur." The largest sources of SO_2 emissions are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%). Smaller sources of

SO_2 emissions include industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. SO_2 is linked with a number of adverse effects on the respiratory system. EPA first set standards for SO_2 in 1971. EPA set a 24-hour primary standard at 140 ppb and an annual average standard at 30 ppb (to protect health). EPA also set a 3-hour average secondary standard at 500 ppb (to protect the public welfare). The last review of the SO_2 NAAQS was completed in 1996 and the Agency chose not to revise the standards. In the last review, EPA also considered, but did not set, a five minute NAAQS to protect asthmatics at elevated ventilation rates from bronchoconstriction and respiratory symptoms associated with 5-10 minute peaks of SO2" (EPA 2010).

2.2 CALIFORNIA CLEAN AIR ACT

The California Legislature enacted the California Clean Air Act (CCAA) in 1988 to address air quality issues of concern not adequately addressed by the federal CAA at the time. California's air quality problems were and continue to be some of the most severe in the nation, and required additional actions beyond the federal mandates. The California Air Resources Board (ARB) administers California Ambient Air Quality Standards (CAAQS) for the 10 air pollutants designated in the CCAA. The 10 state air pollutants are the six federal standards listed above as well visibility-reducing particulates, hydrogen sulfide, sulfates, and vinyl chloride. The EPA authorized California to adopt its own regulations for motor vehicles and other sources that are more stringent than similar federal regulations implementing the CAA. Generally, the planning requirements of the CCAA are less stringent than the federal CAA; therefore, consistency with the CAA will also demonstrate consistency with the CCAA.

Table 2 provides the ambient air quality standards for both the CAA and the CCAA.

Table 2: California and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards	
		Concentration	Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m3)	—	Same as Primary Standard
	8 Hour	0.070 ppm (137 µg/m3)	0.075 ppm (147 µg/m3)	
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m3	150 µg/m3	Same as Primary Standard
	Annual Arithmetic Mean	20 µg/m3	—	
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	—	35 µg/m^3	Same as Primary Standard
	Annual Arithmetic Mean	12 µg/m3	15 µg/m^3	

Pollutant	Averaging Time	California Standards	National Standards	
		Concentration	Primary	Secondary
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	—	—
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m3)	—
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as Primary Standard
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
	3 Hour	—	—	0.5 ppm (1300 µg/m3)
	24 Hour	0.04 ppm (105 µg/m3)	0.14 ppm (for certain areas)9	—
	Annual Arithmetic Mean	—	0.030 ppm (for certain areas)9	—
Lead	30 Day Average	1.5 µg/m3	—	—
	Calendar Quarter	—		Same as Primary Standard
	Rolling 3-Month Average	—		
Visibility Reducing Particles	8 Hour	See footnote 12	No National Standards	
Sulfates	24 Hour	25 µg/m3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m3)		
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m3)		
Source: ARB 2013				

2.3 TOXIC AIR CONTAMINANTS (TACS)

Toxic Air Contaminants (TACs) are air contaminants not included in the CAAQS but are considered hazardous to human health. TACs are defined by the ARB as those pollutants that "may cause or

contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health".

The health effects associated with TACs are generally assessed locally rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis or genetic damage; or short-term acute affects such as eye watering, respiratory irritation, running nose, throat pain, and headaches. For evaluation purposes, TACs are separated into carcinogens and non-carcinogens. Carcinogens are assumed to have no safe threshold below which health impacts would not occur, and the cancer risk is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

Diesel Particulate Matter

Diesel particulate matter is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas or particle. The gas phase is composed of many of the urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde and polycyclic aromatic hydrocarbons. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those that are in the categories of fine, and ultra-fine particles. The composition of these fine and ultra-fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements. Diesel exhaust is emitted from a broad range of diesel engines; the on road diesel engines of trucks, buses and cars and the off road diesel engines that include locomotives, marine vessels and heavy duty equipment (EPA 2014).

Asbestos

Asbestos is a fibrous mineral which is both naturally occurring in ultramafic rock (a rock type commonly found in California), and used as a processed component of building materials. Because asbestos has been proven to cause a number of disabling and fatal diseases, such as asbestosis and lung cancer, it is strictly regulated either based on its natural widespread occurrence, or in its use as a building material. In the initial Asbestos National Emission Standards for Hazardous Air Pollutants rule promulgated in 1973, a distinction was made between building materials that would readily release asbestos fibers when damaged or disturbed (friable) and those materials that were unlikely to result in significant fiber release (non-friable). The EPA has since determined that, severely damaged, otherwise non-friable materials can release significant amounts of asbestos fibers. Asbestos has been banned from many building materials under the Toxic Substances Control Act, the Clean Air Act, and the Consumer Product Safety Act.

2.4 ATTAINMENT STATUS

The EPA and the ARB designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are

considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards.

Each standard has a different definition, or "form" of what constitutes attainment, based on specific air quality statistics. For example, the federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the federal annual $PM_{2.5}$ standard is met if the three-year average of the annual average $PM_{2.5}$ concentration is less than or equal to the standard.

The current attainment designations for the Air Basin are shown in Table 3. The Air Basin is designated as nonattainment for ozone, PM_{10}, and $PM_{2.5}$.

Table 3: Alameda County Area Designations for State and National Ambient Air Quality

Criteria Pollutants	State Designation	National Designation
Ozone	Non-attainment	Non-attainment
PM_{10}	Non-attainment	Unclassified
$PM_{2.5}$	Non-attainment	Non-attainment
Carbon Monoxide	Attainment	Unclassified /Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Unclassified
Sulfates	Attainment	-
Lead	Attainment	Unclassified/Attainment
Hydrogen Sulfide	Unclassified	-
Visibility Reducing Particles	Unclassified	-
Source: ARB 2013		

2.5 LOCAL REGULATIONS

Bay Area Air Quality Management District

The BAAQMD regulates air quality in the Air Basin. The BAAQMD is responsible for controlling and permitting industrial pollution sources (such as power plants, refineries, and manufacturing operations) and widespread, area wide sources (such as bakeries, dry cleaners, service stations, and commercial paint applicators), and for adopting local air quality plans and rules.

Air Quality Plans

As described above under federal and state regulations, a SIP is a federal requirement; each state prepares a SIP to describe existing air quality conditions and measures that will be followed to attain and maintain the federal standards. In addition, in California ozone standards have planning requirements. However, state PM_{10} standards have no attainment planning requirements, but air districts must demonstrate that all measures feasible for the area have been adopted. Because the Air Basin is nonattainment for the federal and state ozone standards, the BAAQMD prepared an Ozone Attainment Demonstration Plan to satisfy the federal 1-hour ozone planning requirement and a Clean Air Plan to satisfy the state 1-hour ozone planning requirement.

The latest Air Quality Plan (AQP) in the Basin is the 2010 Clean Air Plan, which provides the following:

- Review progress in improving Bay Area air quality to date.
- Establish a control strategy including "all feasible measures" to achieve state ozone standards by the earliest practicable date and reduce transport of ozone precursors to neighboring air basins.
- Address ozone, particulate matter, air toxics, and GHG emissions in a single integrated plan.

AQPs are required to address transportation control measures requirements of the federal Clean Air Act and California Clean Air Act. Transportation control measures are defined as "any strategy to reduce vehicle trips, vehicle use, vehicle miles traveled (VMT), vehicle idling, or traffic congestion for the purpose of reducing motor vehicle emissions." The Bay Area has extensive experience with developing and implementing transportation control measures. The first regional plan prepared pursuant to the California Clean Air Act, the 1991 Clean Air Plan, included 23 transportation control measures to meet state planning requirements (state transportation control measures). Plan updates in 1994 and 1997 included revisions to the transportation control measures.

Rules and Regulations

BAAQMD establishes and administers a program of rules and regulations, as described above, to attain and maintain state and national air quality standards. The rules and regulations that may apply to this Project include, but are not limited to, the following:

- **Regulation 8, Rule 3.** Architectural Coatings. This rule governs the manufacture, distribution, and sale of architectural coatings and limits the ROG content in paints and paint solvents. Although this rule does not directly apply to the proposed Project, it does dictate the ROG content of paint available for use during the construction.
- **Regulation 8, Rule 15.** Emulsified and Liquid Asphalts. Although this rule does not directly apply to the proposed Project, it does dictate the ROG content of asphalt available for

use during the construction through regulating the sale and use of asphalt and limits the ROG content in asphalt.

Bay Area Air Quality Management District CEQA Guidelines

The purpose of the Bay Area Air Quality Management District (BAAQMD or District) California Environmental Quality Act (CEQA) Guidelines is to assist lead agencies in evaluating air quality impacts of projects and plans proposed in the San Francisco Bay Area Air Basin (SFBAAB). The Guidelines provides BAAQMD-recommended procedures for evaluating potential air quality impacts during the environmental review process consistent with CEQA requirements. The revised Guidelines supersede the BAAQMD's previous CEQA guidance titled BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans (BAAQMD 1999.

In June 2010, the BAAQMD adopted significance thresholds for ROG, NOx, construction related particulate matter, operational CO, and CO_2e. BAAQMD's adoption of the thresholds was called into question by an order issued March 5, 2012, in *California Building Industry Association v. BAAQMD* (Alameda Superior Court Case No. RGI0548693). The order required BAAQMD to set aside its approval of the thresholds until it has conducted environmental review under CEQA. The claims made in the case concerned the environmental impacts of adopting the thresholds, that is, how the thresholds would indirectly affect land use development patterns. The BAAQMD appealed the Alameda County Superior Court's decision and the case went to the Court of Appeal, First Appellate District. The Court of Appeals reversed the trial court's decision. The Court of Appeal's decision does provide the means by which the BAAQMD may ultimately reinstate the 2010 Thresholds. However, the Court of Appeal's decision was subsequently appealed to the California Supreme Court, which granted limited review.

The California Supreme Court issued a decision on the case in December 2015. The decision in *California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD)* (Case No. S213478) held that CEQA does not generally require an analysis of the impacts of existing environmental conditions on a project's future residents and/or receptors. The Court determined that an analysis of the impacts of the environment on a project—known as "CEQA-in-reverse"—is only required in two limited sets of circumstances: first, when a statute provides an express legislative directive to consider such impacts, and second, when a proposed project risks exacerbating environmental hazards or conditions that already exist. The Supreme Court reversed the Court of Appeal's judgment and remanded the case back to the Court of Appeal's for proceedings consistent with its decision.

Currently, common and accepted practice in the Bay Area is to use the guidance for evaluating impacts and the 2010 Thresholds in light of the substantial evidence supporting the Guidelines.

City of Oakland

City of Oakland General Plan

The City of Oakland has developed goals and policies to attain air quality objectives on a local and regional scale. The following policies are pertinent to the proposed Project:

Objective CO-12: Air Resources: To improve air quality in Oakland and the surrounding Bay Region

Policy CO-12.1: Land Use Patterns Which Promote Air Quality: Promote land use patterns and densities which help improve regional air quality conditions by: (a) minimizing dependence on single passenger autos; (b) promoting projects which minimize quick auto starts and stops, such as live-work development, mixed use development, and office development with ground floor retail space; (c) separating land uses which are sensitive to pollution from the sources of air pollution; and (d) supporting telecommuting, flexible work hours, and behavioral changes which reduce the percentage of people in Oakland who must drive to work on a daily basis.

Policy CO-12.4: Design of Development to Minimize Air Quality Impacts: Require that development projects be designed in a manner which reduces potential adverse air quality impact. This may include: (a) the use of vegetation and landscaping to absorb carbon monoxide and to buffer sensitive receptors; (b) the use of low-polluting energy sources and energy conservation measures; (c) designs which encourage transit use and facilitate bicycle and pedestrian travel.

3.0 REGULATORY SETTING FOR GREENHOUSE GASES

3.1 INTERNATIONAL GHG REGULATIONS

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

Intergovernmental Panel on Climate Change. In 1988, the United Nations and the World Meteorological Organization established the Intergovernmental Panel on Climate Change to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

United Nations Framework Convention on Climate Change (Convention). On March 21, 1994, the United States joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

Kyoto Protocol. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at average of five per cent against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2°C above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

Paris Agreement. The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC) dealing with greenhouse gases emissions mitigation, adaptation and finance starting in the year 2020. brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced

support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives. The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework. Further information on key aspects of the Agreement can be found here.

The Paris Agreement requires all Parties to put forward their best efforts through "nationally determined contributions" (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts.

The Paris Agreement entered into force on November 4, 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

3.2 NATIONAL GHG REGULATIONS

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

Greenhouse Gas Endangerment. Massachusetts v. EPA (Supreme Court Case 05-1120) was argued before the United States Supreme Court on November 29, 2006, in which it was petitioned that the EPA regulate four GHGs, including carbon dioxide, under Section 202(a)(1) of the Clean Air Act. A decision was made on April 2, 2007, in which the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below.

The EPA denied ten petitions for Reconsideration of the Endangerment and Cause or Contribute Findings in 2010. Some of the petitioners included the Ohio Coal Association, Peabody Energy Company, and the State of Texas.

In September 2011, the EPA Office of Inspector General evaluated the EPA's compliance with established policy and procedures in the development of the endangerment finding, including processes for ensuring information quality. The evaluation concluded that the technical support document should have had more rigorous EPA peer review.

In June 2012, a federal appeals court rejected a lawsuit by thirteen states against the EPA. The suit alleged that the EPA violated the law by relying almost exclusively on data from the United Nations Intergovernmental Panel on Climate Change rather than doing its own research or testing data according to federal standards. The states include Virginia, Texas, Alabama, Florida, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, Nebraska, North Dakota, Oklahoma, South Carolina, South Dakota, and Utah. Virginia intends to petition the Supreme Court to review the case.

Clean Vehicles. Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On May 7, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the United States. A petition for writ of certiorari to the United States Court of Appeals for the District of Columbia Circuit was denied by the Supreme Court on October 15, 2013.

The first phase of the national program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. Together, these standards would cut carbon dioxide emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the National Highway Safety Administration issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012 (EPA 2012c). The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and medium duty passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO2) in model year

2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20-percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10-percent reduction for gasoline vehicles and a 15-percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the agencies are proposing engine and vehicle standards starting in the 2014 model year, which would achieve up to a 10-percent reduction in fuel consumption and carbon dioxide emissions by 2018 model year.

Mandatory Reporting of Greenhouse Gases. The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the United States, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA.

New Source Review. The EPA issued a final rule on May 13, 2010 that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these Clean Air Act permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the federal code of regulations, the EPA states:

This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the Clean Air Act, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to greenhouse gas sources, starting with the largest greenhouse gas emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources, but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for greenhouse gas emissions until at least April 30, 2016.

The EPA estimates that facilities responsible for nearly 70 percent of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units. As required by a settlement agreement, the EPA proposed new performance standards for emissions of carbon dioxide for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatt would be required to meet an output based standard of 1,000 pounds of carbon dioxide per megawatt-hour, based on the performance of widely used natural gas combined cycle technology.

Cap and Trade. Cap and trade refers to a policy tool where emissions are limited to a certain amount and can be traded, or provides flexibility on how the emitter can comply. Examples in the United States include the Acid Rain Program and the NOx Budget Trading Program and Clean Air Interstate Rule in the northeast. The Clean Air Interstate Rule (CAIR) and the Acid Rain Program (ARP) are both cap and trade programs designed to reduce emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) from power plants. The ARP, established under Title IV of the 1990 Clean Air Act (CAA) Amendments, requires power plants to make major emission reductions of SO2 and NOx, the primary precursors of acid rain. CAIR addresses regional interstate transport of soot (fine particulate matter) and smog (ozone) pollution. CAIR requires certain eastern states to limit annual emissions of SO2 and NOx, which contribute to the formation of fine particulate matter. It also requires certain states to limit ozone season NOx emissions, which contribute to the formation of ozone during the summer ozone season (May through September). There is no federal GHG cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap and trade.

The Regional Greenhouse Gas Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps carbon dioxide emissions from power plants, auctions carbon dioxide emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008.

The Western Climate Initiative partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15 percent below 2005 levels by 2020. The partners are California, British Columbia, Manitoba, Ontario, and Quebec. I

3.3 CALIFORNIA GHG REGULATIONS

3.3.1 Legislative Actions to Reduce Greenhouse Gases

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark AB 32 California Global Warming Solutions Act of 2006 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted

for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

AB 32. The California State Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires that GHGs emitted in California be reduced to 1990 levels by the year 2020. "Greenhouse gases" as defined under AB 32 include carbon dioxide, methane, NOx, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The ARB is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> *Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.*

The ARB Board approved the 1990 GHG emissions level of 427 $MMTCO_2e$ on December 6, 2007 (ARB 2007). Therefore, emissions generated in California in 2020 are required to be equal to or less than 427 $MMTCO_2e$. Emissions in 2020 in a "business as usual" scenario are estimated to be 596 $MMTCO_2e$, which do not account for reductions from AB 32 regulations (ARB 2008a). At that level, a 28 percent reduction was required to achieve the 427 million $MTCO_2e$ 1990 inventory. In October 2010, ARB prepared an updated 2020 forecast to account for the recession and slower forecasted growth. The forecasted inventory without the benefits of adopted regulation is now estimated at 545 million MTCO2e. Therefore, under the updated forecast, a 21.7 percent reduction from BAU is required to achieve 1990 levels (ARB 2010). The ARB also prepared updated emission inventories for 2000 through 2011 to show progress achieved to date (ARB 2013). Executive Order S-3-05 includes a target for 2010 of reducing GHG emissions to 2000 levels. As shown below, the 2010 emission inventory achieved this target. Also shown are the average reductions needed from all statewide sources (including all existing sources) to reduce GHG emissions back to 1990 levels.

- 1990: 427 million MTCO2e
- 2000: 463 million MTCO2e (an average 8-percent reduction needed to achieve 1990 base)
- 2010: 450 million MTCO2e (an average 5-percent reduction needed to achieve 1990 base)
- 2020: 545 million MTCO2e BAU (an average 21.7-percent reduction needed to achieve 1990 base)

ARB Scoping Plan. The ARB's Climate Change Scoping Plan (Scoping Plan) contains measures designed to reduce the State's emissions to 1990 levels by the year 2020 to comply with AB 32 (ARB 2008). The Scoping Plan identifies recommended measures for multiple GHG emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each

sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As stated in the Scoping Plan, the key elements of the strategy for achieving the 2020 GHG target include:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a statewide renewable energy mix of 33 percent;
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
- Establishing targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
- Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the State's long-term commitment to AB 32 implementation.

In addition, the Scoping Plan differentiates between "capped" and "uncapped" strategies. Capped strategies are subject to the proposed cap-and-trade program. The Scoping Plan states that the inclusion of these emissions within the cap-and trade program will help ensure that the year 2020 emission targets are met despite some degree of uncertainty in the emission reduction estimates for any individual measure. Implementation of the capped strategies is calculated to achieve a sufficient amount of reductions by 2020 to achieve the emission target contained in AB 32. Uncapped strategies that will not be subject to the cap-and-trade emissions caps and requirements are provided as a margin of safety by accounting for additional GHG emission reductions.

The ARB approved the First Update to the Scoping Plan (Update) on May 22, 2014. The Update identifies the next steps for California's climate change strategy. The Update shows how California continues on its path to meet the near-term 2020 GHG limit, but also sets a path toward long-term, deep GHG emission reductions. The report establishes a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. The Update identifies progress made to meet the near-term objectives of AB 32 and defines California's climate change priorities and activities Climate for the next several years. The Update does not set new targets for the State, but describes a path that would achieve the long term 2050 goal of Executive Order S-05-03 for emissions to decline to 80 percent below 1990 levels by 2050 (ARB 2014).

The ARB has no legislative mandate to set a target beyond the 2020 target from AB 32 or to adopt additional regulations to achieve a post-2020 target. The Update estimates that reductions averaging 5.2 percent per year would be required after 2020 to achieve the 2050 goal. With no estimate of future reduction commitments from the State, identifying a feasible strategy including plans and measures to be adopted by local agencies is not currently possible.

SB 375. Passing the Senate on August 30, 2008, Senate Bill (SB) 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40 percent of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28 states that CEQA findings determinations for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the ARB accepts as achieving the greenhouse gas emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

AB 1493 Pavley Regulations and Fuel Efficiency Standards. California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. On January 21, 2009, the ARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that the EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request. On September 8, 2009, the U.S. Chamber of Commerce and the National Automobile Dealers Association sued the EPA to challenge its granting of the waiver to California for its standards. California assisted the EPA in defending the waiver decision. The U.S. District Court for the District of Columbia denied the Chamber's petition on April 29, 2011. The EPA subsequently granted the requested waiver in 2009, which was upheld by the by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22-percent reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30-percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program referred to as LEV III or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34 percent from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid electric vehicles and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

SB 1368. In 2006, the State Legislature adopted SB 1368, which was subsequently signed into law by the Governor. SB 1368 directs the California Public Utilities Commission to adopt a performance standard for GHG emissions for the future power purchases of California utilities. SB 1368 seeks to limit carbon emissions associated with electrical energy consumed in California by forbidding procurement arrangements for energy longer than 5 years from resources that exceed the emissions of a relatively clean, combined cycle natural gas power plant. Because of the carbon content of its fuel source, a coal-fired plant cannot meet this standard because such plants emit roughly twice as much carbon as natural gas, combined cycle plants. Accordingly, the new law will effectively prevent California's utilities from investing in, otherwise financially supporting, or purchasing power from new coal plants located in or out of the State. Thus, SB 1368 will lead to dramatically lower GHG emissions associated with California's energy demand, as SB 1368 will effectively prohibit California utilities from purchasing power from out-of-state producers that cannot satisfy the performance standard for GHG emissions required by SB 1368. The California Public Utilities Commission adopted the regulations required by SB 1368 on August 29, 2007.

SB 1078 - Renewable Electricity Standards. On September 12, 2002, Governor Gray Davis signed SB 1078 requiring California to generate 20 percent of its electricity from renewable energy by 2017. SB 107 changed the due date to 2010 instead of 2017. On November 17, 2008, Governor Arnold Schwarzenegger signed Executive Order S-14-08, which established a Renewable Portfolio Standard target for California requiring that all retail sellers of electricity serve 33 percent of their load with renewable energy by 2020. Governor Schwarzenegger also directed the ARB (Executive Order S-21-09) to adopt a regulation by July 31, 2010, requiring the State's load serving entities to meet a 33 percent renewable energy target by 2020. The ARB Board approved the Renewable Electricity Standard on September 23, 2010 by Resolution 10-23.

SB 32 Pavley: California Global Warming Solutions Act of 2006: emissions limit. SB 32 expands upon AB-32 to reduce greenhouse gas (GHG) emissions. The Senate bill requires that there be a reduction in GHG emissions to 40% below the 1990 levels by 2030. AB 32 required California to reduce greenhouse gas emissions to 1990 levels by 2020 and SB 32 continues that timeline to reach the targets set in Executive Order B-30-15. SB-32 provides another intermediate target between the 2020 and 2050 targets set in Executive Order S-3-05.

3.3.2 Executive Orders Related to Greenhouse Gas Emissions

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the State and guide the actions of state agencies.

Executive Order S-13-08. Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the order, the 2009 California Climate Adaptation Strategy (California Natural Resources Agency 2009) was adopted, which is the ". . . first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

Executive Order S-3-05. Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S 3-05, the following reduction targets for GHG emissions:

- By 2010, reduce greenhouse gas emissions to 2000 levels.
- By 2020, reduce greenhouse gas emissions to 1990 levels.
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07 - Low Carbon Fuel Standard. The Governor signed Executive Order S 01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In particular, the executive order established a Low Carbon Fuel Standard and directed the Secretary for Environmental Protection to coordinate the actions of the California Energy Commission, the ARB, the University of California, and other agencies to develop and propose protocols for measuring the "life-cycle carbon intensity" of transportation fuels. This analysis supporting development of the protocols was included in the State Implementation Plan for alternative fuels (State Alternative Fuels Plan adopted by California Energy Commission on December 24, 2007) and was submitted to ARB for consideration as an "early action" item under AB 32. The ARB adopted the Low Carbon Fuel Standard on April 23, 2009. The Low Carbon Fuel Standard was challenged in the United States District Court in Fresno in 2011. The court's ruling issued on December 29, 2011 included a preliminary injunction against ARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012 pending final ruling on appeal, allowing the ARB to continue to implement and enforce the regulation. The 9th Circuit's decision filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that Low Carbon Fuel Standards adopted by ARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court

of Appeal (California) ruled ARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for Low Carbon Fuel Standards. In a partially published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of ARB approving Low Carbon Fuel Standards (LCFS) regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while ARB complies with the procedural requirements it failed to satisfy.

Executive Order B-30-15: Governor Jerry Brown signed Executive Order B-30-15s on April 29, 2015. The following are major provisions of the Executive Order:

1. A new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050.
2. All state agencies with jurisdiction over sources of greenhouse gas emissions shall implement measures, pursuant to statutory authority, to achieve reductions of greenhouse gas emissions to meet the 2030 and 2050 greenhouse gas emissions reductions targets.
3. The California Air Resources Board shall update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

The executive order does not apply directly to cities and counties, but will lead to the preparation of a new ARB Scoping Plan and the development of regulations to achieve post-2020 reduction targets.

3.3.3 California Regulations and Building Codes

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

Title 24. California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The newest version of Title 24 was adopted by the California Energy Commission (CEC) on May 31, 2012 and was scheduled to become effective on January 1, 2014. On December 11, 2013, the CEC extended the compliance date to July 1, 2014 to allow more time for the building industry and local building departments to prepare.

Title 20. California Code of Regulations, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. Twenty-three categories of appliances are included in the scope

of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the State and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

California Green Building Standards Code is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect January 1, 2011. It does not prevent a local jurisdiction from adopting a more stringent code as state law provides methods for local enhancements. The Code recognizes that many jurisdictions have developed existing construction and demolition ordinances, and defers to them as the ruling guidance provided they provide a minimum 50-percent diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. State building code provides the minimum standard that buildings need to meet in order to be certified for occupancy. Enforcement is generally through the local building official.

3.3.4 SB 97 and the CEQA Guidelines Update

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states "(a) On or before July 1, 2009, the Office of Planning and Research shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the Office of Planning and Research pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On April 13, 2009, the Office of Planning and Research submitted to the Secretary for Natural Resources its recommended amendments to the CEQA Guidelines for addressing GHG emissions. On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources Code section 21083.05. Following a 55-day public comment period and two public hearings, the Natural Resources Agency proposed revisions to the text of the proposed Guidelines amendments. The Natural Resources Agency transmitted the adopted amendments and the entire rulemaking file to the Office of Administrative Law on December 31, 2009. On February 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

A new section, CEQA Guidelines Section 15064.4, was added to assist agencies in determining the significance of GHG emissions. The new section allows agencies the discretion to determine whether a quantitative or qualitative analysis is best for a particular project. However, little guidance is offered on the crucial next step in this assessment process—how to determine whether the project's estimated GHG emissions are significant or cumulatively considerable.

Also amended were CEQA Guidelines Sections 15126.4 and 15130, which address mitigation measures and cumulative impacts respectively. GHG mitigation measures are referenced in general terms, but no specific measures are championed. The revision to the cumulative impact discussion requirement (Section 15130) simply directs agencies to analyze GHG emissions in an EIR when a project's incremental contribution of emissions may be cumulatively considerable, however it does not answer the question of when emissions are cumulatively considerable.

Section 15183.5 permits programmatic GHG analysis and later project-specific tiering, as well as the preparation of Greenhouse Gas Reduction Plans. Compliance with such plans can support a determination that a project's cumulative effect is not cumulatively considerable, according to proposed Section 15183.5(b).

In addition, the amendments revised Appendix F of the CEQA Guidelines, which focuses on Energy Conservation. The sample environmental checklist in Appendix G was amended to include GHG questions.

3.4 REGIONAL

3.4.1 BAAQMD Climate Protection Program

The BAAQMD established a climate protection program in 2005 to reduce pollutants that contribute to global climate change and affect air quality in the San Francisco Bay Area Air Basin (SFBAAB). The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy all of which assist in reducing emissions of GHG and in reducing air pollutants that affect the health of residents. The Air District is updating the 2010 Bay Area Clean Air Plan in partnership with the Association of Bay Area Governments, the Bay Conservation and Development Commission, and the Metropolitan Transportation Commission. The Bay Area's first-ever comprehensive Regional Climate Protection Strategy will be included in the 2016 Clean Air Plan - which will identify potential rules, control measures, and strategies that the Air District can pursue to reduce greenhouse gases throughout the Bay Area.

3.4.2 Metropolitan Transportation Commission and Association of Bay Area Governments

In July 2013, the Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG) jointly approved the Plan Bay Area, which includes the region's Sustainable Communities Strategy and the 2040 Regional Transportation Plan, and the associated Final EIR for

the Plan Bay Area. Two of the ten 'targets' of the Plan Bay Area address the requirements of SB 375:

The first two targets are required by SB 375, "The California Sustainable Communities and Climate Protection Act of 2008" (Steinberg), and address the respective goals of climate protection and adequate housing:

- Reduce per-capita carbon dioxide emissions from cars and light-duty trucks by seven percent by 2020 and by 15 percent by 2035.

- House 100 percent of the region's projected 25-year growth by income level (very-low, low, moderate, above-moderate), without displacing current low-income residents.

3.5 LOCAL

3.5.1 City of Oakland Climate Action Plan

The Oakland Climate Action Coalition has worked with the City of Oakland and local residents to develop Oakland's Energy and Climate Action Plan (ECAP). The purpose of the Oakland ECAP is to identify and prioritize actions the City can take to reduce energy consumption and GHG emissions associated with Oakland. The ECAP will assist the City of Oakland in continuing its legacy of leadership on energy, climate and sustainability issues, and provide a roadmap for the Oakland community to achieve broad community goals related to reducing GHG emissions. The Plan puts forth goals and measures to promote healthy and sustainable communities and ultimately reduce GHG emissions.

In July 2009, the Oakland City Council approved a preliminary GHG reduction target for the year 2020 of 36% below 2005 levels. The ECAP outlines a ten-year plan including more than 150 actions that will enable Oakland to achieve a 36% reduction in GHG emissions with respect to each of these GHG sources. Oakland can accomplish this goal by 2020 through:

- 20% reduction in vehicle miles traveled annually as residents, workers and visitors meet daily needs by walking, bicycling, and using transit
- 24 million gallons of oil saved annually due to less driving and more fuel-efficient vehicles on local roads
- 32% decrease in electricity consumption through renewable generation, conservation, and energy efficiency
- 14% decrease in natural gas consumption through building retrofits, solar hot water projects and conservation
- 62 million kWh and 2.7 million therms annually of new renewable energy used to meet local needs
- 375,000 tons of waste diverted away from local landfills through waste reduction, reuse, recycling, and composting

4.0 ENVIRONMENTAL SETTING

4.1 REGIONAL CLIMATE

The proposed project is located in Alameda County within the San Francisco Bay Area Air Basin. During the summer months, the regional climate is driven by a high-pressure cell centered over the northeastern Pacific Ocean that dominates the summer climate of the West Coast. The persistence of this high-pressure cell generally results in negligible precipitation during the summer. During the summer, meteorological conditions are typically stable with a steady northwesterly wind flow. This flow causes upwelling of cold ocean water from below the surface, which produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold-water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast.

In the winter, the Pacific high-pressure cell weakens and shifts to the south, resulting in wind flows offshore, the absence of upwelling, and an increase in the occurrence of storms. Winter stagnation episodes are characterized by nocturnal drainage wind flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the Air Basin.

4.2 REGIONAL AIR QUALITY

The westerly prevailing winds dominant in the San Francisco Bay Region tend to transport air pollutants from the coastal cities into the central valley and up against the western Sierra Foothills. Table 4, summarizes the estimated annual average emissions (tons per day) for the most recent published inventory (2012) within the San Francisco Bay Area Air Basin.

Table 4: 2012 Estimated Annual Average Emissions San Francisco Bay Area Air Basin

STATIONARY SOURCES	TOG	ROG	CO	NO_X	S_OX	PM	PM_{10}	$PM_{2.5}$
FUEL COMBUSTION	18.8	4.3	27.7	34.0	9.4	1.4	1.4	1.3
WASTE DISPOSAL	192.7	3.1	1.9	1.1	0.5	-	-	-
CLEANING AND SURFACE COATINGS	38.2	26.8	0.0	0.0	0.0	-	-	-
PETROLEUM PRODUCTION AND MARKETING	69.7	14.9	0.9	0.6	2.1	-	-	-
INDUSTRIAL PROCESSES	12.3	10.0	1.9	3.9	7.9	8.4	4.5	1.4
*** TOTAL STATIONARY SOURCES**	**331.6**	**59.2**	**32.4**	**39.7**	**19.8**	**9.7**	**5.8**	**2.8**
AREAWIDE SOURCES	**TOG**	**ROG**	**CO**	**NO_X**	**S_OX**	**PM**	**PM_{10}**	**$PM_{2.5}$**
SOLVENT EVAPORATION	68.4	57.9	-	-	-	-	-	-
MISCELLANEOUS PROCESSES	64.0	14.9	127.4	15.8	0.5	173.9	95.2	31.5
*** TOTAL AREAWIDE SOURCES**	**132.3**	**72.8**	**127.4**	**15.8**	**0.5**	**173.9**	**95.2**	**31.5**

MOBILE SOURCES	TOG	ROG	CO	NO_X	SO_X	PM	PM_{10}	$PM_{2.5}$
ON-ROAD MOTOR VEHICLES	90.6	83.4	720.9	166.0	0.9	13.4	13.2	6.9
OTHER MOBILE SOURCES	54.9	49.6	391.3	96.1	1.7	4.8	4.7	4.4
*** TOTAL MOBILE SOURCES**	**145.5**	**133.0**	**1112.2**	**262.1**	**2.7**	**18.2**	**17.9**	**11.3**
GRAND TOTAL FOR SAN FRANCISCO BAY AREA AIR BASIN	**609.5**	**265.0**	**1272.0**	**317.6**	**23.0**	**201.9**	**118.9**	**45.6**

Source: ARB 2013

4.1 LOCAL CLIMATE

The City of Oakland is bound by the Oakland-Berkeley Hills on the east and the San Francisco Bay on the west. According the BAAQMD, "The Oakland-Berkeley Hills causes a bifurcation of westerly flow in the vicinity of Oakland, with southerly winds observed over the San Francisco Bay north of the Golden Gate and northwesterlies over the bay to the south of the Golden Gate. The divergent wind field results in diminished speed on the east side of the bay, with a higher frequency of near calm conditions than areas west of this split flow. Temperatures have a narrow range due to the proximity of the moderating marine air. Maximum temperatures in summer average in the upper 60's to low 70's, with minimums in the mid-50's. Winter highs are in the mid to high 50's and winter lows are in the low to mid-40's. Precipitation totals, generally, increase from south to north and from the lowlands to the Oakland-Berkeley Hills' ridge line." (BAAQMD 2010)

4.2 LOCAL AIR QUALITY

The proposed Project is located within the Northern Alameda, Western Contra Costa Counties Region, bordered to the west by the San Francisco Bay and on east the Oakland-Berkeley Hills. The Oakland-Berkeley Hills create a significant barrier to air flow having an approximately ridge line height of 1,500 feet. The most densely populated area of the region is the narrow strip of land, about 4 miles in width, between the bay and approximately 500 feet in elevation. This is the area where most people live, drive, and work. This area is home to an international airport, major chemical, petroleum, shipping and other industrial operations, a large university, a major military facility (in the process of being decommissioned) and over 3/4 of a million people (BAAQMD 2010). The air pollution potential of the coastal areas is minor, due to frequent wind flow and less influx of high pollutant concentrations from upwind sources.

5.0 MODELING PARAMETERS AND ASSUMPTIONS

5.1 MODEL SELECTION

The California Emissions Estimator Model (CalEEMod) version 2013.2.2 was developed by the South Coast Air Quality Management District in cooperation with other air districts throughout the State. CalEEMod is designed as a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with construction and operation from a variety of land uses. CalEEMod version 2013.2.2 was used to estimate construction and operational impacts of the project.

5.2 AIR POLLUTANTS AND GHGS ASSESSED

Criteria Air Pollutants Assessed

The following criteria air pollutants are assessed in this analysis:

- Reactive organic gases (ROG)
- Nitrogen oxides (NOx)
- Carbon monoxide (CO)
- Sulfur oxides (SOx)
- Particulate matter less than 10 microns in diameter (PM_{10})
- Particulate matter less than 2.5 microns in diameter ($PM_{2.5}$)

Note that the project would emit ozone precursors ROG and NOx. However, the project would not directly emit ozone, since it is formed in the atmosphere during the photochemical reaction of ozone precursors.

GHGs Assessed

This analysis is restricted to GHGs identified by AB 32, which include carbon dioxide (CO_2), methane (CH_4), NOx, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. The project would generate a variety of GHGs, including several defined by AB 32 such as CO_2, CH_4 and NOx.

Certain GHGs defined by AB 32 would not be emitted by the project. Perfluorocarbons and sulfur hexafluoride are typically used in industrial applications, none of which would be used by the project. Therefore, it is not anticipated that the project would emit perfluorocarbons or sulfur hexafluoride.

Greenhouse gas emissions associated with the proposed Project construction, and future operations were estimated using CO_2e (Carbon Dioxide Equivalent) emissions as a proxy for all greenhouse gas emissions. In order to obtain the CO_2e, an individual GHG is multiplied by its global warming potential (GWP). The GWP designates on a pound for pound basis the potency of the GHG compared to CO_2.

5.3 ASSUMPTIONS

Construction Modeling Assumptions

The project was assumed to start construction in August 2017 and to be completed by July 2018. Table 5 provides the anticipated construction schedule.

Table 5: Construction Schedule

Phase	Anticipated Phase Start Date	Anticipated Phase End Date	Total Number of Days
Site Preparation	8/15/2017	8/18/2017	4
Site Grading	8/19/2017	8/25/2017	5
Utilities	8/26/2017	09/8/2017	10
Building Construction	9/8/201725/2017	6/1/2018	190
Paving	6/2/2018	6/8/2018	5
Architectural Coating	6/9/2018	6/15/2018	5
Final Clean Up/Punchlist	6/16/2018	7/9/2018	16

Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and prevailing weather conditions. Construction emissions result from on-site and off-site activities. On-site emissions principally consist of exhaust emissions from the activity levels of heavy-duty construction equipment, motor vehicle operation, and fugitive dust (mainly PM_{10}) from disturbed soil. Additionally, paving operations and application of architectural coatings would release volatile organic compound (VOC) emissions. Off-site emissions are caused by motor vehicle exhaust from delivery vehicles, worker traffic, and road dust (PM_{10} and $PM_{2.5}$).

The construction equipment list is shown in Table 6. The air emission estimates for construction equipment is based on the horsepower and load factors of the equipment. In general, the horsepower is the power of an engine—the greater the horsepower, the greater the power. The load factor is the average power of a given piece of equipment while in operation compared with its maximum rated horsepower. A load factor of 1.0 indicates that a piece of equipment continually operates at its maximum operating capacity.

Table 6: Construction Equipment Assumptions

Phase	Equipment	Unit Amount	Hours per Day	Horsepower	Load Factor
Site Preparation	Graders	1	8	174	0.41
	Tractors/Loaders/Backhoes	1	8	97	0.37
Grading	Concrete/Industrial Saws	1	8	81	0.73
	Rubber Tired Dozers	1	1	255	0.4
	Tractors/Loaders/Backhoes	2	6	97	0.37
Utilities	Excavators	1	8	158	0.38
	Rubber Tired Dozers	1	8	247	0.40
Building Construction	Cranes	1	4	226	0.29
	Forklifts	2	6	89	0.2
	Tractors/Loaders/Backhoes	2	8	97	0.37
Paving	Cement and Mortar Mixers	4	6	9	0.56
	Pavers	1	7	125	0.42
	Rollers	1	7	80	0.38
	Tractors/Loaders/Backhoes	1	7	97	0.37
Architectural Coating	Air Compressors	1	6	78	0.48
Final Clean Up/Punch List	Air Compressors	1	6	78	0.48
	Forklifts	1	8	89	0.48
	Other Construction Equipment	2	8	172	0.42

Operational Modeling Assumptions

Operational emissions are those emissions that occur during operation of the project. The major sources are summarized below.

Motor Vehicles

Motor vehicle emissions refer to exhaust and road dust emissions from the automobiles that would travel to and from the project site. The emissions were estimated using CalEEMod.

The trip generation is presented in Table 7a and 7b. The trip generation rates in Table 7a were derived from the Traffic Impact Study prepared for the proposed project. Using Table 7a, the daily trip generation estimates (Table 7b) were derived by land use type to calculate daily trips, as required for input into the CalEEMod program.

Table 7a: Project Trip Generation

Land Use (ITE Code)	Size	A.M. Peak Hour				P.M. Peak Hour				Daily Trips	
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	Total
Private School (K-8) (534)	620 Students	0.9	307	251	558	0.6	175	197	372	2.48	1538
Transit/Bike/Walk Trips Reduction	43.0%	--	132	108	240	--	75	85	160	--	661
Totals		**--**	**175**	**143**	**318**	**--**	**100**	**112**	**212**	**--**	**877**

Source: ITE Trip Generation, 9th Edition, 2012; City of Oakland Transportation Impact Study Guidelines, City of Oakland Transportation Planning and Funding Division, November 26, 2013; Stantec, 2017.
Note: * The proposed Project would include program from Kindergarten to eighth grade. ITE land use category "Private School (K-8)" would provide closest trip generation estimates compared to other public school land use categories.

Table 7b: Daily Trip Generation Estimates

Land Use (ITE Code)	Size (students)	Daily Trip Generation from Traffic Study	Total Daily Trips	Transit Trip Reduction Percent (Number of Trips)	Reduced Total Daily Trips	Reduced Daily Trip Generation Rate for CalEEMod (trips/unit/day)
Private School (K-8) (534)	620	2.48	1,538	43% (-661)	877	1.41

Pass-by trips are made as intermediate stops on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the generator. Pass-by trips are not diverted from another roadway. The CalEEMod default pass-by trip rates were used in the analysis.

The CalEEMod default round trip lengths for an urban setting (Alameda County portion of the BAAQMD) were used in this analysis.

The vehicle fleet mix is defined as the mix of motor vehicle classes active during the operation of the project. Emission factors are assigned to the expected vehicle mix as a function of vehicle class, speed, and fuel use (gasoline- and diesel-powered vehicles). The CalEEMod default vehicle fleet mix was used for the project.

Architectural Coatings (Painting)

Paints release VOC emissions. The building would be repainted on occasion. CalEEMod defaults were used for this purpose.

Consumer Products

Consumer products are various solvents used in non-industrial applications that emit VOCs during their product use. The default CalEEMod value was used for this project.

Electricity

There would be emissions from the power plants that would generate electricity to be used by the project (for lighting, etc.). CalEEMod was used to estimate these emissions from the project. The 2013 Title 24 standards are 25 percent more efficient for residential developments, however, the CalEEMod emission factors have not been updated.

6.0 AIR QUALITY IMPACT ANALYSIS

This section calculates the expected emissions from construction and operation of the project as a necessary requisite for assessing the regulatory significance of project emissions on a regional and localized level.

6.1 CITY OF OAKLAND CEQA THRESHOLDS OF SIGNIFICANCE GUIDELINES

To help clarify and standardize analysis and decision-making in the environmental review process in the City of Oakland, the City has established these CEQA Thresholds of Significance Guidelines (which have been in general use since at least 2002). These Thresholds are offered as guidance in preparing all environmental review documents (including Initial Studies and EIRs). Where possible, these Thresholds should be used unless the location of the project or other unique factors warrants the use of different thresholds. These Thresholds are intended to implement and supplement provisions in the CEQA Guidelines for determining the significance of environmental effects, including sections 15064, 15064.4, 15064.5, 15064.7, 15065, 15382, and Appendix G, and form the basis of the City's Initial Study and Environmental Review Checklist.

6.1.1 CEQA Guidelines – Appendix G

According to the CEQA Guidelines' Appendix G Environmental Checklist, to determine whether impacts to air quality are significant environmental effects, the following questions are analyzed and evaluated.

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

d) Expose sensitive receptors to substantial pollutant concentrations?

e) Create objectionable odors affecting a substantial number of people?

6.1.2 City of Oakland Air Quality Thresholds of Significance

The thresholds below related to criteria air pollutants (thresholds 1 through 3) pertain to impacts that are, by their nature, cumulative impacts because one project by itself cannot generate air pollution that would violate regional air quality standards. Thresholds 1 through 3 pertain to a project's contribution to cumulative impacts but are labeled "Project-Level Impacts" here to be consistent with the terminology used by BAAQMD.

1. During project construction result in average daily emissions of 54 pounds per day of ROG, NOx, or PM2.5 or 82 pounds per day of PM10;

2. During project operation result in average daily emissions of 54 pounds per day of ROG, NOx, or PM2.5 or 82 pounds per day of PM10; or result in maximum annual emissions of 10 tons per year of ROG, NOx, or PM2.5 or 15 tons per year of PM10;

3. Contribute to carbon monoxide (CO) concentrations exceeding the California Ambient Air Quality Standards (CAAQS) of nine parts per million (ppm) averaged over eight hours and 20 ppm for one hour [NOTE: Pursuant to BAAQMD CEQA Guidelines, localized CO concentrations should be estimated for projects in which (a) project-generated traffic would conflict with an applicable congestion management program established by the county congestion management agency or (b) project-generated traffic would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour (or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited, such as tunnels, parking garages, bridge underpasses, natural or urban street canyons, and below-grade roadways). In Oakland, only the MacArthur Maze portion of Interstate 580 exceeds the 44,000 vehicles per hour screening criteria.];

4. For new sources of Toxic Air Contaminants (TACs), during either project construction or project operation expose sensitive receptors to substantial levels of TACs under project conditions resulting in (a) an increase in cancer risk level greater than 10 in one million, (b) a non-cancer risk (chronic or acute) hazard index greater than 1.0, or (c) an increase of annual average PM2.5 of greater than 0.3 micrograms per cubic meter; or, under cumulative conditions, resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter [NOTE: Pursuant to the BAAQMD CEQA Guidelines, when siting new TAC sources consider receptors located within 1,000 feet. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers. The cumulative analysis should consider the combined risk from all TAC sources.];

5. Expose new sensitive receptors to substantial ambient levels of Toxic Air Contaminants (TACs) resulting in (a) a cancer risk level greater than 100 in a million, (b) a non-cancer risk (chronic or acute) hazard index greater than 10.0, or (c) annual average PM2.5 of greater than 0.8 micrograms per cubic meter [NOTE: Pursuant to the BAAQMD CEQA Guidelines,

when siting new sensitive receptors consider TAC sources located within 1,000 feet including, but not limited to, stationary sources, freeways, major roadways (10,000 or greater vehicles per day), truck distribution centers, airports, seaports, ferry terminals, and rail lines. For this threshold, sensitive receptors include residential uses, schools, parks, daycare centers, nursing homes, and medical centers.]; or

6. Frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people [NOTE: For this threshold, sensitive receptors include residential uses, schools, daycare centers, nursing homes, and medical centers (but not parks).].

6.2 AIR IMPACT ANALYSIS

Impact AIR-1 Conflict with or obstruct implementation of the applicable air quality plan?

Impact Analysis

The BAAQMD's Bay Area 2010 Clean Air Plan (2010 Clean Air Plan) is the regional air quality plan (AQP) for the Air Basin. The 2010 Clean Air Plan accounts for projections of population growth provided by Association of Bay Area Governments and vehicle miles traveled provided by the Metropolitan Transportation Commission, and it identifies strategies to bring regional emissions into compliance with federal and State air quality standards. The BAAQMD's Guidance provides two criteria for determining if a plan-level project is consistent with the current AQP control measures. The City of Oakland does not provide a threshold of significance for project-level consistency analysis. For plan-level impacts, the City of Oakland has identified the following thresholds of significance:

1. Fundamentally conflict with the primary goals of the Bay Area Clean Air Plan (CAP);

2. Fundamentally conflict with the CAP because the plan does not demonstrate reasonable efforts to implement control measures contained in the CAP or the plan conflicts with or obstructs implementation of any control measures in the CAP.

Therefore, the following criteria will be used for determining the project-level impact to the AQP.

- Criterion 1: Does the project support the primary goals of the AQP? (consistent with plan-level threshold 1, above)

- Criterion 2: Does the project include applicable control measures from the AQP? (consistent with plan-level threshold 2, above)

- Criterion 3: Does the project disrupt or hinder implementation of any AQP control measures? (consistent with plan-level threshold 2, above)

Criterion 1

The primary goals of the 2010 Clean Plan, the current AQP to date, are to:

- Attain air quality standards;
- Reduce population exposure to unhealthy air and protecting public health in the Bay area; and

As discussed in impact discussions AIR-2, AIR-3, AIR-4, and AIR-5, the project would not create a localized violation of state or federal air quality standards, significantly contribute to cumulative nonattainment pollutant violations, expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors affecting a substantial number of people after incorporation of City of Oakland Standard Conditions of Approvals (SCA). Specifically, City SCA's 13 Construction Management Plan, SCA 19 Construction-Related Air Pollution Controls (Dust and Construction Emissions), and SCA 23 Asbestos in Structures reduce the project's potential to generate a significant localized dust impact and a significant TAC impact during project construction to a less than significant level. Therefore, the project is consistent with criterion 1 with incorporation of those City SCAs.

Criterion 2

The 2010 Plan contains 55 control measures aimed at reducing air pollution in the Bay Area. Along with the traditional stationary, area, mobile source, and transportation control measures, the 2010 Plan contains a number of new control measures designed to protect the climate and promote mixed use, compact development to reduce vehicle emissions and exposure to pollutants from stationary and mobile sources (BAAQMD 2010).

None of the 18 stationary source control measures are applicable to the project. In addition, none of the 10 mobile source measures or six land use and local impact measures applies to the project. Of the transportation control measures, TCM D (Support Focused Growth), measures D-1 through D-3, apply to the project. The project will be developed in an existing urban area with easy access to transit stops and anticipated bike paths and the project would provide sidewalks.

Relative to the Energy and Climate measures contained in the 2010 Clean Air Plan, the project would be consistent with all applicable measures:

Energy Efficiency: The project applicant would be required to conform to the energy efficiency requirements of the California Building Standards Code, also known as Title 24. Specifically, the project must implement the requirements of the most recent Building Energy Efficiency Standards, which is the current version of Title 24. The 2008 Building Efficiency Standards were adopted and updated in 2013, in part, to meet an Executive order in the Green Building Initiative to improve the energy efficiency of buildings through aggressive standards. The updated 2013 Title 24 Standards are 30 percent more efficient than the 2008 Title 24 standards for non-residential buildings.

Renewable Energy. PG&E provides electricity and natural gas service to the City. PG&E facilities include nuclear, natural gas, and hydroelectric facilities. PG&E's 2015 power mix consisted of nuclear generation (23.0 percent), large hydroelectric facilities (6.0 percent) and renewable resources (30.0 percent), such as wind, geothermal, biomass and small hydro. The remaining portion came from natural gas (25.0 percent), and unspecified sources (17.0 percent) (PG&E 2015). The Renewable Portfolio Standard requires PG&E to include a minimum of 33 percent renewable energy in their portfolio by year 2020.

In summary, the project would comply with all applicable rules and regulations and the project would not impede attainment because its emissions fall below the BAAQMD regional significance thresholds.

Criterion 3

If the approval of a project would not cause a disruption, delay, or otherwise hinder the implementation of any air quality plan control measure it would be considered consistent with the 2010 CAP. Examples of how a project may cause the disruption or delay if control measures include a project that precludes an extension of a transit line or bike path, or proposes excessive biking beyond parking requirements. The project will not preclude extension of a transit line or bike path, propose excessive parking beyond parking requirements, or otherwise create an impediment or disruption to implementation of any AQP control measures. As shown above, the project incorporates several AQP control measures as project design features.

Conclusion

The project would be consistent with the criteria of the AQP with incorporation of City SCA 13 Construction Management, SCA 19 Construction-Related Air Pollution Controls (Dust and Equipment Emissions), and SCA 23 Asbestos in Structures. As such, with the incorporation of these SCAs this impact would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact AIR-2 Violate any air quality standard or contribute to an existing or projected air quality violation?

Impact Analysis

This impact relates to localized criteria pollutant impacts. Potential localized impacts would be exceedances of state or federal standards for particulate matter (PM_{10}), or carbon monoxide (CO). PM_{10} are of concern during construction because of the potential to emit fugitive dust during earth-disturbing activities (construction fugitive dust). CO emissions are of concern during project operation because operational CO hotspots are related to increases in on-road vehicle congestion. Each pollutant is discussed separately below.

Construction Fugitive Dust

During construction (grading), fugitive dust (PM_{10}) would be generated from site grading and other earth-moving activities. The majority of this fugitive dust will remain localized and will be deposited near the project site.

The City of Oakland does not have a quantitative threshold for fugitive dust. The BAAQMD's Air Quality Guidelines recommend that projects determine the significance for fugitive dust through application of Best Management Practices (BMPs). SCAs 13 and 19 require the implementation fugitive dust control measures that are consistent with BMPs established by the BAAQMD, which reduce the project's construction-generated fugitive dust impacts to a less than significant level.

Operational CO Hotspot

Localized high levels of CO (CO hotspot) are associated with traffic congestion and idling or slow-moving vehicles. The BAAQMD recommends a screening analysis to determine if a project has the potential to contribute to a CO hotspot. The screening criteria identify when site-specific CO dispersion modeling is necessary. The project would result in a less than significant impact to air quality for local CO if the following screening criteria are met:

- The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans; or
- The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour; or
- The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

A review of the 2015 Congestion Management Plan for Alameda County indicates that the project is consistent with the applicable congestion management plan. According to the Traffic

Impact Study prepared for the project by Stantec Consulting Services, the project would generate approximately 308 net new trips during the a.m. peak hour and 205 net new trips during the p.m. peak hour and would not substantially increase traffic volumes on nearby roadways above 44,000 vehicles per hour. Furthermore, the adjacent roadways are not located in an area where vertical and/or horizontal mixing, or the free movement of the air mass, is substantially limited by physical barriers such as bridge overpasses or urban or natural canyon walls. Therefore, the project would not significantly contribute to an existing or projected CO hotspot. Impacts are less than significant.

Conclusion

The project would not generate a significant amount of fugitive dust during construction after compliance with SCA 13 and 19. The project operations would not generate or substantially contribute to a CO hotspot. Therefore, the project would not violate an air quality standard or substantially contribute to an existing or projected air quality violation.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact AIR-3	**Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?**

Impact Analysis

This impact is related to regional air quality impacts. Non-attainment pollutants of concern for this impact are ozone, PM_{10} and $PM_{2.5}$. If a project exceeds the identified regional significance thresholds, its emissions would be cumulatively considerable and result in significant adverse air quality impacts to the region's existing air quality conditions. Project construction and operational impacts are assessed separately below. See Section 4 for Modeling Parameters and Assumptions.

Construction Emissions

Construction is anticipated to begin in June 2017 and be completed by November 2017. If construction were delayed to later years, the emissions would be expected to decrease as new

regulations requiring lower polluting construction equipment take effect that would require the turnover of higher polluting equipment.

Construction activities associated with development activities contemplated by the project would include demolition, site preparation, grading, paving, building construction, and painting. Generally, the most substantial air pollutant emissions would be dust generated from demolition, site preparation and grading. If uncontrolled, these emissions could lead to both health and nuisance impacts. Construction activities would also temporarily create emissions of equipment exhaust and other air contaminants.

BAAQMD bases the determination of significance for fugitive dust on a consideration of the control measures to be implemented. If all appropriate emissions control measures recommended by BAAQMD are implemented for a project, then fugitive dust emissions during construction are not considered significant. Therefore, without application of best management practices, this impact is potentially significant. Incorporation of SCA 13 Construction Management Plan and SCA 19 Construction-Related Air Pollution Controls (Dust and Equipment Emissions) would reduce this impact to less than significant.

Off-road construction equipment is a large source of oxides of nitrogen (NOx) and diesel particulate matter in the Bay Area. NOx is an ozone precursor pollutant that contributes to regional ozone formation. Diesel particulate matter contributes to elevated PM_{10} and $PM_{2.5}$ concentrations and is a TAC.

Table 8 summarizes the 2017 construction-generated emissions by construction phase in annual tons and also provides the average daily emissions. Table 9 provides the 2018 construction-generated emissions by construction phase in annual tons and also provides the average daily emissions. As shown in Tables 8 and 9 the project would not exceed the City of Oakland thresholds of significance. Therefore, project construction emissions are less than significant.

Table 8: 2017 Construction Criteria Air Pollutant Emissions (Tons)

Phase	ROG	NOx	CO	SO2	Fugitive PM10 (Dust)	Exhaust PM10	Total PM10	Fugitive PM2.5 (Dust)	Exhaust PM2.5	Total PM2.5
Site Preparation										
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-road Equipment	0.00	0.02	0.01	0.00		0.00	0.00		0.00	0.00
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00						
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00
Off-road Equipment	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Utilities										
Off-road Equipment	0.01	0.09	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Construction										
Off-road Equipment	0.05	0.51	0.32	0.00	0.00	0.03	0.00	0.00	0.03	0.03
Offsite (Hauling, Vendors, Worker trips)	0.01	0.07	0.06	0.00	0.01	0.00	0.01	0.00	0.00	0.00
Total Tons	**0.07**	**0.72**	**0.45**	**0.00**	**0.02**	**0.04**	**0.02**	**0.00**	**0.04**	**0.04**
Total Pounds	**145.22**	**1,435.24**	**907.84**	**1.64**	**32.04**	**84.16**	**36.80**	**9.38**	**77.48**	**86.86**
Average Daily Emissions	**1.61**	**15.95**	**10.09**	**0.02**	**0.36**	**0.94**	**0.41**	**0.10**	**0.86**	**0.97**
City of Oakland Threshold	**54**	**54**	**N/A**	**N/A**	**-**	**-**	**82**	**-**	**-**	**54**
Exceed Threshold?	**No**	**No**	**N/A**	**N/A**	**-**	**-**	**No**	**-**	**-**	**No**
Significant Impact?	**No**	**No**	**N/A**	**N/A**	**-**	**-**	**No**	**-**	**-**	**No**

Table 9: 2018 Construction Criteria Air Pollutant Emissions (Tons)

Phase	ROG	NOx	CO	SO2	Fugitive PM10 (Dust)	Exhaust PM10	Total PM10	Fugitive PM2.5 (Dust)	Exhaust PM2.5	Total PM2.5
Building Construction										
Off-road Equipment	0.06	0.61	0.43	0.00	0.00	0.04	0.04	0.00	0.04	0.04
Offsite (Hauling, Vendors, Worker trips)	0.01	0.09	0.07	0.00	0.02	0.00	0.02	0.00	0.00	0.01
Paving										
Off-road Equipment	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Architectural Coating										
Painting	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-road Equipment	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Final Cleanup/Punch List										
Painting	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Off-road Equipment	0.01	0.14	0.10	0.00	0.00	0.01	0.01	0.01	0.00	0.01
Offsite (Hauling, Vendors, Worker trips)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Tons	**0.41**	**0.87**	**0.63**	**0.00**	**0.02**	**0.05**	**0.07**	**0.01**	**0.04**	**0.05**
Total Pounds	**828.30**	**1,743.14**	**1,263.38**	**2.00**	**36.52**	**100.22**	**136.74**	**26.12**	**76.32**	**102.44**
Average Daily Emissions	**5.71**	**12.02**	**8.71**	**0.01**	**0.25**	**0.69**	**0.94**	**0.18**	**0.53**	**0.71**

Phase	ROG	NOx	CO	SO2	Fugitive PM10 (Dust)	Exhaust PM10	Total PM10	Fugitive PM2.5 (Dust)	Exhaust PM2.5	Total PM2.5
City of Oakland Threshold	**54**	**54**	**N/A**	**N/A**	**-**	**-**	**82**	**-**	**-**	**54**
Exceed Threshold?	**No**	**NO**	**N/A**	**N/A**	**-**	**-**	**No**	**-**	**-**	**No**
Significant Impact?	**No**	**NO**	**N/A**	**N/A**	**-**	**-**	**No**	**-**	**-**	**No**
Note: The construction emissions calculations presented in this table are based on an earlier construction start date. It should be noted that emissions based on the later construction start date would be less.										

Operational Emissions

Long-term operation of the project would generate an increase in traffic volumes on the local roadways within the Project vicinity and as such would increase localized emissions. Note that operational emissions have not been estimated for potential stationary source equipment such as generators since none have currently been proposed. Additionally, any stationary source equipment would be subject to BAAQMD permitting requirements.

The annual operational emissions for the project are shown in Table 10. Table 11 and Table 12 show the daily operational emissions for summer and winter, respectively. As shown in the tables, the project would not exceed the City of Oakland's annual or daily significance thresholds. The impact would be less than significant.

Table 10: Annual Operational Emissions (2019)

	Annual Emissions (tons)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Project Operations	0.45	1.36	0.53	0.15
BAAQMD Threshold of Significance	10	10	15	10
Exceed Significance Threshold?	No	No	No	No
Note: Operational emissions were based on an earlier operational date of 2019; actual operational emissions will decrease in later operational years as vehicle fleets become cleaner.				

Table 11: Daily Operational Emissions (2019) (Summer)

	Overall Operational lbs./day (Maximum Daily Emissions – Criteria Pollutants)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Project Operations	3.16	10.11	4.21	1.19
City of Oakland Thresholds of Significance	54	54	82	54
Exceed Significance Threshold?	No	No	No	No
Note: Operational emissions were based on an earlier operational date of 2019; actual operational emissions will decrease in later operational years as vehicle fleets become cleaner.				

Table 12: Daily Operational Emissions (2019) (Winter)

	Overall Operational lbs./day (Maximum Daily Emissions – Criteria Pollutants)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Project Operations	2.93	10.53	4.21	1.19
City of Oakland Threshold of Significance	54	54	82	54

	Overall Operational lbs./day (Maximum Daily Emissions – Criteria Pollutants)			
	ROG	NO_x	PM_{10}	$PM_{2.5}$
Exceed Significance Threshold?	No	No	No	No
Note: Operational emissions were based on an earlier operational date of 2019; actual operational emissions will decrease in later operational years as vehicle fleets become cleaner.				

Conclusion

Project construction emissions would not exceed the City of Oakland's thresholds of significance for regional construction emissions. Operational emissions would not exceed the City of Oakland's thresholds of significance for regional operational emissions. SCAs 13 and 19 would ensure that all appropriate emissions controls for fugitive dust are implemented during construction, and thus would reduce fugitive dust impacts to a less than significant level. As such, the residual significance of this impact would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact AIR-4 Expose sensitive receptors to substantial pollutant concentrations?

Impact Analysis

This impact addresses whether the project would expose sensitive receptors to construction-generated fugitive dust (PM_{10} and $PM_{2.5}$), construction-generated DPM, operational-related TACs, or operational CO hotspots. Project construction and operational impacts are assessed separately below.

A sensitive receptor is defined as the following "Facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and residential areas" (BAAQMD 2010).

Two scenarios have the potential for exposing sensitive receptors to TACs. The first is when a project includes a new or modified source of TACs and would be located near an existing or proposed

sensitive receptor. The second scenario involves a residential or other sensitive receptor development locating near an existing or planned source of TACs. Because the project would house sensitive receptors, the project itself is a sensitive receptor.

Construction

Project as a Source

Construction Generated DPM

As discussed in the BAAQMD's 2010 Air Quality Guidelines, construction activity using diesel-powered equipment emits DPM, a known carcinogen. DPM includes exhaust $PM_{2.5}$. A 10-year research program (ARB 1998) demonstrated that DPM (exhaust $PM_{2.5}$) from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. Health risks from TACs are a function of both concentration and duration of exposure. Construction diesel emissions are temporary, affecting an area for a period of weeks or months. Additionally, construction-related sources are mobile and transient in nature. SCAs 13 and 19 require the preparation of a Construction Management Plan that would implement control measures to reduce equipment exhaust, which is the primary source of DPM. Because of the temporary nature of construction emissions and with compliance with SCAs 13 and 19, construction emissions of DPM would be minimized and the potential health risk impact would be less than significant.

Construction Fugitive Dust

During construction (grading), fugitive dust (PM_{10}) is generated. As detailed in Impact AIR-2, the project would result in a less than significant dust impact after compliance with SCAs 13 and 19. Therefore, the project would not expose adjacent receptors to significant amounts of construction dust.

Operations

Project as a Receptor

The project is locating new sensitive receptors (students) in an area where they could be subject to existing sources of TACs.

For project-level analysis, the City of Oakland specifies both individual and cumulative-level thresholds of significance for risks and hazards. For projects that are considered new sources of TACs or $PM_{2.5}$ (such as stationary sources, industrial sources, or roadway projects), it is generally appropriate to use both the project-level and cumulative-level thresholds because the project-level threshold identifies said project's individual contribution to risk, while the cumulative threshold assesses said project's cumulative contribution to risk. However, for projects that consist of new receptors, it is generally appropriate to use only the cumulative-level threshold because the project itself is not a source of TACs and, thus, the individual project-level threshold is not relevant.

The cumulative risk threshold accounts for all potential sources of TACs and $PM_{2.5}$ in proximity to new receptors. Because the proposed project is not considered a source of TACs, this analysis is focused to the cumulative impact of nearby sources of TACs to the project site.

Placeworks prepared a quantitative Health Risk Assessment (HRA) that is in accordance with BAAQMD recommended methodologies and consistent with the City of Oakland's Standard Condition of Approval #20 requiring an HRA to assess a project's exposure to TACs. The following information is based on the HRA for the project included as Appendix B. As noted previously, the assessment and dispersion modeling methodologies used in the preparation of this report included all relevant and appropriate procedures developed by the EPA and the latest guidance on conducting health risk assessments from OEHHA (2015). These methodologies and assumptions were used to ensure that the assessment effectively quantified school-based impacts associated with emission sources.

The BAAQMD has developed screening analysis tools for identifying stationary and mobile sources within the vicinity of a proposed project. Two stationary sources were identified within a quarter-mile of the site. In addition, three high volume roadways (average annual daily traffic counts in excess of 10,000 vehicles per day) were identified. Lastly, emissions generated by diesel locomotives from Amtrak passenger trains and UP freight trains to the southwest of the site were included in the assessment. Contaminant release information and associated chemical species were identified through a review of available documentation for each identified source (see Table 13). To assess the impact of emitted compounds on individuals who may work and/or attend classes at the proposed school facility, air quality modeling using the ISCST3 atmospheric dispersion model was performed for the two stationary sources and locomotive mobile sources. The model is a steady state Gaussian plume model and is recommended by BAAQMD for estimating ground level or flagpole-level impacts from point and fugitive sources in simple and complex terrain. Health risks associated with exposure to carcinogenic compounds at the proposed project site were determined in accordance with BAAQMD and the Office of Environmental Health Hazard Assessment (OEHHA) guidance. Non-carcinogenic, chronic, and acute health risks were also estimated using the hazard index approach and ARB's HARP2, Risk Assessment Standalone Tool.

The results of the health risk assessment from individual and cumulative emission sources, provided in Table 13, indicate that the excess cancer risk from each individual stationary and mobile source within a quarter-mile from the site is less than the City of Oakland threshold of 10 in a million for a lifetime cancer risk and less than the non-carcinogenic chronic hazard index of 1.0. The $PM_{2.5}$ concentrations for all individual emission sources are below the City of Oakland significance threshold of 0.3 µg/m^3. In addition, the cumulative health risks from all evaluated emission sources are below City of Oakland's cumulative significance thresholds.

Table 13: Health Risk Assessment Results

Source	Cancer Risk (per million)		Chronic Hazard Index	Acute Hazard Index	PM2.5 (µg/m³)
	Staff Exposure	Student Exposure			
Refined Modeling Values					
Pro Speed Auto Body	0.00	0.00	< 0.001	< 0.001	N/A
H&H Auto Collision, Inc.	0.00	0.00	< 0.001	< 0.001	N/A
Amtrak/UP Railroad	0.03	0.06	< 0.001		N/A
Screening Values					
International Boulevard	2.65	2.86	0.030	0.030	0.14
Fruitvale Avenue	0.33	0.35	0.030	0.030	0.02
East 12th Street	0.56	0.61	0.030	0.030	0.03
City of Oakland Project-level Threshold	10	10	1.0	1.0	0.30
Exceed City of Oakland Project-level Threshold?	No	No	No	No	No
Cumulative Total	3.57	3.88	0.09	0.09	0.19
City of Oakland Cumulative Threshold	100	100	10	10	0.80
Exceed City of Oakland Cumulative Threshold?	No	No	No	No	No

Notes:
N/A = not applicable
Source: Placeworks, 2016

Based on a comparison to the carcinogenic and non-carcinogenic thresholds established by OEHHA and the City of Oakland, hazardous air emissions generated from the stationary and mobile sources within a quarter-mile radius are not anticipated to pose an actual or potential endangerment to students and staff occupying the project site and no mitigation measures are required.

Asbestos

Because the proposed project would involve demolition of the existing buildings, various regulatory requirements apply. The BAAQMD has regulations that require compliance with the asbestos demolition and renovation requirements. Regulation 11-2-401.3 requires that for every demolition (even when no asbestos is present), a notification must be made to the BAAQMD at least 10 working days (except in special circumstances) prior to commencement of demolition/renovation. This requirement is included as SCA 23 by the City of Oakland as to reduce

potential health risks from demolishing asbestos containing building materials to a less than significant level.

The California Department of Conservation and the USGS have published a guide for generally identifying areas that are likely to contain naturally occurring asbestos (NOA). The closest ultramafic rock outcroppings are located approximately 3.5 miles northeast of the project site (USGS 2011); as such, there is no potential for NOA to occur on site. The BAAQMD requires that construction and grading projects located where NOA is likely to be found prepare an Asbestos Airborne Toxic Control Measure (ATCM). The project would not be required to prepare an ATCM.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact AIR-5 Create objectionable odors affecting a substantial number of people?

Impact Analysis

Odors are generally regarded as an annoyance rather than a health hazard and the ability to detect odors varies considerably among the populations and overall is subjective.

The City of Oakland has determined that a significant odor impact would occur if a project would frequently and for a substantial duration, create or expose sensitive receptors to substantial objectionable odors affecting a substantial number of people The City of Oakland does not have a recommended odor threshold for construction activities. However, BAAQMD recommends operational screening criteria, as shown in Table 14, that are based on distance between types of sources known to generate odor and the receptor. Projects that would site an odor source or a receptor farther than the applicable screening distance, shown in Table 14 below, would not result in a significant odor impact.

Table 14: Odor Screening Distances

Odor Generator	Distance
Wastewater Treatment Facilities	2 mile
Wastewater Pumping Facilities	1 mile
Sanitary Landfill	2 miles

Odor Generator	Distance
Transfer Station	1 mile
Compositing Facility	1 mile
Petroleum Refinery	1 mile
Asphalt Batch Plant	2 miles
Chemical Manufacturing	2 miles
Fiberglass Manufacturing	1 mile
Painting/Coating Operations (e.g., auto body shop)	1 mile
Rendering Plan	2 miles
Coffee Roaster	1 mile
Confined Animal Facility/Feed Lot/Dairy	1 mile
Green Waste and Recycling Operations	1 mile
Metal Smelting Plant	2 miles
Source: BAAQMD 2010	

Project Construction

Diesel exhaust and ROG would be emitted during construction of the project, the odors of which are objectionable to some; however, emissions would disperse rapidly from the project site and, therefore, would not create objectionable odors affecting a substantial number of people. Therefore, odor impacts would be less than significant during project construction.

Project Operation

Land uses typically considered associated with odors include wastewater treatment facilities, waste-disposal facilities, or agricultural operations. The project does not contain any of these land uses, or other land uses typically associated with emitting objectionable odors.

The project site is not located within the recommended screening distances (as shown in Table 14) of any typical sources of objectionable odors, which typically include agricultural operations (e.g., dairies, feedlots, etc.), landfills, wastewater treatment plants, refineries, and other types of industrial land uses. Therefore, odor impacts would be less than significant during project operations.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

7.0 GREENHOUSE GAS ANALYSIS RESULTS

7.1 CEQA GUIDELINES

The CEQA Guidelines define a significant effect on the environment as "a substantial, or potentially substantial, adverse change in the environment." To determine if a project would have a significant impact on GHGs, the type, level, and impact of emissions generated by the project must be evaluated.

The following GHG significance thresholds are contained in Appendix G of the CEQA Guidelines:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

City of Oakland Greenhouse Gas Significance Criteria

Greenhouse gas impacts are, by their nature, cumulative impacts because one project by itself cannot cause global climate change. These thresholds pertain to a project's contribution to cumulative impacts but are labeled "Project-Level Impacts" here to be consistent with the terminology used by BAAQMD. For a project involving a land use development, the project would need to produce total emissions of more than 1,100 metric tons of CO_2e annually and more than 4.6 metric tons of CO_2e per service population annually. The service population includes both the residents and the employees of the project. The project's impact would be considered significant if the emissions exceed both the 1,100 metric tons threshold and the 4.6 metric tons threshold. Accordingly, the impact would be considered less than significant if the project's emissions are below either of these thresholds.

The City of Oakland adopted its Energy and Climate Action Plan (ECAP) in December 2012. The ECAP identified a GHG reduction target for the year 2020 of 36 percent below the 2005 levels and provided a checklist for new development to determine consistency with the Plan. The ECAP is recognized as a qualified GHG Reduction Strategy pursuant to State CEQA Guidelines and BAAQMD criteria.

7.2 IMPACT ANALYSIS

Impact GHG-1	**Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?**

Impact Analysis

The project is located in Alameda County, which is a part of the San Francisco Bay Area Air Basin (Air Basin). The Air Basin is regulated by the BAAQMD. Greenhouse gas emissions were estimated

for construction and operations of the project using the California Emissions Estimator model version 2013.2.2

Construction

The project would emit greenhouse gas emissions during construction from the off-road equipment, worker vehicles, and any hauling that may occur. The BAAQMD does not presently provide a construction-related greenhouse gas generation threshold, but recommends that construction-generated greenhouse gases be quantified and disclosed. However, BAAQMD does recommend that Lead Agencies quantify, disclose, and provide a significance determination for construction-generated greenhouse gas emissions. Therefore, the project operational emission threshold of 1,100 $MTCO_2e$ is used in this analysis to determine significance of project construction emissions. Greenhouse gas emissions from project construction equipment and worker vehicles are shown in Table 15.

Table 15: Construction Greenhouse Gas Emissions

Year	Emissions ($MTCO_2e$)
2017	76
2018	104
Total	180
Amortized emissions (40 year life expectancy)	4.5

Construction of the proposed project would generate greenhouse gases. AB 32 requires that greenhouse gas emissions generated in California in year 2020 be equal to or less than California's statewide inventory from 1990. Construction emissions would occur before the year 2020, so the project's construction would not contribute to year 2020 emissions, furthermore, the project's construction emissions in addition to the operational emissions are less than the 1,100 $MTCO_2e$ screening threshold established by the BAAQMD. Therefore, construction emissions would not conflict with the AB 32 Scoping Plan and would be less than significant.

Operations

Long-term, operational GHG emissions would result from project generated vehicular traffic, onsite combustion of natural gas, operation of any landscaping equipment, offsite generation of electrical power over the life of the project, the energy required to convey water to and wastewater from the project site, and the emissions associated with the hauling and disposal of solid waste from the project site. Operational emissions for the project are shown in Table 16.

Table 16: Operational Greenhouse Gas Emissions (2019)

Emission Source	Emissions ($MTCO_2e$)
Area Sources	0.01
Energy	119
Mobile (Motor Vehicles)	660
Waste	57
Water	8
Total Operational Emissions	844
Amortized Construction Emissions	4.5
Total GHG Emissions	**849**
City of Oakland Screening Threshold	**1,100**
Significant Impact?	**No**

As shown above, the project would be less than the 1,100 $MTCO_2e$ screening threshold established by the City of Oakland. The City of Oakland set the thresholds of 1,100 $MTCO_2e$ and 4.6 $MTCO_2e$/sp as a screening mechanism for determining whether projects would have significant GHG emissions. Projects that are below the screening thresholds would not have the potential to cause a significant GHG impact. Accordingly, the Project impacts to GHGs would be less than significant.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Impact GHG-2	**Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?**

Impact Analysis

The project's consistency with the City of Oakland's ECAP and ARB's Scoping Plan were used for this analysis.

Energy Climate Action Plan

As a qualified GHG Reduction Strategy, the ECAP provides a list of mandatory measures that a new development project must comply with in order to be deemed consistent and thus less than significant for GHG impacts. Table 17 provides a consistency determination of the required measures.

Table 17: City of Oakland Energy and Climate Action Plan Consistency Analysis

Reduction Measure		Consistency/Applicability Determination
Goal Area: Transportation and Land Use		
TLU-7	Create a Transportation Impact Fee	**Not applicable.** This is a City-wide measure. The Project would pay all applicable development fees at the time building permits are sought.
TLU-8	Require Transit-Oriented Development Performance for New Development	**Consistent.** The Project is consistent with the land use designation and zoning. The Project would construct a school near transit which would promote alternative transportation methods from students and employees.
TLU-13	Launch and Develop a Funding Plan for the Downtown Shuttle	**Not applicable.** The City launched the Free B Shuttle and service is continuing. The project would not impact the operation of the Shuttle.
TLU-16	Accelerate Completion of Bicycle and Pedestrian Networks	**Not applicable.** This is a City-wide measure and is not project-specific. The City has implemented this measure and has completed a number of bikeways. The project would comply with regulations for constructing pedestrian connections through and from the site.
TLU-17	Optimize Street Design for Transit, Bicycling and Walking	**Not applicable.** This is a City-wide measure. The City is developing "complete streets" criteria for optimizing street design based on the primary and secondary modes each street is designed to serve. The project would not impede the City's progress towards this goal.
TLU-26	Enforce Transportation Demand Management Measures in New Development	**Not applicable.** The City has developed a Transportation Demand Management Program that is applicable to new large, dense development to ensure that these projects establish programs to reduce vehicle traffic and provide multi-modal options. The project would not be considered a large development.
TLU-30	Impose Parking Maximums on New Development	**Not applicable.** The City is currently considering parking maximums, and other strategies to reduce

Reduction Measure		Consistency/Applicability Determination
		parking demand, in the process of preparing zoning updates for Off-Street Parking. The Transportation Demand Management program update will include updating TDM requirements for major new development projects. The project would comply with the existing parking requirements.
TLU-31	Facilitate Unbundling of Parking Costs from Renting Building Space	**Not applicable.** This is a City-wide measure that the applicant cannot implement at a project-level.
Goal Area: Building Energy Use		
BE-1	Adopt a Green Building Ordinance for Private Development	**Consistent.** The City Council adopted a Green Building Ordinance for Private Development in 2010. The Project would comply with the Ordinance.
BE-32	Create an Oakland-specific Water Efficient Landscape Ordinance	**Not applicable.** This is a City-wide measure that the applicant cannot implement at a project-level. The Ordinance development is on-hold due to budgetary concerns.
Goal Area: Material Consumption and Waste		
MW-1	Restructure Solid Waste Management System	**Not applicable.** This is a City-wide measure that the applicant cannot implement at a project-level.
MW-4	Enforce Statewide and Countywide Bans on Certain Materials	**Not applicable.** This is a City-wide measure that the applicant cannot implement at a project-level.
Source of Measures: City of Oakland Energy and Climate Action Plan, Appendix 2011		

As shown above, many of the measures would not be applicable on a project-level basis; however, the project would not impede the implementation of those measures. The proposed project would promote transit use, pedestrian activity, and bicycling by incorporating bicycle racks into the project design, there is also a public transit stop located within 200 feet of the project site and additional public transit via BART nearby.

The project would be consistent with Title 24, Part 6 energy efficiency standards. Consistent with Executive Order S-20- 04, sustainable measures and conservation features would be implemented in accordance with the Green Building Code, assuring minimal energy use and further minimizing direct and indirect GHG emissions from project operations.

For all the reasons provided above, the Project would be consistent with the City of Oakland's ECAP and would have a less than significant impact on GHGs.

AB 32 Scoping Plan

AB 32 required the ARB to develop a Scoping Plan that would reduce emissions to 1990 levels by 2020. The ARB's adopted AB 32 Scoping Plan (Scoping Plan) calls for an approximate 29 percent reduction of Business as Usual (BAU) from 2020 levels or 15 percent from 2008 levels. The Scoping Plan also refers to Executive Order S-3-05, which identified the Scoping Plan's 2020 target, but also included a 2050 GHG emissions reduction goal that represents the level scientists believe is necessary to stabilize the climate. The City of Oakland's GHG thresholds incorporate BAAQMD's recommended significance thresholds which are based on Executive Order S-3-05 reductions goals. Therefore, project emission less than the City of Oakland's significance thresholds demonstrates consistency with Executive Order S-3-05 goals and, by extension, the ARB's Scoping Plan to achieve AB 32 reduction goals. The project's GHG emissions are below the greenhouse gas thresholds recommended by the City of Oakland, as demonstrated above. Therefore, it can be concluded that the project is in compliance with the applicable AB 32 Scoping Plan.

The Scoping Plan identifies recommended measures for multiple greenhouse gas emission sectors and the associated emission reductions needed to achieve the year 2020 emissions target—each sector has a different emission reduction target. Most of the measures target the transportation and electricity sectors. As shown in Table , the project is consistent with the strategies or the strategies are not applicable to the project. Therefore, the project is consistent with the applicable strategies and would not conflict with the recommendations of AB 32 in achieving a statewide reduction in greenhouse emissions. The impact is less than significant.

Table 18: Scoping Plan Measures Consistency Analysis

Scoping Plan Reduction Measure	Project Consistency
California Cap-and-Trade Program Linked to Western Climate Initiative. Implement a broad-based California Cap-and-Trade program to provide a firm limit on emissions. Link the California cap-and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.	**Not applicable.** Although the cap-and-trade system has begun, the project is not one targeted by cap-and-trade system regulations and therefore this measure does not apply to the Project.
California Light-Duty Vehicle Greenhouse Gas Standards. Implement adopted standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency. However, the standards would be applicable to the light-duty vehicles that would access the project site.
Energy Efficiency. Maximize energy efficiency building and appliance standards; pursue additional efficiency including new technologies,	**Consistent.** This is a measure for the State to increase its energy efficiency standards in new buildings. The project is required to build to the

Scoping Plan Reduction Measure	Project Consistency
policy, and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California.	new standards and would maximize its energy efficiency through compliance.
Renewable Portfolio Standard. Achieve 33 percent renewable energy mix statewide. Renewable energy sources include (but are not limited to) wind, solar, geothermal, small hydroelectric, biomass, anaerobic digestion, and landfill gas.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency. Pacific Gas and Electric is required to increase its percent of power supply from renewable sources to 33 percent by the year 2020 pursuant to various regulations. Therefore, the school would purchase power that is comprised of a greater amount of renewable sources.
Low Carbon Fuel Standard. Develop and adopt the Low Carbon Fuel Standard.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency. When this measure goes into effect, the standard would be applicable to the fuel used by vehicles that would access the project site.
Regional Transportation-Related Greenhouse Gas Targets. Develop regional greenhouse gas emissions reduction targets for passenger vehicles. This measure refers to SB 375.	**Not applicable.** The project is not related to developing greenhouse gas emission reduction targets. To meet the goals of SB 375, Plan Bay Area is the Sustainable Communities Strategy Plan from the Bay Area Metropolitan Transportation Commission that is applicable to the project. The project would not preclude the implementation of this strategy.
Vehicle Efficiency Measures. Implement light-duty vehicle efficiency measures.	**Not applicable.** When this measure is initiated, the standards would be applicable to the light-duty vehicles that would access the project site.
Goods Movement. Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.	**Not applicable.** The project does not propose any changes to maritime, rail, or intermodal facilities or forms of transportation.
Million Solar Roofs Program. Install 3,000 MW of solar-electric capacity under California's existing solar programs.	**Consistent.** This measure is to increase solar throughout California, which is being done by various electricity providers and existing solar programs. The project would comply with Title 24, which requires new buildings to be "solar ready." The project would not preclude the implementation of this strategy.
Medium/Heavy-Duty Vehicles. Adopt medium and heavy-duty vehicle efficiency measures.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency. The standards phase-in over model years 2014 through 2018 would be applicable to the vehicles that access the project site.
Industrial Emissions. Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce greenhouse gas emissions and provide other pollution reduction co-benefits. Reduce	**Not applicable.** This measure would apply to the direct greenhouse gas emissions at major industrial facilities emitting more than 500,000 $MTCO_2e$ per year. The project is not an industrial land use.

Scoping Plan Reduction Measure	Project Consistency
greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.	
High Speed Rail. Support implementation of a high-speed rail system.	**Not applicable.** This is a statewide measure that cannot be implemented by a project applicant or lead agency. The project would not preclude the implementation of this strategy.
Green Building Strategy. Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.	**Consistent.** The project would comply with the California Energy Code, and thus incorporate applicable energy efficiency features designed to reduce project energy consumption.
High Global Warming Potential Gases. Adopt measures to reduce high global warming potential gases.	**Not applicable.** This measure is applicable to the high global warming potential gases (high GWP refrigerant) that would be used by non-residential sources with large equipment (such as in air conditioning and commercial refrigerators). he project is a mixed use project and would not include refrigeration or air conditioning equipment that would use more than 50 pounds of high-GWP refrigerant.
Recycling and Waste. Reduce methane emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero waste.	**Consistent.** The project would utilize City of Oakland recycling services.
Sustainable Forests. Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation.	**Not applicable.** The project site is not forested; therefore, no preservation is possible.
Water. Continue efficiency programs and use cleaner energy sources to move and treat water.	**Consistent.** The project would comply with Green Building Code regulations and would implement required water conservation features.
Agriculture. In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.	**Not applicable.** The project site is not designated or in use for agriculture purposes. No grazing, feedlot, or other agricultural activities that generate manure occur on-site or are proposed to be implemented by the project.
Source of Measures: California Air Resources Board, Scoping Plan, 2008	

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less Than Significant Impact.

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APPENDIX A:
CALEEMOD RESULTS

CalEEMod Results

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Aspire Results – Annual 1
Aspire Results – Summer 30
Aspire Results – Winter 37

Aspire Eres Academy - Alameda County, Annual

Aspire Eres Academy

Alameda County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	620.00	Student	0.42	51,834.09	0
Other Non-Asphalt Surfaces	0.05	Acre	0.05	2,178.00	0
Parking Lot	0.42	Acre	0.42	18,295.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per applicant info

Construction Phase - Based on applicant schedule

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - assumed equipment

Off-road Equipment -

Off-road Equipment - Assumed equipment for utilities

Demolition -

Grading -

Architectural Coating - final clean and punch has minimal painting, if any

Vehicle Trips - Based on Stantec Traffic Study

Water And Wastewater - Based on applicant info

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	25,081.00	10,000.00
tblArchitecturalCoating	ConstArea_Nonresidential_Interior	75,243.00	10,000.00
tblArchitecturalCoating	ConstArea_Parking	1,228.00	500.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	5.00	16.00
tblConstructionPhase	NumDays	100.00	190.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	1.00	4.00
tblLandUse	LotAcreage	1.19	0.42
tblOffRoadEquipment	LoadFactor	0.20	0.48
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Utilities
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Utilities
tblProjectCharacteristics	OperationalYear	2018	2019
tblVehicleTrips	WD_TR	1.29	1.41
tblWater	OutdoorWaterUseRate	3,740,256.00	16,972.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0790	0.7746	0.4970	8.9000e-004	0.0193	0.0457	0.0650	5.2600e-003	0.0423	0.0475	0.0000	82.4192	82.4192	0.0183	0.0000	82.8776
2018	0.4141	0.8716	0.6317	1.1400e-003	0.0182	0.0501	0.0683	4.9500e-003	0.0462	0.0512	0.0000	104.8535	104.8535	0.0239	0.0000	105.4519
Maximum	**0.4141**	**0.8716**	**0.6317**	**1.1400e-003**	**0.0193**	**0.0501**	**0.0683**	**5.2600e-003**	**0.0462**	**0.0512**	**0.0000**	**104.8535**	**104.8535**	**0.0239**	**0.0000**	**105.4519**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.0790	0.7746	0.4970	8.9000e-004	0.0193	0.0457	0.0650	5.2600e-003	0.0423	0.0475	0.0000	82.4191	82.4191	0.0183	0.0000	82.8775
2018	0.4141	0.8716	0.6317	1.1400e-003	0.0182	0.0501	0.0683	4.9500e-003	0.0462	0.0512	0.0000	104.8534	104.8534	0.0239	0.0000	105.4518
Maximum	**0.4141**	**0.8716**	**0.6317**	**1.1400e-003**	**0.0193**	**0.0501**	**0.0683**	**5.2600e-003**	**0.0462**	**0.0512**	**0.0000**	**104.8534**	**104.8534**	**0.0239**	**0.0000**	**105.4518**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	8-1-2017	10-31-2017	0.4135	0.4135
2	11-1-2017	1-31-2018	0.5065	0.5065
3	2-1-2018	4-30-2018	0.4458	0.4458
4	5-1-2018	7-31-2018	0.4566	0.4566
		Highest	0.5065	0.5065

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2309	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118
Energy	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	118.9212	118.9212	4.1800e-003	1.5200e-003	119.4799
Mobile	0.2124	1.3201	2.2977	7.1700e-003	0.5151	0.0100	0.5251	0.1385	9.4700e-003	0.1480	0.0000	658.8889	658.8889	0.0323	0.0000	659.6969
Waste						0.0000	0.0000		0.0000	0.0000	22.2275	0.0000	22.2275	1.3136	0.0000	55.0677
Water						0.0000	0.0000		0.0000	0.0000	0.4615	2.3069	2.7684	0.0475	1.1400e-003	4.2958
Total	**0.4479**	**1.3622**	**2.3388**	**7.4200e-003**	**0.5151**	**0.0132**	**0.5283**	**0.1385**	**0.0127**	**0.1512**	**22.6890**	**780.1281**	**802.8171**	**1.3976**	**2.6600e-003**	**838.5521**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2309	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118
Energy	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	118.9212	118.9212	4.1800e-003	1.5200e-003	119.4799
Mobile	0.2124	1.3201	2.2977	7.1700e-003	0.5151	0.0100	0.5251	0.1385	9.4700e-003	0.1480	0.0000	658.8889	658.8889	0.0323	0.0000	659.6969
Waste						0.0000	0.0000		0.0000	0.0000	22.2275	0.0000	22.2275	1.3136	0.0000	55.0677
Water						0.0000	0.0000		0.0000	0.0000	0.4615	2.3069	2.7684	0.0475	1.1400e-003	4.2958
Total	**0.4479**	**1.3622**	**2.3388**	**7.4200e-003**	**0.5151**	**0.0132**	**0.5283**	**0.1385**	**0.0127**	**0.1512**	**22.6890**	**780.1281**	**802.8171**	**1.3976**	**2.6600e-003**	**838.5521**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	8/1/2017	8/14/2017	5	10	
2	Site Preparation	Site Preparation	8/15/2017	8/18/2017	5	4	
3	Grading	Grading	8/19/2017	8/25/2017	5	5	
4	Utilities	Trenching	8/26/2017	9/8/2017	5	10	Utilities
5	Building Construction	Building Construction	9/9/2017	6/1/2018	5	190	
6	Architectural Coating	Architectural Coating	6/9/2018	6/15/2018	5	5	
7	Paving	Paving	6/2/2018	6/8/2018	5	5	
8	Final Clean/Punch	Architectural Coating	6/16/2018	7/9/2018	5	16	

Acres of Grading (Site Preparation Phase): 2

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.47

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 75,243; Non-Residential Outdoor: 25,081; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Utilities	Excavators	1	8.00	158	0.38
Utilities	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37

Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	4	6.00	9	0.56
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Final Clean/Punch	Air Compressors	1	6.00	78	0.48
Final Clean/Punch	Forklifts	1	8.00	89	0.48
Final Clean/Punch	Other Construction Equipment	2	8.00	172	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	24.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Utilities	2	5.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	30.00	12.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Final Clean/Punch	4	6.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					2.5900e-003	0.0000	2.5900e-003	3.9000e-004	0.0000	3.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0500e-003	0.0525	0.0396	6.0000e-005		3.6600e-003	3.6600e-003		3.4900e-003	3.4900e-003	0.0000	5.3493	5.3493	1.0500e-003	0.0000	5.3755
Total	**6.0500e-003**	**0.0525**	**0.0396**	**6.0000e-005**	**2.5900e-003**	**3.6600e-003**	**6.2500e-003**	**3.9000e-004**	**3.4900e-003**	**3.8800e-003**	**0.0000**	**5.3493**	**5.3493**	**1.0500e-003**	**0.0000**	**5.3755**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	4.2300e-003	7.0000e-004	1.0000e-005	2.0000e-004	2.0000e-005	2.3000e-004	6.0000e-005	2.0000e-005	8.0000e-005	0.0000	0.9452	0.9452	5.0000e-005	0.0000	0.9465
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.9000e-004	1.8800e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3839	0.3839	1.0000e-005	0.0000	0.3843
Total	**3.7000e-004**	**4.4200e-003**	**2.5800e-003**	**1.0000e-005**	**6.0000e-004**	**2.0000e-005**	**6.3000e-004**	**1.7000e-004**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.3291**	**1.3291**	**6.0000e-005**	**0.0000**	**1.3308**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.5900e-003	0.0000	2.5900e-003	3.9000e-004	0.0000	3.9000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0500e-003	0.0525	0.0396	6.0000e-005		3.6600e-003	3.6600e-003		3.4900e-003	3.4900e-003	0.0000	5.3492	5.3492	1.0500e-003	0.0000	5.3755
Total	**6.0500e-003**	**0.0525**	**0.0396**	**6.0000e-005**	**2.5900e-003**	**3.6600e-003**	**6.2500e-003**	**3.9000e-004**	**3.4900e-003**	**3.8800e-003**	**0.0000**	**5.3492**	**5.3492**	**1.0500e-003**	**0.0000**	**5.3755**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.3000e-004	4.2300e-003	7.0000e-004	1.0000e-005	2.0000e-004	2.0000e-005	2.3000e-004	6.0000e-005	2.0000e-005	8.0000e-005	0.0000	0.9452	0.9452	5.0000e-005	0.0000	0.9465
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.9000e-004	1.8800e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3839	0.3839	1.0000e-005	0.0000	0.3843
Total	**3.7000e-004**	**4.4200e-003**	**2.5800e-003**	**1.0000e-005**	**6.0000e-004**	**2.0000e-005**	**6.3000e-004**	**1.7000e-004**	**2.0000e-005**	**1.9000e-004**	**0.0000**	**1.3291**	**1.3291**	**6.0000e-005**	**0.0000**	**1.3308**

3.3 Site Preparation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0600e-003	0.0000	1.0600e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7000e-003	0.0210	8.7100e-003	2.0000e-005		9.5000e-004	9.5000e-004		8.7000e-004	8.7000e-004	0.0000	1.8135	1.8135	5.6000e-004	0.0000	1.8274
Total	**1.7000e-003**	**0.0210**	**8.7100e-003**	**2.0000e-005**	**1.0600e-003**	**9.5000e-004**	**2.0100e-003**	**1.1000e-004**	**8.7000e-004**	**9.8000e-004**	**0.0000**	**1.8135**	**1.8135**	**5.6000e-004**	**0.0000**	**1.8274**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0768	0.0768	0.0000	0.0000	0.0769
Total	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0768**	**0.0768**	**0.0000**	**0.0000**	**0.0769**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.0600e-003	0.0000	1.0600e-003	1.1000e-004	0.0000	1.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.7000e-003	0.0210	8.7100e-003	2.0000e-005		9.5000e-004	9.5000e-004		8.7000e-004	8.7000e-004	0.0000	1.8135	1.8135	5.6000e-004	0.0000	1.8274
Total	**1.7000e-003**	**0.0210**	**8.7100e-003**	**2.0000e-005**	**1.0600e-003**	**9.5000e-004**	**2.0100e-003**	**1.1000e-004**	**8.7000e-004**	**9.8000e-004**	**0.0000**	**1.8135**	**1.8135**	**5.6000e-004**	**0.0000**	**1.8274**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-005	4.0000e-005	3.8000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0768	0.0768	0.0000	0.0000	0.0769

Total	**5.0000e-005**	**4.0000e-005**	**3.8000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0768**	**0.0768**	**0.0000**	**0.0000**	**0.0769**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8800e-003	0.0000	1.8800e-003	1.0300e-003	0.0000	1.0300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.0200e-003	0.0262	0.0198	3.0000e-005		1.8300e-003	1.8300e-003		1.7400e-003	1.7400e-003	0.0000	2.6746	2.6746	5.3000e-004	0.0000	2.6878
Total	**3.0200e-003**	**0.0262**	**0.0198**	**3.0000e-005**	**1.8800e-003**	**1.8300e-003**	**3.7100e-003**	**1.0300e-003**	**1.7400e-003**	**2.7700e-003**	**0.0000**	**2.6746**	**2.6746**	**5.3000e-004**	**0.0000**	**2.6878**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.4000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1920	0.1920	1.0000e-005	0.0000	0.1921
Total	**1.2000e-004**	**9.0000e-005**	**9.4000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1920**	**0.1920**	**1.0000e-005**	**0.0000**	**0.1921**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.8800e-003	0.0000	1.8800e-003	1.0300e-003	0.0000	1.0300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.0200e-003	0.0262	0.0198	3.0000e-005		1.8300e-003	1.8300e-003		1.7400e-003	1.7400e-003	0.0000	2.6746	2.6746	5.3000e-004	0.0000	2.6878
Total	**3.0200e-003**	**0.0262**	**0.0198**	**3.0000e-005**	**1.8800e-003**	**1.8300e-003**	**3.7100e-003**	**1.0300e-003**	**1.7400e-003**	**2.7700e-003**	**0.0000**	**2.6746**	**2.6746**	**5.3000e-004**	**0.0000**	**2.6878**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.4000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1920	0.1920	1.0000e-005	0.0000	0.1921
Total	**1.2000e-004**	**9.0000e-005**	**9.4000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1920**	**0.1920**	**1.0000e-005**	**0.0000**	**0.1921**

3.5 Utilities - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Off-Road	7.9200e-003	0.0864	0.0398	7.0000e-005		4.2400e-003	4.2400e-003		3.9000e-003	3.9000e-003	0.0000	6.3587	6.3587	1.9500e-003	0.0000	6.4074
Total	**7.9200e-003**	**0.0864**	**0.0398**	**7.0000e-005**		**4.2400e-003**	**4.2400e-003**		**3.9000e-003**	**3.9000e-003**	**0.0000**	**6.3587**	**6.3587**	**1.9500e-003**	**0.0000**	**6.4074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.4000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1920	0.1920	1.0000e-005	0.0000	0.1921
Total	**1.2000e-004**	**9.0000e-005**	**9.4000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1920**	**0.1920**	**1.0000e-005**	**0.0000**	**0.1921**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	7.9200e-003	0.0864	0.0398	7.0000e-005		4.2400e-003	4.2400e-003		3.9000e-003	3.9000e-003	0.0000	6.3587	6.3587	1.9500e-003	0.0000	6.4074
Total	**7.9200e-003**	**0.0864**	**0.0398**	**7.0000e-005**		**4.2400e-003**	**4.2400e-003**		**3.9000e-003**	**3.9000e-003**	**0.0000**	**6.3587**	**6.3587**	**1.9500e-003**	**0.0000**	**6.4074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	9.4000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1920	0.1920	1.0000e-005	0.0000	0.1921
Total	**1.2000e-004**	**9.0000e-005**	**9.4000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1920**	**0.1920**	**1.0000e-005**	**0.0000**	**0.1921**

3.6 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0513	0.5104	0.3228	4.6000e-004		0.0344	0.0344		0.0316	0.0316	0.0000	42.3081	42.3081	0.0130	0.0000	42.6321
Total	**0.0513**	**0.5104**	**0.3228**	**4.6000e-004**		**0.0344**	**0.0344**		**0.0316**	**0.0316**	**0.0000**	**42.3081**	**42.3081**	**0.0130**	**0.0000**	**42.6321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7200e-003	0.0689	0.0164	1.4000e-004	3.1500e-003	5.9000e-004	3.7400e-003	9.1000e-004	5.6000e-004	1.4700e-003	0.0000	12.9113	12.9113	8.9000e-004	0.0000	12.9335
Worker	5.6600e-003	4.5400e-003	0.0450	1.0000e-004	9.4900e-003	7.0000e-005	9.5600e-003	2.5200e-003	7.0000e-005	2.5900e-003	0.0000	9.2139	9.2139	3.2000e-004	0.0000	9.2219
Total	**8.3800e-003**	**0.0734**	**0.0614**	**2.4000e-004**	**0.0126**	**6.6000e-004**	**0.0133**	**3.4300e-003**	**6.3000e-004**	**4.0600e-003**	**0.0000**	**22.1252**	**22.1252**	**1.2100e-003**	**0.0000**	**22.1554**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0513	0.5104	0.3228	4.6000e-004		0.0344	0.0344		0.0316	0.0316	0.0000	42.3080	42.3080	0.0130	0.0000	42.6321
Total	**0.0513**	**0.5104**	**0.3228**	**4.6000e-004**		**0.0344**	**0.0344**		**0.0316**	**0.0316**	**0.0000**	**42.3080**	**42.3080**	**0.0130**	**0.0000**	**42.6321**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.7200e-003	0.0689	0.0164	1.4000e-004	3.1500e-003	5.9000e-004	3.7400e-003	9.1000e-004	5.6000e-004	1.4700e-003	0.0000	12.9113	12.9113	8.9000e-004	0.0000	12.9335
Worker	5.6600e-003	4.5400e-003	0.0450	1.0000e-004	9.4900e-003	7.0000e-005	9.5600e-003	2.5200e-003	7.0000e-005	2.5900e-003	0.0000	9.2139	9.2139	3.2000e-004	0.0000	9.2219

Total	**8.3800e-003**	**0.0734**	**0.0614**	**2.4000e-004**	**0.0126**	**6.6000e-004**	**0.0133**	**3.4300e-003**	**6.3000e-004**	**4.0600e-003**	**0.0000**	**22.1252**	**22.1252**	**1.2100e-003**	**0.0000**	**22.1554**

3.6 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0597	0.6067	0.4263	6.3000e-004		0.0390	0.0390		0.0359	0.0359	0.0000	57.2064	57.2064	0.0178	0.0000	57.6516
Total	**0.0597**	**0.6067**	**0.4263**	**6.3000e-004**		**0.0390**	**0.0390**		**0.0359**	**0.0359**	**0.0000**	**57.2064**	**57.2064**	**0.0178**	**0.0000**	**57.6516**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2800e-003	0.0890	0.0203	1.9000e-004	4.3300e-003	6.3000e-004	4.9700e-003	1.2500e-003	6.1000e-004	1.8600e-003	0.0000	17.7012	17.7012	1.1300e-003	0.0000	17.7295
Worker	6.9200e-003	5.4300e-003	0.0542	1.4000e-004	0.0131	1.0000e-004	0.0131	3.4700e-003	9.0000e-005	3.5600e-003	0.0000	12.3278	12.3278	3.9000e-004	0.0000	12.3375
Total	**0.0102**	**0.0944**	**0.0745**	**3.3000e-004**	**0.0174**	**7.3000e-004**	**0.0181**	**4.7200e-003**	**7.0000e-004**	**5.4200e-003**	**0.0000**	**30.0290**	**30.0290**	**1.5200e-003**	**0.0000**	**30.0670**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0597	0.6067	0.4263	6.3000e-004		0.0390	0.0390		0.0359	0.0359	0.0000	57.2063	57.2063	0.0178	0.0000	57.6516
Total	**0.0597**	**0.6067**	**0.4263**	**6.3000e-004**		**0.0390**	**0.0390**		**0.0359**	**0.0359**	**0.0000**	**57.2063**	**57.2063**	**0.0178**	**0.0000**	**57.6516**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2800e-003	0.0890	0.0203	1.9000e-004	4.3300e-003	6.3000e-004	4.9700e-003	1.2500e-003	6.1000e-004	1.8600e-003	0.0000	17.7012	17.7012	1.1300e-003	0.0000	17.7295
Worker	6.9200e-003	5.4300e-003	0.0542	1.4000e-004	0.0131	1.0000e-004	0.0131	3.4700e-003	9.0000e-005	3.5600e-003	0.0000	12.3278	12.3278	3.9000e-004	0.0000	12.3375
Total	**0.0102**	**0.0944**	**0.0745**	**3.3000e-004**	**0.0174**	**7.3000e-004**	**0.0181**	**4.7200e-003**	**7.0000e-004**	**5.4200e-003**	**0.0000**	**30.0290**	**30.0290**	**1.5200e-003**	**0.0000**	**30.0670**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Archit. Coating	0.2658					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5000e-004	5.0100e-003	4.6400e-003	1.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	0.6383	0.6383	6.0000e-005	0.0000	0.6398
Total	**0.2666**	**5.0100e-003**	**4.6400e-003**	**1.0000e-005**		**3.8000e-004**	**3.8000e-004**		**3.8000e-004**	**3.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**6.0000e-005**	**0.0000**	**0.6398**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	5.0000e-005	4.9000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1121	0.1121	0.0000	0.0000	0.1122
Total	**6.0000e-005**	**5.0000e-005**	**4.9000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1121**	**0.1121**	**0.0000**	**0.0000**	**0.1122**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.2658					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.5000e-004	5.0100e-003	4.6400e-003	1.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	0.6383	0.6383	6.0000e-005	0.0000	0.6398
Total	**0.2666**	**5.0100e-003**	**4.6400e-003**	**1.0000e-005**		**3.8000e-004**	**3.8000e-004**		**3.8000e-004**	**3.8000e-004**	**0.0000**	**0.6383**	**0.6383**	**6.0000e-005**	**0.0000**	**0.6398**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	5.0000e-005	4.9000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1121	0.1121	0.0000	0.0000	0.1122
Total	**6.0000e-005**	**5.0000e-005**	**4.9000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1121**	**0.1121**	**0.0000**	**0.0000**	**0.1122**

3.8 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3000e-003	0.0219	0.0181	3.0000e-005		1.2800e-003	1.2800e-003		1.1800e-003	1.1800e-003	0.0000	2.4270	2.4270	6.8000e-004	0.0000	2.4441
Paving	5.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.8500e-003**	**0.0219**	**0.0181**	**3.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.1800e-003**	**1.1800e-003**	**0.0000**	**2.4270**	**2.4270**	**6.8000e-004**	**0.0000**	**2.4441**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3362	0.3362	1.0000e-005	0.0000	0.3365
Total	**1.9000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3362**	**0.3362**	**1.0000e-005**	**0.0000**	**0.3365**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	2.3000e-003	0.0219	0.0181	3.0000e-005		1.2800e-003	1.2800e-003		1.1800e-003	1.1800e-003	0.0000	2.4270	2.4270	6.8000e-004	0.0000	2.4441
Paving	5.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**2.8500e-003**	**0.0219**	**0.0181**	**3.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.1800e-003**	**1.1800e-003**	**0.0000**	**2.4270**	**2.4270**	**6.8000e-004**	**0.0000**	**2.4441**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-004	1.5000e-004	1.4800e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3362	0.3362	1.0000e-005	0.0000	0.3365

Total	**1.9000e-004**	**1.5000e-004**	**1.4800e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3362**	**0.3362**	**1.0000e-005**	**0.0000**	**0.3365**

3.9 Final Clean/Punch - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0597					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0147	0.1432	0.1046	1.5000e-004		8.7200e-003	8.7200e-003		8.1200e-003	8.1200e-003	0.0000	13.7458	13.7458	3.8400e-003	0.0000	13.8417
Total	**0.0744**	**0.1432**	**0.1046**	**1.5000e-004**		**8.7200e-003**	**8.7200e-003**		**8.1200e-003**	**8.1200e-003**	**0.0000**	**13.7458**	**13.7458**	**3.8400e-003**	**0.0000**	**13.8417**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.6000e-004	1.5800e-003	0.0000	3.8000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3586	0.3586	1.0000e-005	0.0000	0.3589
Total	**2.0000e-004**	**1.6000e-004**	**1.5800e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.8000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3586**	**0.3586**	**1.0000e-005**	**0.0000**	**0.3589**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0597					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0147	0.1432	0.1046	1.5000e-004		8.7200e-003	8.7200e-003		8.1200e-003	8.1200e-003	0.0000	13.7458	13.7458	3.8400e-003	0.0000	13.8417
Total	**0.0744**	**0.1432**	**0.1046**	**1.5000e-004**		**8.7200e-003**	**8.7200e-003**		**8.1200e-003**	**8.1200e-003**	**0.0000**	**13.7458**	**13.7458**	**3.8400e-003**	**0.0000**	**13.8417**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.0000e-004	1.6000e-004	1.5800e-003	0.0000	3.8000e-004	0.0000	3.8000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.3586	0.3586	1.0000e-005	0.0000	0.3589
Total	**2.0000e-004**	**1.6000e-004**	**1.5800e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.8000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3586**	**0.3586**	**1.0000e-005**	**0.0000**	**0.3589**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2124	1.3201	2.2977	7.1700e-003	0.5151	0.0100	0.5251	0.1385	9.4700e-003	0.1480	0.0000	658.8889	658.8889	0.0323	0.0000	659.6969
Unmitigated	0.2124	1.3201	2.2977	7.1700e-003	0.5151	0.0100	0.5251	0.1385	9.4700e-003	0.1480	0.0000	658.8889	658.8889	0.0323	0.0000	659.6969

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Elementary School	874.20	0.00	0.00	1,376,827	1,376,827
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	874.20	0.00	0.00	1,376,827	1,376,827

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Elementary School	9.50	7.30	7.30	65.00	30.00	5.00	63	25	12
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Elementary School	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Other Non-Asphalt Surfaces	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Parking Lot	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	73.1429	73.1429	3.3100e-003	6.8000e-004	73.4295
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	73.1429	73.1429	3.3100e-003	6.8000e-004	73.4295
NaturalGas Mitigated	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	45.7784	45.7784	8.8000e-004	8.4000e-004	46.0504
NaturalGas Unmitigated	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	45.7784	45.7784	8.8000e-004	8.4000e-004	46.0504

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Elementary School	857854	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	45.7784	45.7784	8.8000e-004	8.4000e-004	46.0504
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**4.6300e-003**	**0.0421**	**0.0353**	**2.5000e-004**		**3.2000e-003**	**3.2000e-003**		**3.2000e-003**	**3.2000e-003**	**0.0000**	**45.7784**	**45.7784**	**8.8000e-004**	**8.4000e-004**	**46.0504**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Elementary School	857854	4.6300e-003	0.0421	0.0353	2.5000e-004		3.2000e-003	3.2000e-003		3.2000e-003	3.2000e-003	0.0000	45.7784	45.7784	8.8000e-004	8.4000e-004	46.0504
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**4.6300e-003**	**0.0421**	**0.0353**	**2.5000e-004**		**3.2000e-003**	**3.2000e-003**		**3.2000e-003**	**3.2000e-003**	**0.0000**	**45.7784**	**45.7784**	**8.8000e-004**	**8.4000e-004**	**46.0504**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Elementary School	235327	68.4593	3.1000e-003	6.4000e-004	68.7275
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	16099.8	4.6836	2.1000e-004	4.0000e-005	4.7020
Total		**73.1429**	**3.3100e-003**	**6.8000e-004**	**73.4295**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Elementary School	235327	68.4593	3.1000e-003	6.4000e-004	68.7275
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	16099.8	4.6836	2.1000e-004	4.0000e-005	4.7020
Total		**73.1429**	**3.3100e-003**	**6.8000e-004**	**73.4295**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2309	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118
Unmitigated	0.2309	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0266					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2038					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.5000e-004	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118
Total	**0.2309**	**5.0000e-005**	**5.7600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0111**	**0.0111**	**3.0000e-005**	**0.0000**	**0.0118**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0266					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2038					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.5000e-004	5.0000e-005	5.7600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0111	0.0111	3.0000e-005	0.0000	0.0118
Total	**0.2309**	**5.0000e-005**	**5.7600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0111**	**0.0111**	**3.0000e-005**	**0.0000**	**0.0118**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			

Mitigated	2.7684	0.0475	1.1400e-003	4.2958
Unmitigated	2.7684	0.0475	1.1400e-003	4.2958

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Elementary School	1.45454 / 0.016972	2.7684	0.0475	1.1400e-003	4.2958
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**2.7684**	**0.0475**	**1.1400e-003**	**4.2958**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Elementary School	1.45454 / 0.016972	2.7684	0.0475	1.1400e-003	4.2958
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**2.7684**	**0.0475**	**1.1400e-003**	**4.2958**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	22.2275	1.3136	0.0000	55.0677
Unmitigated	22.2275	1.3136	0.0000	55.0677

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Elementary School	109.5	22.2275	1.3136	0.0000	55.0677
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**22.2275**	**1.3136**	**0.0000**	**55.0677**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Elementary School	109.5	22.2275	1.3136	0.0000	55.0677
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**22.2275**	**1.3136**	**0.0000**	**55.0677**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Aspire Eres Academy

Alameda County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	620.00	Student	0.42	51,834.09	0
Other Non-Asphalt Surfaces	0.05	Acre	0.05	2,178.00	0
Parking Lot	0.42	Acre	0.42	18,295.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per applicant info

Vehicle Trips - Based on Stantec Traffic Study

Water And Wastewater - Based on applicant info

Off-road Equipment - default equipment

Off-road Equipment -

Trips and VMT - added utilities trips to paving and arch coating

Operational Off-Road Equipment - none

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	100.00	190.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	1.00	4.00
tblLandUse	LotAcreage	1.19	0.42
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Utilities
tblOffRoadEquipment	PhaseName		Utilities
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	0.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	WorkerTripNumber	18.00	23.00
tblTripsAndVMT	WorkerTripNumber	6.00	11.00
tblVehicleTrips	WD_TR	1.29	1.41

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Energy	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Mobile	1.6288	10.2959	18.6809	0.0546	4.1131	0.0776	4.1907	1.1024	0.0734	1.1757		5,531.2317	5,531.2317	0.2846		5,538.3455
Total	**2.9272**	**10.5269**	**18.9385**	**0.0560**	**4.1131**	**0.0953**	**4.2085**	**1.1024**	**0.0911**	**1.1935**		**5,807.8717**	**5,807.8717**	**0.2902**	**5.0700e-003**	**5,816.6378**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Energy	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Mobile	1.6288	10.2959	18.6809	0.0546	4.1131	0.0776	4.1907	1.1024	0.0734	1.1757		5,531.2317	5,531.2317	0.2846		5,538.3455
Total	**2.9272**	**10.5269**	**18.9385**	**0.0560**	**4.1131**	**0.0953**	**4.2085**	**1.1024**	**0.0911**	**1.1935**		**5,807.8717**	**5,807.8717**	**0.2902**	**5.0700e-003**	**5,816.6378**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.6288	10.2959	18.6809	0.0546	4.1131	0.0776	4.1907	1.1024	0.0734	1.1757		5,531.2317	5,531.2317	0.2846		5,538.3455
Unmitigated	1.6288	10.2959	18.6809	0.0546	4.1131	0.0776	4.1907	1.1024	0.0734	1.1757		5,531.2317	5,531.2317	0.2846		5,538.3455

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Elementary School	874.20	0.00	0.00	1,376,827	1,376,827
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	874.20	0.00	0.00	1,376,827	1,376,827

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Elementary School	9.50	7.30	7.30	65.00	30.00	5.00	63	25	12
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Elementary School	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Other Non-Asphalt Surfaces	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Parking Lot	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
NaturalGas Unmitigated	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Elementary School	2350.29	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0254**	**0.2304**	**0.1936**	**1.3800e-003**		**0.0175**	**0.0175**		**0.0175**	**0.0175**		**276.5042**	**276.5042**	**5.3000e-003**	**5.0700e-003**	**278.1473**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Elementary School	2.35029	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0254**	**0.2304**	**0.1936**	**1.3800e-003**		**0.0175**	**0.0175**		**0.0175**	**0.0175**		**276.5042**	**276.5042**	**5.3000e-003**	**5.0700e-003**	**278.1473**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Unmitigated	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1504					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1165					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0600e-003	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Total	**1.2730**	**5.9000e-004**	**0.0640**	**0.0000**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**		**0.1358**	**0.1358**	**3.7000e-004**		**0.1450**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1504					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1165					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0600e-003	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Total	**1.2730**	**5.9000e-004**	**0.0640**	**0.0000**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**		**0.1358**	**0.1358**	**3.7000e-004**		**0.1450**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

11.0 Vegetation

Aspire Eres Academy

Alameda County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	620.00	Student	0.42	51,834.09	0
Other Non-Asphalt Surfaces	0.05	Acre	0.05	2,178.00	0
Parking Lot	0.42	Acre	0.42	18,295.20	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	63
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per applicant info

Vehicle Trips - Based on Stantec Traffic Study

Water And Wastewater - Based on applicant info

Off-road Equipment - default equipment

Off-road Equipment -

Trips and VMT - added utilities trips to paving and arch coating

Operational Off-Road Equipment - none

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	100.00	190.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	NumDays	1.00	4.00
tblLandUse	LotAcreage	1.19	0.42
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Final Clean/Punch
tblOffRoadEquipment	PhaseName		Utilities
tblOffRoadEquipment	PhaseName		Utilities
tblOperationalOffRoadEquipment	OperDaysPerYear	260.00	0.00
tblProjectCharacteristics	OperationalYear	2018	2019
tblTripsAndVMT	WorkerTripNumber	18.00	23.00
tblTripsAndVMT	WorkerTripNumber	6.00	11.00
tblVehicleTrips	WD_TR	1.29	1.41

2.0 Emissions Summary

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Energy	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Mobile	1.8627	9.8805	18.1130	0.0583	4.1131	0.0768	4.1899	1.1024	0.0726	1.1750		5,903.3336	5,903.3336	0.2723		5,910.1398
Total	**3.1611**	**10.1115**	**18.3705**	**0.0597**	**4.1131**	**0.0945**	**4.2076**	**1.1024**	**0.0903**	**1.1927**		**6,179.9736**	**6,179.9736**	**0.2779**	**5.0700e-003**	**6,188.4321**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Energy	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Mobile	1.8627	9.8805	18.1130	0.0583	4.1131	0.0768	4.1899	1.1024	0.0726	1.1750		5,903.3336	5,903.3336	0.2723		5,910.1398
Total	**3.1611**	**10.1115**	**18.3705**	**0.0597**	**4.1131**	**0.0945**	**4.2076**	**1.1024**	**0.0903**	**1.1927**		**6,179.9736**	**6,179.9736**	**0.2779**	**5.0700e-003**	**6,188.4321**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.8627	9.8805	18.1130	0.0583	4.1131	0.0768	4.1899	1.1024	0.0726	1.1750		5,903.3336	5,903.3336	0.2723		5,910.1398
Unmitigated	1.8627	9.8805	18.1130	0.0583	4.1131	0.0768	4.1899	1.1024	0.0726	1.1750		5,903.3336	5,903.3336	0.2723		5,910.1398

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Elementary School	874.20	0.00	0.00	1,376,827	1,376,827
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	874.20	0.00	0.00	1,376,827	1,376,827

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Elementary School	9.50	7.30	7.30	65.00	30.00	5.00	63	25	12
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Elementary School	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Other Non-Asphalt Surfaces	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779
Parking Lot	0.556416	0.041967	0.190895	0.111485	0.018156	0.005234	0.022193	0.041963	0.002079	0.002948	0.005586	0.000300	0.000779

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
NaturalGas Unmitigated	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Elementary School	2350.29	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0254**	**0.2304**	**0.1936**	**1.3800e-003**		**0.0175**	**0.0175**		**0.0175**	**0.0175**		**276.5042**	**276.5042**	**5.3000e-003**	**5.0700e-003**	**278.1473**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Elementary School	2.35029	0.0254	0.2304	0.1936	1.3800e-003		0.0175	0.0175		0.0175	0.0175		276.5042	276.5042	5.3000e-003	5.0700e-003	278.1473
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0254**	**0.2304**	**0.1936**	**1.3800e-003**		**0.0175**	**0.0175**		**0.0175**	**0.0175**		**276.5042**	**276.5042**	**5.3000e-003**	**5.0700e-003**	**278.1473**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Unmitigated	1.2730	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1504					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1165					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0600e-003	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Total	**1.2730**	**5.9000e-004**	**0.0640**	**0.0000**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**		**0.1358**	**0.1358**	**3.7000e-004**		**0.1450**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1504					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1165					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.0600e-003	5.9000e-004	0.0640	0.0000		2.3000e-004	2.3000e-004		2.3000e-004	2.3000e-004		0.1358	0.1358	3.7000e-004		0.1450
Total	**1.2730**	**5.9000e-004**	**0.0640**	**0.0000**		**2.3000e-004**	**2.3000e-004**		**2.3000e-004**	**2.3000e-004**		**0.1358**	**0.1358**	**3.7000e-004**		**0.1450**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

11.0 Vegetation

APPENDIX B:
HEALTH RISK ASSESSMENT

June 2016 | Health Risk Assessment

ASPIRE ERES ACADEMY

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1. Introduction

The Pacific Companies, on behalf of Aspire Public Schools, proposes to construct a new charter school for kindergarten through 8th grade students, which will be located at 2956 International Boulevard in the City of Oakland, Alameda County, California.

Regulations pertaining to the siting of new schools or the modernization of existing schools in California require compliance with the California Code of Regulations (CCR) Title 5 standards. For new schools, Title 5 studies must demonstrate that facilities with the potential to emit hazardous air pollutants within a quarter-mile radius of the school site will not constitute an actual or potential public health risk to students and staff that would attend and work at the school. This health risk assessment (HRA) involved conducting the following tasks:

- Mobile emission sources associated with vehicles and trucks traveling on high volume roadways with annual average daily traffic volumes exceeding 10,000 vehicles per day were evaluated. Identified high volume roadways within a quarter-mile radius of the site include International Boulevard, Fruitvale Avenue, and East 12th Street. A screening level health risk analysis was conducted for the high volume roadways using Bay Area Air Quality Management District's (BAAQMD's) screening criteria.

- Facilities within a quarter-mile (1,320-foot) radius of the project site that might reasonably emit hazardous or acutely hazardous air emissions were identified and evaluated.

- Emissions from Amtrak and Union Pacific (UP) diesel locomotives along the railroad right-of-way that is located approximately 1,000 feet southwest of the site were evaluated.

- For stationary sources and the Amtrak/UP locomotives, air dispersion modeling was conducted using the ISCST3 computer model to quantify maximum pollutant concentrations for receptors at the proposed school site. Meteorological data from the nearest BAAQMD monitoring station with similar meteorological conditions were used to represent local weather conditions and prevailing winds.

- Cancer and non-cancer risks to students and staff attending and working at the project site were determined, based on the results of the air dispersion modeling. The assessment considered exposure through the inhalation pathway. Unit Risk Factors (URFs) and Cancer Potency Factors (CPFs) were used to determine carcinogenic risk and Recommended Exposure Limits (RELs) were used to determine non-carcinogenic risk.

- A health risk assessment report has been prepared that compares the calculated risks with thresholds established by the BAAQMD and Office of Environmental Health Hazard Assessment (OEHHA).

1. Introduction

The assessment and dispersion modeling methodologies used in the preparation of this report included all relevant and appropriate procedures developed by the US Environmental Protection Agency (USEPA) and the latest guidance on conducting health risk assessments from OEHHA (2015). These methodologies and assumptions were used to ensure that the assessment effectively quantified school-based impacts associated with emission sources.

It should be noted that these health impacts were based on conservative (i.e., health protective) assumptions. The USEPA (2005) and OEHHA (2015) note that conservative assumptions used in a risk assessment are intended to ensure that the estimated risks do not underestimate the actual risks. Therefore, the estimated risks do not necessarily represent actual risks experienced by populations at or near a site. The use of conservative assumptions tends to produce upper-bound estimates of risk and usually overestimate exposure and thus risk. For this school-based risk assessment, the following conservative assumptions were used:

- It was assumed that maximum exposed children and adults stood outside at the site for 8 hours per day, 180 days per year for 9 years (students) or 250 days per year for 25 years (staff). In reality, students and staff are exposed to outdoor pollutant concentration levels only during nutrition, lunch, and PE classes and are indoors with reduced pollutant concentrations for the remaining school hours. This would result in lower estimated risk values.

- The calculated risk for children from 2-16 years is multiplied by a factor of 3 to account for early life exposure and uncertainty in child versus adult exposure impacts.

Thus, the estimated risks provided in this HRA are conservative.

2. Project Description

Aspire Public Schools proposes to construct a new charter school for kindergarten through 8th grade on an approximately 0.8-acre site that is located at 2956 International Boulevard in the City of Oakland, California 94601. The project includes a 3-story classroom building with an associated parking lot, landscaping, and play area.

The site is currently occupied by paved parking areas, and a 2-story multi-unit residential building. The proposed school site will be bounded to the north by Fruitvale Health Care Center Nursing Home, to the east by Derby Avenue, to the south by a multi-story office building and parking lot, and to the west by an apartment complex and a historic house museum (Cohen-Bray House). The project site is about 600 feet northeast of an elevated Bay Area Rapid Transit (BART) light rail line along East 12th Street and approximately 1,000 feet northeast of an Amtrak and Union Pacific (UP) railroad right-of-way.

The project site and vicinity are depicted in Figure 1.

2. Project Description

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Base Map Source: Google Earth Pro, 2016

0 1,500 Feet

Figure 1
Site Location

2. Project Description

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3. Source Identification

BAAQMD has developed screening analysis tools for identifying stationary and mobile sources within the vicinity of a proposed project. Two stationary sources were identified within a quarter-mile of the site and are listed in Table 1. In addition, three high volume roadways (average annual daily traffic counts in excess of 10,000 vehicles per day) were identified. Lastly, emissions generated by diesel locomotives from Amtrak passenger trains and UP freight trains to the southwest of the site were included in the assessment.

A summary of the emissions sources evaluated for this assessment is provided below in Table 1. The project site and emission sources are depicted in Figure 2.

Table 1 Emission Sources

Source	Address
Pro Speed Auto Body	1410 31st Avenue, Oakland, CA 94601
H&H Auto Collision, Inc.	3031 East 12th Street, Oakland, CA 94601
Amtrak/UP Railroad	Approximate 1,900-foot long stretch of track within ¼-mile radius; 1,000 feet southwest of site
International Boulevard	95 feet southwest of project
Fruitvale Avenue	500 feet southwest of project
East 12st Street	575 feet southwest of project

3. Source Identification

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Project Boundary
1/4-Mile Radius

1 Pro-Speed Auto Body
2 H&H Auto Collision, Inc.
3 Amtrak/UP Railroad
4 International Boulevard
5 Fruitvale Avenue
6 East 12th Street

Base Map Source: Google Earth Pro, 2016

N 0 500 Feet

Figure 2
Emission Sources

3. Source Identification

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4. Source Characterization

4.1 STATIONARY SOURCES

Contaminant release information and associated chemical species were identified through a review of available documentation for each source referenced in Section 3. In addition to BAAQMD's screening tools for stationary sources, BAAQMD provided to Cornerstone Earth Group a 2015 hazardous air emissions summary for all facilities within a half-mile of the project (Cornerstone Earth Group, 2016). As the provided BAAQMD 2015 emissions summary represents updated facility information compared to BAAQMD's screening tools, which were developed in 2012, the stationary sources within a quarter-mile were evaluated using the 2015 air emissions summaries. To the degree practical, all contaminant emissions generated from each source location were considered in the analysis. The limiting factor for the inclusion of a compound was the availability of published exposure factors and other toxicity data enabling risks to be quantified and, where appropriate, target organs identified.

The compounds emitted from each stationary source are listed in Table 2.

Table 2 Compounds Emitted from Stationary Sources

Source	Contaminant
Pro Speed Auto Body	Isopropanol, Toluene, Xylene
H&H Auto Collision, Inc.	Isopropanol, Toluene, Xylene

4.2 LOCOMOTIVE EMISSIONS

Locomotive engines generate pollutants, which can impact local air quality. Although locomotive engines produced today meet stringent USEPA emission requirements and use cleaner burning fuels, they still emit significant amounts of diesel particulate matter (DPM), which contributes to public health impacts.

Fleet distribution profiles for locomotives traversing the railroad easement southwest of the site are based upon passenger and freight train information obtained from Amtrak schedules, the Federal Railroad Administration (FRA) Office of Safety Analysis, and PlaceWorks site reconnaissance on February 5, 2016. For the railroad easement 1,000 feet southwest of the site, nine passenger trains and two freight trains were observed during school hours traveling along the approximate 1,900-foot long stretch of track within a quarter-mile of the site. Approximately 73 percent of the observed passenger trains during the site reconnaissance averaged one locomotive per train. Conservatively, 2 locomotives per train were evaluated in the HRA. Locomotive emission factors used in this evaluation were obtained from the San Joaquin Valley Air Pollution Control District's locomotive emission factor methodology, based on the USEPA's Emission Factors for Locomotives Technical Report (USEPA, 2009). The emission factor for the locomotive was based on a representative engine model (EMD F59PHI) operating at a throttle notch of 5 for a speed of 34 mph

(Starcrest, 2012), which was the average speed observed during PlaceWorks' site reconnaissance for the section of track near the site.

EPA's *Clean Air Nonroad Diesel Rule* (2004) requires that locomotive and marine diesel fuels meet the ultra-low sulfur classification of 15 parts per million by 2012. Characterizations of diesel particulate emissions from locomotive activity were updated to account for the use of ultra-low sulfur diesel fuel, based on the California Air Resources Board (CARB) *OFFROAD Modeling Change Technical Memo, Changes to the Locomotive Inventory* (2006).

Appendix B contains a graphical representation of each emitting source. Appendix C presents the emission rate calculations for each source considered in the assessment.

4.3 MOBILE SOURCES

Mobile sources within a quarter-mile of the project site were identified using BAAQMD's Highway Screening Analysis Tools (BAAQMD, 2011) and the prepared Traffic Impact Analysis for the project (Stantec, 2015). Three high volume roadways, which are defined as having annual average daily trips (AADT) exceeding 10,000 vehicles per day, were identified (International Boulevard, Fruitvale Avenue, and East 12th Street). The BAAQMD Roadway Screening Analysis Calculator (2015) provided screening level health risk and hazard values for residential receptors, based on the distance of the project site from the roadway segment. The screening health risk values for each high volume roadway considered in the assessment are summarized in Table 3. The calculations and screening health risk values are also provided in Appendix A. To determine school-based screening cancer risks, the residential-based screening cancer risks were adjusted based on the difference in exposure duration between residences and schools (Appendix E, Table E2).

Table 3 High Volume Roadways Screening Health Risk Values

Source	Annual Average Daily Trips (AADT)	Cancer Risk - Staff (per million)	Cancer Risk - Students (per million)	Chronic Hazard Index	$PM_{2.5}$ ($\mu g/m^3$)
International Boulevard	15,100	2.65	2.86	0.030	0.14
Fruitvale Avenue	10,680	0.33	0.35	0.030	0.02
East 12th Street	11,530	0.56	0.61	0.030	0.03
BAAQMD Significance Threshold		10	10	1.0	0.3
Exceeds Threshold?		No	No	No	No

Source: Traffic Impact Analysis for the project (Stantec, 2015) and BAAQMD Roadway Screening Analysis Calculator (2015), adjusted for school-based receptors and County Surface Street Screening Tables for Alameda County (2011).

The roadway screening health risk values, adjusted for school-based receptors, are all below the BAAQMD significance thresholds for individual health risks (10 in a million excess cancer risk, 1.0 chronic and acute hazard indices, and $PM_{2.5}$ concentration greater than 0.3 $\mu g/m^3$), and therefore a more detailed analysis was not required.

5. Air Dispersion Modeling

To assess the impact of emitted compounds on individuals who may work and/or attend classes at the proposed school facility, air quality modeling using the ISCST3 atmospheric dispersion model was performed for the two stationary sources and locomotive mobile sources. The model is a steady state Gaussian plume model and is recommended by BAAQMD for estimating ground level or flagpole-level impacts from point and fugitive sources in simple and complex terrain.

The model requires additional input parameters, including chemical emission data and local meteorology. Inputs for each emitting source were based on the characterizations referenced in Section 4. Meteorological data provided by BAAQMD for the Oakland STP meteorological station (1998-2000) were used to represent local weather conditions and prevailing winds. According to the data from the Oakland STP Monitoring Station, as presented in Appendix C, the prevailing wind direction in the area of the project site is to the east-southeast (ESE).

The modeling analysis also considered the spatial distribution of each emitting source in relation to the project site. To accommodate the model's Cartesian grid format, direction-dependent calculations were obtained by identifying the Universal Transverse Mercator (UTM) coordinates for each source. In addition, digital elevation model (DEM) data for the area were obtained and included in the model runs to account for complex terrain.

For all modeling runs, a unit emission rate of 1 gram per second (g/s) was used. The unit emission rates were proportioned among the volume sources for mobile sources (e.g. Amtrak/UP Railroad). The maximum exposed receptor (MER) concentrations from the model output files were then multiplied by the emission rates calculated in Appendix C to obtain the maximum flagpole-level concentrations at the school site. The model output for the emission sources is presented in Appendix D. The flagpole-level concentrations used in the risk calculation spreadsheets are provided in Table E1 of Appendix E.

5. Air Dispersion Modeling

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6. Risk Characterizations

6.1 CARCINOGENIC CHEMICAL RISK

Carcinogenic compounds are not considered to have "threshold" levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. The BAAQMD has established a maximum incremental cancer risk of 10 in a million (1.0E-05) for CEQA projects and the Office of Environmental Health Hazard Assessment (OEHHA) also set a typical risk management level as 10 in a million (OEHHA, 2015). The maximum incremental cancer risk of 10 in a million is used as a "threshold" for the purposes of HRA evaluations.

Under CEQA guidance, BAAQMD has developed thresholds of significance for air pollutants emitted from individual sources and for cumulative exposures of multiple sources. Although BAAQMD is currently not implementing the use of these significance thresholds pending the resolution of ongoing litigation, lead agencies may continue to rely on the use of these thresholds to determine the significance of a project's air quality impacts. For this assessment, the 2011 BAAQMD significance thresholds were used to determine potential health impacts.

Project-level emissions of TACs or $PM_{2.5}$ from individual sources within a quarter-mile of the site that exceed any of the thresholds listed below are considered a potentially significant community health risk:

a) An excess cancer risk level of more than 10 in one million, or a non-cancer (i.e., chronic or acute) hazard index greater than 1.0 would be a significant considerable contribution.

b) An incremental increase of greater than 0.3 micrograms per cubic meter ($\mu g/m^3$) annual average $PM_{2.5}$ from a single source would be a significant considerable contribution.

Cumulative sources represent the combined total risk values of each of the individual sources within the quarter-mile evaluation zone. A project would have a cumulatively considerable impact if the aggregate total of all past, present, and foreseeable future sources within a quarter-mile radius from the fence line of a source or location of a receptor, plus the contribution from the site, exceeds the following:

c) An excess cancer risk level of more than 100 in one million, or a non-cancer (i.e., chronic or acute) hazard index (from all local sources) greater than 10.0; or

d) 0.8 $\mu g/m^3$ annual average $PM_{2.5}$.

Health risks associated with exposure to carcinogenic compounds at the proposed project site can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF), a measure of

6. Risk Characterizations

the carcinogenic potential of a chemical when a dose is received through the inhalation pathway. It is an upper-limit estimate of the probability of contracting cancer as a result of continuous exposure to an ambient concentration of one microgram per cubic meter ($\mu g/m^3$) over a lifetime of 70 years.

Recent guidance from OEHHA recommends a refinement to the standard point estimate approach with the use of age-specific breathing rates and age sensitivity factors (ASFs) to assess risk for susceptible subpopulations such as children. For the inhalation pathway, the procedure requires the incorporation of several discrete variates to effectively quantify dose for each age group. Once determined, contaminant dose is multiplied by the cancer potency factor in units of inverse dose expressed in milligrams per kilogram per day $(mg/kg/day)^{-1}$ to derive the cancer risk estimate. Therefore, to accommodate the unique exposures associated with the proposed school population, the following dose algorithm was used.

$$\text{Dose}_{\text{AIR,per age group}} = (C_{air} \times EF \times [\frac{BR}{BW}] \times A \times CF)$$

Where:

$Dose_{AIR}$	=	dose by inhalation (mg/kg-day), per age group
C_{air}	=	concentration of contaminant in air ($\mu g/m^3$)
EF	=	exposure frequency (number of days/365 days)
BR/BW	=	daily breathing rate normalized to body weight (L/kg-day)
A	=	inhalation absorption factor (default = 1)
CF	=	conversion factor ($1x10^{-6}$, µg to mg, L to m^3)

The inhalation absorption factor (A) is a unitless factor that is only used if the cancer potency factor included a correction for absorption across the lung. For this assessment, the default value of 1 was used. To represent the unique characteristics of the school population, the assessment employed the USEPA's guidance to develop viable dose estimates based on reasonable maximum exposure, defined as the "highest exposure that is reasonably expected to occur" for a given receptor population. Lifetime risk values for the student population were adjusted to account for an exposure of 180 days per year for 9 years (K through 8th grade). In addition, the calculated risk for students is multiplied by an ASF weighting factor of 3 (for children ages 5 to 14 years) to account for early life sensitivity to pollutant exposures (OEHHA, 2015). To assess staff-related risk, exposures were adjusted to account for an employment period of 250 days per year for 25 years. This timeline is considered appropriate for potential workplace exposures established by OEHHA (2015).

To calculate the overall cancer risk, the risk for each appropriate age group is calculated per the following equation:

$$\text{Cancer Risk}_{\text{AIR}} = \text{Dose}_{\text{AIR}} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$Dose_{AIR}$	=	dose by inhalation (mg/kg-day), per age group
CPF	=	cancer potency factor, chemical-specific $(mg/kg-day)^{-1}$
ASF	=	age sensitivity factor, per age group

ED = exposure duration (years)
AT = averaging time period over which exposure duration is averaged (always 70 years)

The CPFs used in the assessment were obtained from OEHHA guidance. The cancer risk is calculated separately for the students and staff, because of age differences in sensitivity to carcinogens and age differences in intake rates. The final step converts the cancer risk in scientific notation to a whole number that expresses the cancer risk in "chances per million" by multiplying the cancer risk by a factor of $1x10^6$ (i.e. 1 million).

CARB's Hotspots Analysis and Reporting Program (HARP2), Risk Assessment Standalone Tool was used to calculate the cancer risk values (CARB, 2016). The determined cancer risks attributed to each chemical exposure and summation of those risks are presented in Appendix E, Table E3.

6.2 NON-CARCINOGENIC HAZARDS

An evaluation of the potential non-cancer effects of chronic and acute chemical exposures was also conducted. Under the point estimate approach, adverse health effects are evaluated by comparing the annual ground level concentration of each chemical compound with the appropriate Reference Exposure Level (REL). Available RELs promulgated by OEHHA were considered in the assessment.

To quantify non-carcinogenic impacts, the hazard index approach was used. The hazard index assumes that chronic or acute sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). For each discrete chemical exposure, target organs presented in regulatory guidance were used. To calculate the hazard index, each chemical concentration or dose is divided by the appropriate toxicity value. For compounds affecting the same toxicological endpoint, this ratio is summed. Where the total equals or exceeds one, a health hazard is presumed to exist.

CARB's HARP2, Risk Assessment Standalone Tool was used to calculate the chronic and acute health risk values (CARB, 2016). The determined non-cancer hazard quotient for identified compounds generated from each source and a summation for each toxicological endpoint are presented in Appendix E, Tables E3 and E4.

6.3 CRITERIA AIR POLLUTANTS

The BAAQMD has recently incorporated $PM_{2.5}$ into the District's CEQA significance thresholds due to recent studies that show adverse health impacts from exposure to this pollutant. An incremental increase for the annual average $PM_{2.5}$ concentration of more than 0.3 $\mu g/m^3$ is considered to be a significant impact. Appendix E, Table E1 presents the screening level $PM_{2.5}$ annual concentrations for each roadway emission source.

6.4 ACCIDENTAL RELEASES

Under the auspices of the California Accidental Release Prevention (CalARP) Program, should a stationary source use more than a threshold quantity of a regulated hazardous substance, a Risk Management Plan

6. Risk Characterizations

(RMP) which includes a risk assessment of accidental releases is required to be conducted pursuant to the provisions of the federal Accidental Release Prevention program (Title 40, Code of Federal Regulations, Part 68) Article 2, Chapter 6.95 of the Health and Safety Code.

A review of the available information collected during the source identification process (e.g., regulatory records review and interviews with business owner/operators) did not reveal the presence of any CalARP program facilities within a quarter-mile of the proposed site (Center of Effective Government, 2014). Therefore, this report did not warrant the need for the preparation of a RMP.

7. Conclusions

The results of the health risk assessment from individual and cumulative emission sources, provided in Table 4, indicate that the excess cancer risk from each individual stationary and mobile source within a quarter-mile from the site is less than the BAAQMD threshold of 10 in a million for a lifetime cancer risk and less than the non-carcinogenic chronic hazard index of 1.0. The $PM_{2.5}$ concentrations for all individual emission sources are below the BAAQMD significance threshold of 0.3 $\mu g/m^3$. In addition, the cumulative health risks from all evaluated emission sources are below BAAQMD's cumulative significance thresholds.

Table 4 Health Risk Assessment Results

Source	Cancer Risk (per million)		Chronic Hazard Index	Acute Hazard Index	$PM_{2.5}$ (µg/m3)
	Staff Exposure	Student Exposure			
REFINED MODELING VALUES					
Pro Speed Auto Body	0.00	0.00	<0.001	<0.001	n/a
H&H Auto Collision, Inc.	0.00	0.00	<0.001	<0.001	n/a
Amtrak/UP Railroad	0.03	0.06	<0.001	n/a	n/a
SCREENING VALUES					
International Boulevard	2.65	2.86	0.030	0.030	0.14
Fruitvale Avenue	0.33	0.35	0.030	0.030	0.02
East 12th Street	0.56	0.61	0.030	0.030	0.03
BAAQMD Threshold	10	10	1.0	1.0	0.30
Exceeds Threshold?	No	No	No	No	No
Cumulative Total	3.57	3.88	0.09	0.09	0.19
BAAQMD Threshold	100	100	10.0	10.0	0.80
Exceeds Threshold?	No	No	No	No	No

Source: Lakes AERMOD View, 9.1.0, 2015.

Based on a comparison to the carcinogenic and noncarcinogenic thresholds established by OEHHA and BAAQMD, hazardous air emissions generated from the stationary and mobile sources within a quarter-mile radius are not anticipated to pose an actual or potential endangerment to students and staff occupying the project site and no mitigation measures are required.

7. Conclusions

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8. References

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8. References

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Appendix A. Screening Analysis

Appendix

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Bay Area Air Quality Management District

Roadway Screening Analysis Calculator

County specific tables containing estimates of risk and hazard impacts from roadways in the Bay Area.

INSTRUCTIONS:

Input the site-specific characteristics of your project by using the drop down menu in the "Search Parameter" box. We recommend that this analysis be used for roadways with 10,000 AADT and above.

• County: Select the County where the project is located. The calculator is only applicable for projects within the nine Bay Area counties.

• Roadway Direction: Select the orientation that best matches the roadway. If the roadway orientation is neither clearly north-south nor east-west, use the highest values predicted from either orientation.

• Side of the Roadway: Identify on which side of the roadway the project is located.

• Distance from Roadway: Enter the distance in feet from the nearest edge of the roadway to the project site. The calculator estimates values for distances greater than 10 feet and less than 1000 feet. For distances greater than 1000 feet, the user can choose to extrapolate values using a distribution curve or apply 1000 feet values for greater distances.

• Annual Average Daily Traffic (ADT): Enter the annual average daily traffic on the roadway. These data may be collected from the city or the county (if the area is unincorporated).

When the user has completed the data entries, the screening level PM2.5 annual average concentration and the cancer risk results will appear in the Results Box on the right. Please note that the roadway tool is not applicable for California State Highways and the District refers the user to the Highway Screening Analysis Tool at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

Notes and References listed below the Search Boxes

Search Parameters

County	Alameda
Roadway Direction	East-West
Side of the Roadway	North
Distance from Roadway	95 feet
Annual Average Daily Traffic (ADT)	15,100

Results

Alameda County

EAST-WEST DIRECTIONAL ROADWAY

PM2.5 annual average

0.143 ($\mu g/m^3$)

Cancer Risk

7.41 (per million)

Data for Alameda County based on meteorological data collected from Pleasanton in 2005

Notes and References:

1. Emissions were developed using EMFAC2011 for fleet mix in 2014 assuming 10,000 AADT and includes impacts from diesel and gasoline vehicle exhaust, brake and tire wear, and resuspended dust.
2. Roadways were modeled using CALINE4 air dispersion model assuming a source length of one kilometer. Meteorological data used to estimate the screening values are noted at the bottom of the "Results" box.
3. Cancer risks were estimated for 70 year lifetime exposure starting in 2014 that includes sensitivity values for early life exposures and OEHHA toxicity values adopted in 2013.

Bay Area Air Quality Management District

Roadway Screening Analysis Calculator

County specific tables containing estimates of risk and hazard impacts from roadways in the Bay Area.

INSTRUCTIONS:

Input the site-specific characteristics of your project by using the drop down menu in the "Search Parameter" box. We recommend that this analysis be used for roadways with 10,000 AADT and above.

• County: Select the County where the project is located. The calculator is only applicable for projects within the nine Bay Area counties.

• Roadway Direction: Select the orientation that best matches the roadway. If the roadway orientation is neither clearly north-south nor east-west, use the highest values predicted from either orientation.

• Side of the Roadway: Identify on which side of the roadway the project is located.

• Distance from Roadway: Enter the distance in feet from the nearest edge of the roadway to the project site. The calculator estimates values for distances greater than 10 feet and less than 1000 feet. For distances greater than 1000 feet, the user can choose to extrapolate values using a distribution curve or apply 1000 feet values for greater distances.

• Annual Average Daily Traffic (ADT): Enter the annual average daily traffic on the roadway. These data may be collected from the city or the county (if the area is unincorporated).

When the user has completed the data entries, the screening level PM2.5 annual average concentration and the cancer risk results will appear in the Results Box on the right. Please note that the roadway tool is not applicable for California State Highways and the District refers the user to the Highway Screening Analysis Tool at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

Notes and References listed below the Search Boxes

Search Parameters

County	Alameda
Roadway Direction	North-South
Side of the Roadway	West
Distance from Roadway	500 feet
Annual Average Daily Traffic (ADT)	10,680

Results

Alameda County

NORTH-SOUTH DIRECTIONAL ROADWAY

PM2.5 annual average

0.016 ($\mu g/m^3$)

Cancer Risk

0.92 (per million)

Data for Alameda County based on meteorological data collected from Pleasanton in 2005

Notes and References:

1. Emissions were developed using EMFAC2011 for fleet mix in 2014 assuming 10,000 AADT and includes impacts from diesel and gasoline vehicle exhaust, brake and tire wear, and resuspended dust.
2. Roadways were modeled using CALINE4 air dispersion model assuming a source length of one kilometer. Meteorological data used to estimate the screening values are noted at the bottom of the "Results" box.
3. Cancer risks were estimated for 70 year lifetime exposure starting in 2014 that includes sensitivity values for early life exposures and OEHHA toxicity values adopted in 2013.

Bay Area Air Quality Management District

Roadway Screening Analysis Calculator

County specific tables containing estimates of risk and hazard impacts from roadways in the Bay Area.

INSTRUCTIONS:

Input the site-specific characteristics of your project by using the drop down menu in the "Search Parameter" box. We recommend that this analysis be used for roadways with 10,000 AADT and above.

• County: Select the County where the project is located. The calculator is only applicable for projects within the nine Bay Area counties.

• Roadway Direction: Select the orientation that best matches the roadway. If the roadway orientation is neither clearly north-south nor east-west, use the highest values predicted from either orientation.

• Side of the Roadway: Identify on which side of the roadway the project is located.

• Distance from Roadway: Enter the distance in feet from the nearest edge of the roadway to the project site. The calculator estimates values for distances greater than 10 feet and less than 1000 feet. For distances greater than 1000 feet, the user can choose to extrapolate values using a distribution curve or apply 1000 feet values for greater distances.

• Annual Average Daily Traffic (ADT): Enter the annual average daily traffic on the roadway. These data may be collected from the city or the county (if the area is unincorporated).

When the user has completed the data entries, the screening level PM2.5 annual average concentration and the cancer risk results will appear in the Results Box on the right. Please note that the roadway tool is not applicable for California State Highways and the District refers the user to the Highway Screening Analysis Tool at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

Notes and References listed below the Search Boxes

Search Parameters

County	Alameda
Roadway Direction	East-West
Side of the Roadway	North
Distance from Roadway	575 feet
Annual Average Daily Traffic (ADT)	11,530

Results

Alameda County

EAST-WEST DIRECTIONAL ROADWAY

PM2.5 annual average

0.029 ($\mu g/m^3$)

Cancer Risk

1.58 (per million)

Data for Alameda County based on meteorological data collected from Pleasanton in 2005

Notes and References:

1. Emissions were developed using EMFAC2011 for fleet mix in 2014 assuming 10,000 AADT and includes impacts from diesel and gasoline vehicle exhaust, brake and tire wear, and resuspended dust.
2. Roadways were modeled using CALINE4 air dispersion model assuming a source length of one kilometer. Meteorological data used to estimate the screening values are noted at the bottom of the "Results" box.
3. Cancer risks were estimated for 70 year lifetime exposure starting in 2014 that includes sensitivity values for early life exposures and OEHHA toxicity values adopted in 2013.

Alameda County
PM2.5 Concentrations and Cancer Risks Generated from Surface Streets

How to use the screening tables:

- Distance is from the edge of the nearest travel lane of a street to the facility or development
- When two or more streets are within the influence area, sum the contribution from each street

$PM_{2.5}$ CONCENTRATIONS (UG/M^3)

NORTH-SOUTH DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance East or West of Surface Street - PM2.5 Concentration (ug/m^3)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	0.159	0.135	0.095	0.045	0.015	0.014	0.014
20,000	0.199	0.191	0.175	0.111	0.043	0.029	0.016
30,000	0.278	0.270	0.238	0.167	0.062	0.045	0.027
40,000	0.342	0.334	0.302	0.215	0.087	0.058	0.041
50,000	0.485	0.477	0.421	0.278	0.103	0.072	0.049
60,000	0.640	0.624	0.529	0.346	0.123	0.087	0.060
70,000	0.795	0.771	0.636	0.413	0.143	0.103	0.070
80,000	0.908	0.881	0.727	0.472	0.164	0.118	0.080
90,000	1.022	0.991	0.818	0.531	0.184	0.133	0.090
100,000	1.136	1.101	0.908	0.590	0.204	0.148	0.100

EAST-WEST DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance North or South of Surface Street - PM2.5 Concentration (ug/m^3)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	0.111	0.095	0.072	0.050	0.024	0.020	0.014
20,000	0.223	0.191	0.143	0.095	0.039	0.030	0.025
30,000	0.254	0.246	0.223	0.135	0.053	0.035	0.027
40,000	0.334	0.318	0.254	0.191	0.070	0.053	0.033
50,000	0.636	0.572	0.461	0.223	0.095	0.066	0.048
60,000	0.680	0.604	0.469	0.262	0.115	0.081	0.056
70,000	0.723	0.636	0.477	0.302	0.135	0.095	0.065
80,000	0.827	0.727	0.545	0.345	0.154	0.109	0.074
90,000	0.930	0.818	0.613	0.388	0.174	0.123	0.084
100,000	1.033	0.908	0.681	0.431	0.193	0.136	0.093

LIFETIME CANCER RISK

NORTH-SOUTH DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance East or West of Surface Street - Cancer Risk (per million)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	4.60	3.83	2.87	1.26	0.61	0.49	0.38
20,000	5.01	4.63	4.06	2.77	1.15	0.88	0.61
30,000	6.56	6.33	5.79	3.86	1.50	1.12	0.77
40,000	8.11	8.06	7.33	5.39	2.08	1.54	1.08
50,000	11.58	11.42	8.93	6.93	2.62	1.92	1.38
60,000	15.25	14.97	11.99	8.30	3.14	2.29	1.63
70,000	18.91	18.52	15.06	9.66	3.66	2.65	1.88
80,000	21.62	21.17	17.21	11.04	4.18	3.03	2.15
90,000	24.32	23.81	19.36	12.42	4.70	3.41	2.42
100,000	27.02	26.46	21.51	13.80	5.22	3.79	2.69

EAST-WEST DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance North or South of Surface Street - Cancer Risk (per million)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	2.70	2.39	1.92	1.46	0.84	0.65	0.53
20,000	5.47	4.63	3.47	2.65	1.33	1.07	0.80
30,000	6.17	5.79	5.40	3.46	1.53	1.11	0.88
40,000	8.10	8.01	6.17	4.63	2.03	1.53	1.11
50,000	15.06	12.78	10.45	5.40	2.68	2.03	1.42
60,000	15.75	13.92	11.38	6.55	3.20	2.39	1.68
70,000	16.44	15.06	12.31	7.70	3.72	2.76	1.95
80,000	18.79	17.21	14.07	8.80	4.25	3.15	2.23
90,000	21.14	19.36	15.83	9.90	4.79	3.55	2.51
100,000	23.49	21.51	17.59	11.00	5.32	3.94	2.79

- Screening tables based on meteorological data collected from Pleasanton in 2005.
- The maximum acute and chronic hazard index for the distances and AADT shown in the table will be less than 0.03.
- Cancer risk were estimated based on exposure from 2014 through 2084. PM2.5 concentrations were based on emissions in 2014.

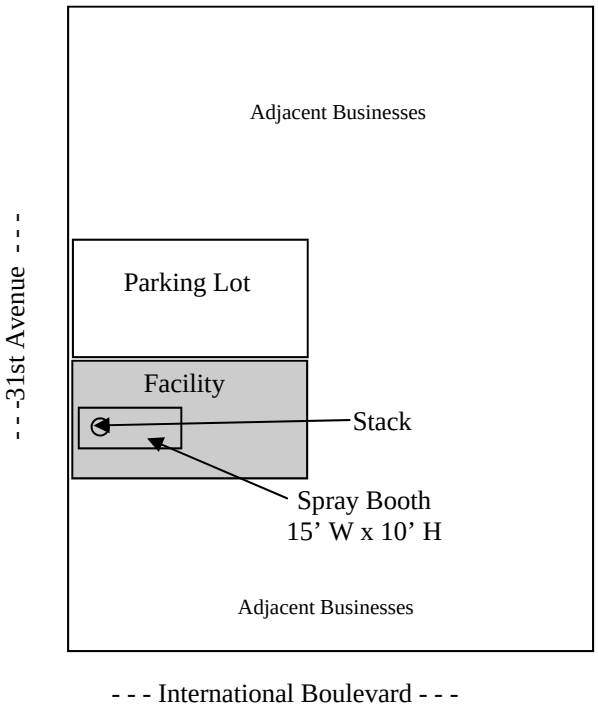
Appendix B. Graphical Representations of Emitting Sources

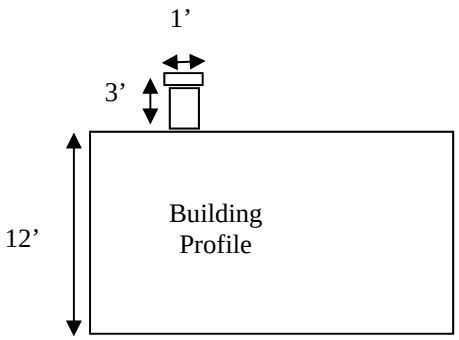
Source 1
Pro Speed Auto Body
1410 31st Avenue
Oakland, CA 94601
Monday - Friday: 8:30 AM - 5:00 PM



Chemical and Use Rate
From BAAQMD 2015 Hazardous Air Emissions Summary for facility:

Isopropanol: 4.03×10^{-2} pounds per day
Toluene: 5.75×10^{-2} pounds per day
Xylene: 4.03×10^{-2} pounds per day



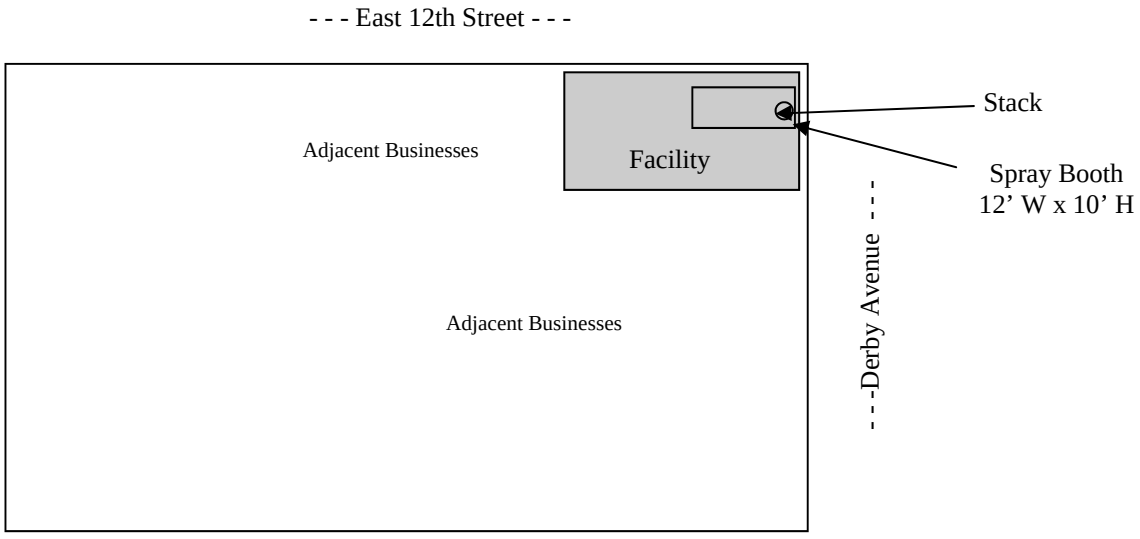


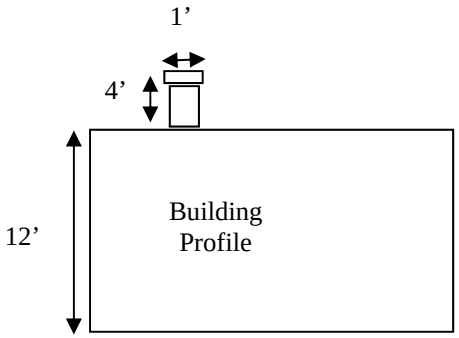
Source 2
H&H Auto Collision, Inc.
3031 East 12th Street
Oakland, CA 94601
Monday - Friday: 8:30 AM - 5:30 PM



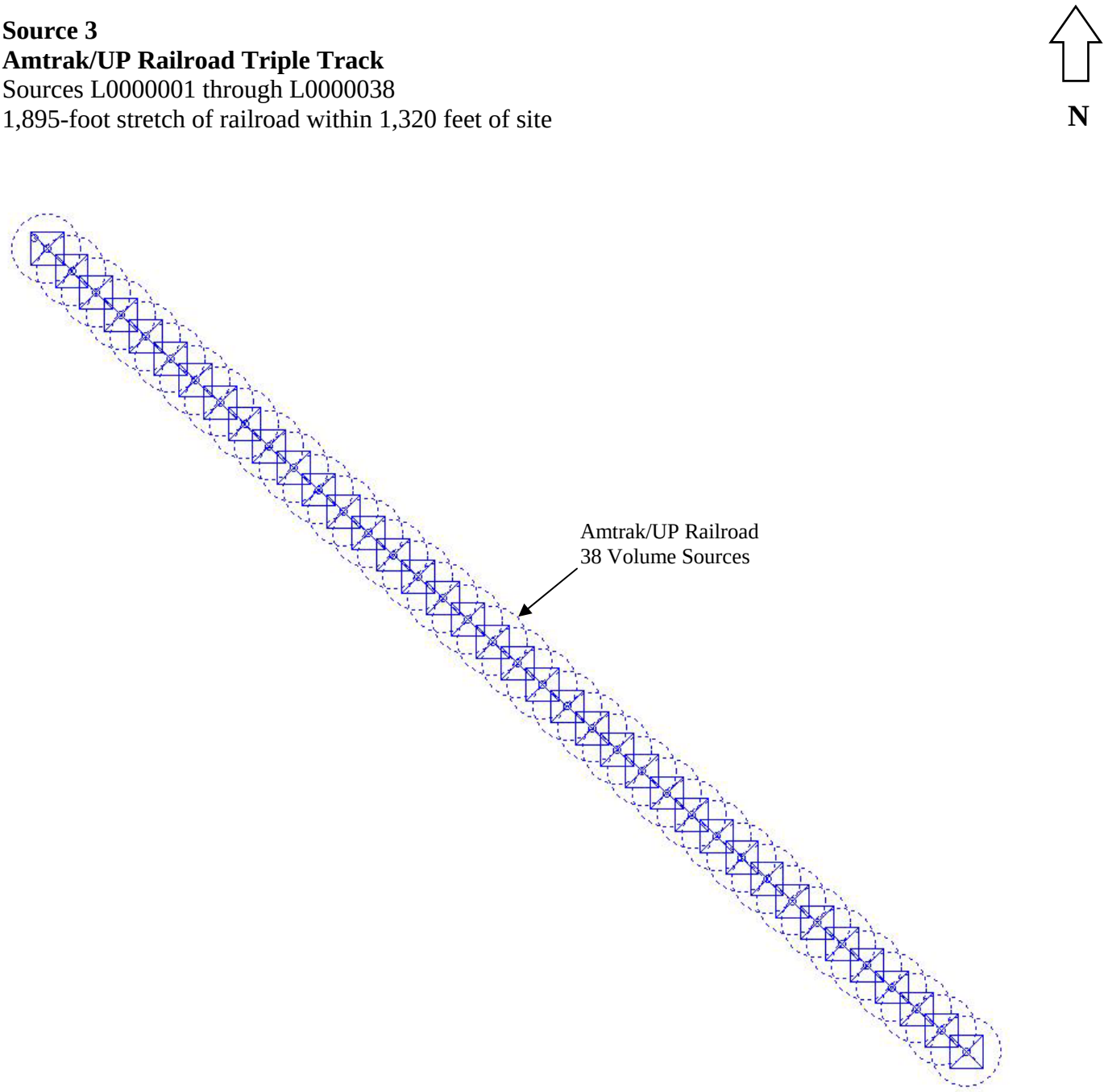
Chemical and Use Rate
From BAAQMD 2015 Hazardous Air Emissions Summary for facility:

Isopropanol: 9.40×10^{-3} pounds per day
Toluene: 1.34×10^{-2} pounds per day
Xylene: 9.40×10^{-3} pounds per day





Source 3
Amtrak/UP Railroad Triple Track
Sources L0000001 through L0000038
1,895-foot stretch of railroad within 1,320 feet of site



Release heights of 5 m used for daytime hours, based upon *Toxic Air Contaminant Emissions Inventory and Dispersion Modeling Report for the City of Industry Rail Yard*, City of Industry, CA (Sierra Research, Inc., 2007).

Appendix C. Emission Rate Calculations

Appendix

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Source 1
Pro Speed Auto Body
1410 31st Avenue
Oakland, CA 94601

Operation: Automotive Refinishing

	hours	days	weeks
Temporal Profile:	8.5	5	52
	0	0	0

Emissions: [1]

			Wt Fraction
Isopropanol	4.03E-02	lbs/day	0.29
Toluene	5.75E-02	lbs/day	0.42
Xylene	4.03E-02	lbs/day	0.29
Total	1.38E-01	lbs/day	1.00
	1.62E-02	lbs/hr	
	2.05E-03	g/s	

Point Source Specifications (vertical release, capped):

Stack Velocity	0.01	m/s
Stack Temperature	298	K
Stack Diameter	1.0	ft
Adjusted Stack Diameter [2]	33.6	m
Stack Height	15.0	ft
Adjusted Stack Height [2]	12.0	ft

(1) Emissions from BAAQMD 2015 hazardous air emissions summary for the facility (ID 21544), provided to Cornerstone Earth Group (2/22/2016).

(2) Stack diameter and height adjusted for prescence of fixed raincap, and incorporation of "no stack-tip downwash" parameter in ISCST3 model.

Source 2
H&H Auto Collision, Inc.
3031 East 12th Street
Oakland, CA 94601

Operation: Automotive Refinishing

	hours	days	weeks
Temporal Profile:	9	5	52
	0	0	0

Emissions: (1)

			Wt Fraction
Isopropanol	9.40E-03	lbs/day	0.29
Toluene	1.34E-02	lbs/day	0.42
Xylene	9.40E-03	lbs/day	0.29
Total	3.22E-02	lbs/day	1.00
	3.58E-03	lbs/hr	
	4.51E-04	g/s	

Point Source Specifications (vertical release, capped):

Stack Velocity	0.01	m/s
Stack Temperature	298	K
Stack Diameter	1.0	ft
Adjusted Stack Diameter (2)	30.0	m
Stack Height	16.0	ft
Adjusted Stack Height (2)	13.0	ft

(1) Emissions from BAAQMD 2015 hazardous air emissions summary for the facility (ID 21544), provided to Cornerstone Earth Group (2/22/2016).

(2) Stack diameter and height adjusted for prescence of fixed raincap, and incorporation of "no stack-tip downwash" parameter in ISCST3 model.

Source 3
Amtrack/UP Railroad Triple Track

Operation: Locomotive emissions

Link Length (feet)	1,895
Link Length (mi)	0.36
Trains per day during school hours[1]	11
School hours[1]	8
Trains per hour	1.4
Locomotives per train[2]	2
Train speed (mph)[3]	34
Throttle notch	5
Travel time (hr)[4]	0.011
DPM Emission Rate per Locomotive (g/hp-hr) [5]	0.13
Load factor[6]	0.48
Locomotive horsepower[7]	3,200
Correction factor for low sulfur fuel[8]	0.72
Emission Rate per Locomotive (g/hr)	142.8

Emission Rate Along Rail Line Near Project Site (g/hr)	4.14	g/hr
	1.15E-03	g/sec

(1) Based on PlaceWorks site reconnaissance on February 5, 2016 and Amtrak schedules between 8 am and 4 pm.

(2) 73 percent of trains observed with one locmotive, based on PlaceWorks' site reconnaissance.

(3) Based on average speed of trains from PlaceWorks' site reconnaissance

(4) Calculated by dividing distance in miles by a speed of 34 mph per train.

(5) Emission rate is from San Joaquin Valley Air Pollution Control District's Trains Emission Factor worksheets for 2016 passenger/commuter trains. Emission factors based on USEPA's Emission Factors for Locomotives Technical Report (2009).

(6) Based on a throttle notch of 5 for a speed of 34 mph, *Port of LA Emissions Inventory* (Starcrest, 2012).

(7) Horsepower of EMD F59PHI locomotives used by Amtrak.

(8) Correction factor for freight trains in South Coast Air Basin after 2011, Changes to Locomotive Inventory (CARB, 2006).

Release Height[9] (m) 5

(9) Release height for daytime hours, based upon *Toxic Air Contaminant Emissions Inventory and Dispersion Modeling Report for the City of Industry Rail Yard* , City of Industry, CA (Sierra Research, Inc., 2007).

Sigma Values for Railroad

Initial Horizontal Dispersion Parameter (Sigma Y)
SY = (source separation distance)/2.15

Initial Vertical Dispersion Parameter (Sigma Z)
$SZ = (1.8 + 0.11(TR)) \times (60/30)^{0.2}$
TR = W2/U

Where:
W2 = traveled way half width (m)
U = average wind speed (m/s)

Width of Traveled Way (m)	15.23
Average Wind Speed (m/s)	3.86
Source Separation Distance (m)	15.23

SY =	**7.08**
SZ =	**2.32**

BAAQMD Meteorological Site

Name: Oakland STP
Site ID:1804
Start Date:9/18/1997
End Date: 1/2/2002
Operator: Non-District
Latitude: 37.8256
Longitude: 122.2988
Elevation:1 m
Wind Height: 27.7
UTM - East: 561.708
UTM - North: 4186.701
County: Alameda
Sensors: ws,wd,temp RH,precip,pressure

Files for Downloading

Year	ASCII	ISCST3 300 m mixing height	ISCST3 600 m mixing height
2001	metdata1804-01met.zip	A	A
2000	metdata1804-00met.zip	metdata1804-003ra.zip	metdata1804-006ra.zip
1999	metdata1804-99met.zip	metdata1804-993ra.zip	metdata1804-996ra.zip
1998	metdata1804-98met.zip	metdata1804-98300.zip	metdata1804-98600.zip

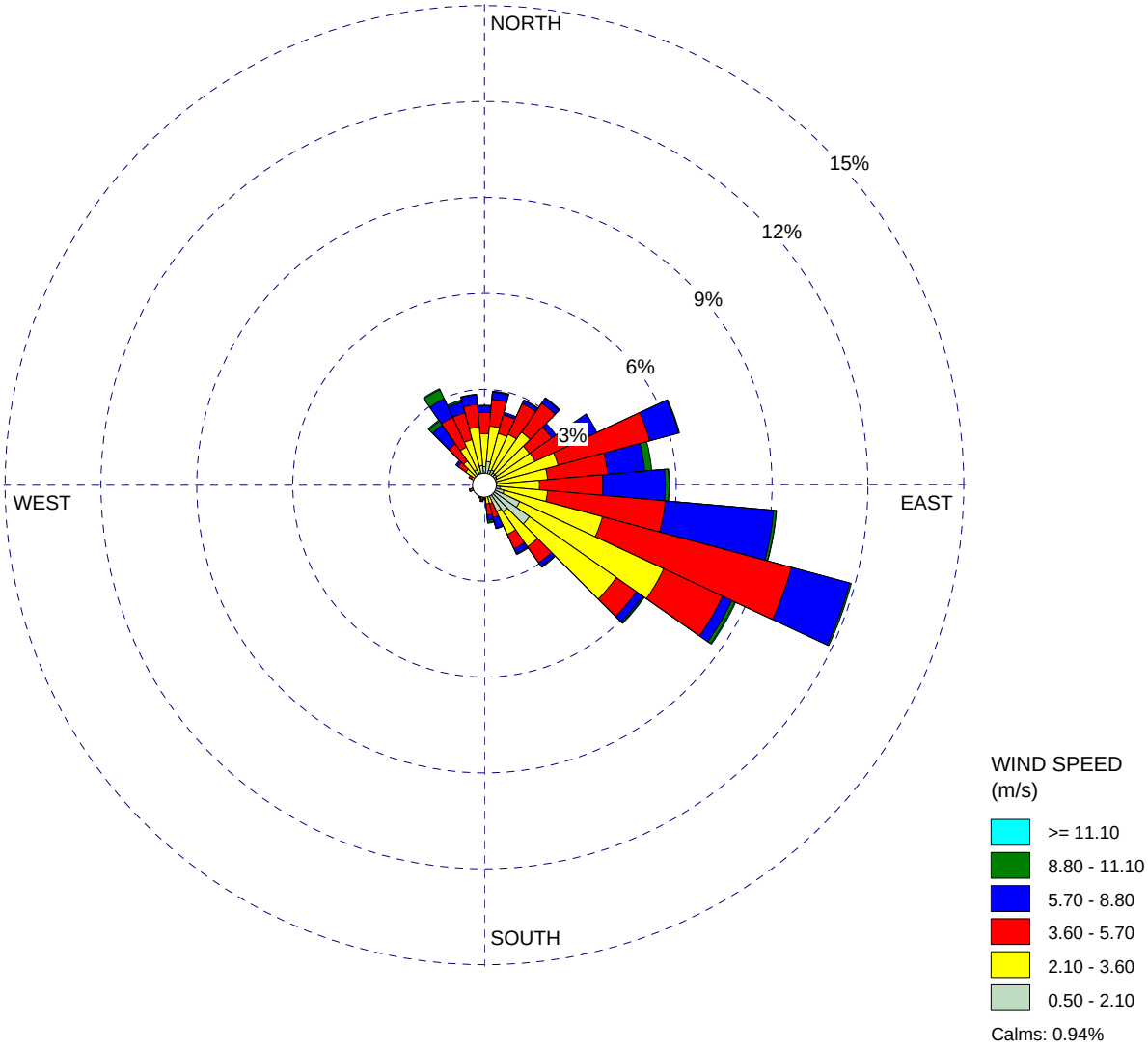
Note: An ◆A◆ instead of a filename for any given year in the ASCII column signifies the data are missing. An ◆A◆ in the ISCST3 columns indicates the data are either missing or do not meet the EPA 90% data capture rate required for regulatory modeling applications.

WIND ROSE PLOT:

Oakland STP Monitoring Station
1998-2000

DISPLAY:

Wind Speed
Flow Vector (blowing to)



COMMENTS: School Hours (8AM-4PM)	DATA PERIOD: **Start Date: 1/1/1998 - 08:00** **End Date: 12/31/2000 - 15:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **0.94%**	TOTAL COUNT: **8768 hrs.**	
	AVG. WIND SPEED: **3.86 m/s**	DATE: **5/6/2016**	PROJECT NO.: **TPCO-03.0**

Appendix D. Air Dispersion Model Output

Appendix

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Model Output
Unit Emission Rates (1 g/s)

Results Summary

Aspire ERES Academy HRA
Oakland, CA

Concentration - Source Group: 1 - Pro Speed Auto Body

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	548.90399	ug/m^3	568050.31	4181574.50	14.73	0.00	0.00	
PERIOD		1.87163	ug/m^3	568060.31	4181604.50	15.19	0.00	0.00	

Concentration - Source Group: 2 - H&H Auto Collision

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
1-HR	1ST	264.46133	ug/m^3	568010.31	4181564.50	14.57	0.00	0.00	
PERIOD		0.88830	ug/m^3	568010.31	4181564.50	14.57	0.00	0.00	

Concentration - Source Group: 3 - Railroad

Averaging Period	Rank	Peak	Units	X (m)	Y (m)	ZELEV (m)	ZFLAG (m)	ZHILL (m)	Peak Date, Start Hour
PERIOD		0.48966	ug/m^3	568010.31	4181564.50	14.57	0.00	0.00	

Model Input
Unit Emission Rates (1 g/s)

```
*** ISCST3 - VERSION 02035 ***    *** Aspire ERES Academy HRA                                          ***        05/10/16
                                   *** Oakland, CA                                                     ***         13:44:44
**MODELOPTs:                                                                                                     PAGE   1
CONC                   URBAN ELEV  FLGPOL               NOSTD

                                        ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Intermediate Terrain Processing is Selected

**Model Is Setup For Calculation of Average CONCentration Values.

  --  SCAVENGING/DEPOSITION LOGIC --
**Model Uses NO DRY DEPLETION.  DDPLETE =  F
**Model Uses NO WET DEPLETION.  WDPLETE =  F
**NO WET SCAVENGING Data Provided.
**NO GAS DRY DEPOSITION Data Provided.
**Model Does NOT Use GRIDDED TERRAIN Data for Depletion Calculations

**Model Uses URBAN Dispersion.

**Model Uses User-Specified Options:
          1. Final Plume Rise.
          2. Not Use Stack-tip Downwash.
          3. Buoyancy-induced Dispersion.
          4. Calms Processing Routine.
          5. Not Use Missing Data Processing Routine.
          6. Default Wind Profile Exponents.
          7. Default Vertical Potential Temperature Gradients.

**Model Accepts Receptors on ELEV Terrain.

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR
    and Calculates PERIOD Averages

**This Run Includes:    40 Source(s);      3 Source Group(s); and      43 Receptor(s)

**The Model Assumes A Pollutant Type of:  OTHER

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
        Model Outputs Tables of PERIOD Averages by Receptor
        Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
        Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours
```

Model Input
Unit Emission Rates (1 g/s)

```
**Misc. Inputs:  Anem. Hgt. (m) =    10.00 ;    Decay Coef. =    0.000     ;    Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                                ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =     1.3 MB of RAM.

**Input Runstream File:          AspireERES-statrail.INP
**Output Print File:             AspireERES-statrail.OUT
**Detailed Error/Message File:   ASPIRE~3.ERR
```

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** POINT SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	STACK HEIGHT (METERS)	STACK TEMP. (DEG.K)	STACK EXIT VEL. (M/SEC)	STACK DIAMETER (METERS)	BUILDING EXISTS	EMISSION RATE SCALAR VARY BY
1	0	0.10000E+01	568136.4	4181510.5	14.4	3.66	298.00	0.01	33.60	YES	SHRDOW
2	0	0.10000E+01	567927.5	4181356.8	11.7	3.96	298.00	0.01	30.00	YES	SHRDOW

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** VOLUME SOURCE DATA ***

SOURCE ID	NUMBER PART. CATS.	EMISSION RATE (GRAMS/SEC)	X (METERS)	Y (METERS)	BASE ELEV. (METERS)	RELEASE HEIGHT (METERS)	INIT. SY (METERS)	INIT. SZ (METERS)	EMISSION RATE SCALAR VARY BY
L0000001	0	0.26316E-01	567589.8	4181520.2	8.5	5.00	7.08	2.32	SHRDOW
L0000002	0	0.26316E-01	567601.1	4181510.2	8.2	5.00	7.08	2.32	SHRDOW
L0000003	0	0.26316E-01	567612.6	4181500.2	9.1	5.00	7.08	2.32	SHRDOW
L0000004	0	0.26316E-01	567623.9	4181490.0	8.6	5.00	7.08	2.32	SHRDOW
L0000005	0	0.26316E-01	567635.3	4181480.0	9.1	5.00	7.08	2.32	SHRDOW
L0000006	0	0.26316E-01	567646.8	4181469.8	9.2	5.00	7.08	2.32	SHRDOW
L0000007	0	0.26316E-01	567658.1	4181459.8	8.7	5.00	7.08	2.32	SHRDOW
L0000008	0	0.26316E-01	567669.6	4181449.8	8.5	5.00	7.08	2.32	SHRDOW
L0000009	0	0.26316E-01	567680.9	4181439.5	9.0	5.00	7.08	2.32	SHRDOW
L0000010	0	0.26316E-01	567692.4	4181429.5	9.1	5.00	7.08	2.32	SHRDOW
L0000011	0	0.26316E-01	567703.8	4181419.2	9.0	5.00	7.08	2.32	SHRDOW
L0000012	0	0.26316E-01	567715.2	4181409.2	9.4	5.00	7.08	2.32	SHRDOW
L0000013	0	0.26316E-01	567726.6	4181399.2	9.2	5.00	7.08	2.32	SHRDOW
L0000014	0	0.26316E-01	567738.1	4181389.2	9.1	5.00	7.08	2.32	SHRDOW
L0000015	0	0.26316E-01	567749.6	4181379.2	9.2	5.00	7.08	2.32	SHRDOW
L0000016	0	0.26316E-01	567761.1	4181369.3	9.4	5.00	7.08	2.32	SHRDOW
L0000017	0	0.26316E-01	567772.6	4181359.2	9.3	5.00	7.08	2.32	SHRDOW
L0000018	0	0.26316E-01	567784.1	4181349.2	9.5	5.00	7.08	2.32	SHRDOW
L0000019	0	0.26316E-01	567795.6	4181339.2	9.3	5.00	7.08	2.32	SHRDOW
L0000020	0	0.26316E-01	567807.1	4181329.2	9.2	5.00	7.08	2.32	SHRDOW
L0000021	0	0.26316E-01	567818.6	4181319.2	9.2	5.00	7.08	2.32	SHRDOW
L0000022	0	0.26316E-01	567830.1	4181309.2	9.8	5.00	7.08	2.32	SHRDOW
L0000023	0	0.26316E-01	567841.5	4181299.3	9.7	5.00	7.08	2.32	SHRDOW
L0000024	0	0.26316E-01	567853.0	4181289.2	9.9	5.00	7.08	2.32	SHRDOW
L0000025	0	0.26316E-01	567864.5	4181279.3	9.7	5.00	7.08	2.32	SHRDOW
L0000026	0	0.26316E-01	567876.0	4181269.2	9.7	5.00	7.08	2.32	SHRDOW
L0000027	0	0.26316E-01	567887.5	4181259.2	9.8	5.00	7.08	2.32	SHRDOW
L0000028	0	0.26316E-01	567899.1	4181249.2	9.7	5.00	7.08	2.32	SHRDOW
L0000029	0	0.26316E-01	567910.6	4181239.5	9.8	5.00	7.08	2.32	SHRDOW
L0000030	0	0.26316E-01	567922.1	4181229.5	9.9	5.00	7.08	2.32	SHRDOW
L0000031	0	0.26316E-01	567933.6	4181219.5	10.1	5.00	7.08	2.32	SHRDOW
L0000032	0	0.26316E-01	567945.1	4181209.5	10.1	5.00	7.08	2.32	SHRDOW
L0000033	0	0.26316E-01	567956.6	4181199.5	10.1	5.00	7.08	2.32	SHRDOW
L0000034	0	0.26316E-01	567968.2	4181189.5	9.9	5.00	7.08	2.32	SHRDOW
L0000035	0	0.26316E-01	567979.7	4181179.8	9.9	5.00	7.08	2.32	SHRDOW
L0000036	0	0.26316E-01	567991.2	4181169.8	10.0	5.00	7.08	2.32	SHRDOW
L0000037	0	0.26316E-01	568002.8	4181159.8	10.0	5.00	7.08	2.32	SHRDOW
L0000038	0	0.26316E-01	568014.2	4181149.8	10.2	5.00	7.08	2.32	SHRDOW

Model Input
Unit Emission Rates (1 g/s)

CONC URBAN ELEV FLGPOL NOSTD

*** SOURCE IDs DEFINING SOURCE GROUPS ***

GROUP ID	SOURCE IDs
1	1 ,
2	2 ,
3	L0000001, L0000002, L0000003, L0000004, L0000005, L0000006, L0000007, L0000008, L0000009, L0000010, L0000011, L0000012, L0000013, L0000014, L0000015, L0000016, L0000017, L0000018, L0000019, L0000020, L0000021, L0000022, L0000023, L0000024, L0000025, L0000026, L0000027, L0000028, L0000029, L0000030, L0000031, L0000032, L0000033, L0000034, L0000035, L0000036, L0000037, L0000038,

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** DIRECTION SPECIFIC BUILDING DIMENSIONS ***

SOURCE ID: 1

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	3.7,	32.7,	0	2	3.7,	30.5,	0	3	3.7,	32.7,	0	4	3.7,	34.0,	0	5	3.7,	34.3,	0	6	3.7,	33.5,	0
7	3.7,	31.7,	0	8	3.7,	28.9,	0	9	3.7,	25.2,	0	10	3.7,	20.8,	0	11	3.7,	15.8,	0	12	3.7,	20.8,	0
13	3.7,	25.2,	0	14	3.7,	28.9,	0	15	3.7,	31.7,	0	16	3.7,	33.5,	0	17	3.7,	34.3,	0	18	3.7,	34.0,	0
19	3.7,	32.7,	0	20	3.7,	30.5,	0	21	3.7,	32.7,	0	22	3.7,	34.0,	0	23	3.7,	34.3,	0	24	3.7,	33.5,	0
25	3.7,	31.7,	0	26	3.7,	28.9,	0	27	3.7,	25.2,	0	28	3.7,	20.8,	0	29	3.7,	15.8,	0	30	3.7,	20.8,	0
31	3.7,	25.2,	0	32	3.7,	28.9,	0	33	3.7,	31.7,	0	34	3.7,	33.5,	0	35	3.7,	34.3,	0	36	3.7,	34.0,	0

SOURCE ID: 2

IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK	IFV	BH	BW	WAK
1	3.7,	25.7,	0	2	3.7,	24.7,	0	3	3.7,	23.0,	0	4	3.7,	22.6,	0	5	3.7,	24.4,	0	6	3.7,	25.5,	0
7	3.7,	25.9,	0	8	3.7,	25.5,	0	9	3.7,	24.2,	0	10	3.7,	22.3,	0	11	3.7,	19.7,	0	12	3.7,	16.5,	0
13	3.7,	15.8,	0	14	3.7,	19.1,	0	15	3.7,	21.8,	0	16	3.7,	23.9,	0	17	3.7,	25.3,	0	18	3.7,	25.9,	0
19	3.7,	25.7,	0	20	3.7,	24.7,	0	21	3.7,	23.0,	0	22	3.7,	22.6,	0	23	3.7,	24.4,	0	24	3.7,	25.5,	0
25	3.7,	25.9,	0	26	3.7,	25.5,	0	27	3.7,	24.2,	0	28	3.7,	22.3,	0	29	3.7,	19.7,	0	30	3.7,	16.5,	0
31	3.7,	15.8,	0	32	3.7,	19.1,	0	33	3.7,	21.8,	0	34	3.7,	23.9,	0	35	3.7,	25.3,	0	36	3.7,	25.9,	0

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

* SOURCE EMISSION RATE SCALARS WHICH VARY SEASONALLY, DIURNALLY AND BY DAY OF WEEK (SHRDOW) *

SOURCE ID = 1, 2, and 3 ; SOURCE TYPE = POINT :

HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR	HOUR	SCALAR
							SEASON = WINTER; DAY OF WEEK = WEEKDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.1000E+01	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SPRING; DAY OF WEEK = WEEKDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.1000E+01	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SUMMER; DAY OF WEEK = WEEKDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.1000E+01	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = FALL ; DAY OF WEEK = WEEKDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.1000E+01	10	.1000E+01	11	.1000E+01	12	.1000E+01	13	.1000E+01	14	.1000E+01	15	.1000E+01	16	.1000E+01
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = WINTER; DAY OF WEEK = SATURDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SPRING; DAY OF WEEK = SATURDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SUMMER; DAY OF WEEK = SATURDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = FALL ; DAY OF WEEK = SATURDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = WINTER; DAY OF WEEK = SUNDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SPRING; DAY OF WEEK = SUNDAY								
1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00
							SEASON = SUMMER; DAY OF WEEK = SUNDAY								

Model Input
Unit Emission Rates (1 g/s)

1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

SEASON = FALL ; DAY OF WEEK = SUNDAY

1	.0000E+00	2	.0000E+00	3	.0000E+00	4	.0000E+00	5	.0000E+00	6	.0000E+00	7	.0000E+00	8	.0000E+00
9	.0000E+00	10	.0000E+00	11	.0000E+00	12	.0000E+00	13	.0000E+00	14	.0000E+00	15	.0000E+00	16	.0000E+00
17	.0000E+00	18	.0000E+00	19	.0000E+00	20	.0000E+00	21	.0000E+00	22	.0000E+00	23	.0000E+00	24	.0000E+00

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** DISCRETE CARTESIAN RECEPTORS ***
(X-COORD, Y-COORD, ZELEV, ZFLAG)
(METERS)

(568010.3,	4181564.5,	14.6,	1.5);	(568050.3,	4181564.5,	14.6,	1.5);
(568000.3,	4181574.5,	14.6,	1.5);	(568010.3,	4181574.5,	14.6,	1.5);
(568020.3,	4181574.5,	14.7,	1.5);	(568030.3,	4181574.5,	14.7,	1.5);
(568040.3,	4181574.5,	14.8,	1.5);	(568050.3,	4181574.5,	14.7,	1.5);
(567990.3,	4181584.5,	14.7,	1.5);	(568000.3,	4181584.5,	14.7,	1.5);
(568010.3,	4181584.5,	14.7,	1.5);	(568020.3,	4181584.5,	14.7,	1.5);
(568030.3,	4181584.5,	14.7,	1.5);	(568040.3,	4181584.5,	14.8,	1.5);
(568050.3,	4181584.5,	14.9,	1.5);	(568060.3,	4181584.5,	14.8,	1.5);
(567990.3,	4181594.5,	14.7,	1.5);	(568000.3,	4181594.5,	14.7,	1.5);
(568010.3,	4181594.5,	14.8,	1.5);	(568020.3,	4181594.5,	14.8,	1.5);
(568030.3,	4181594.5,	14.8,	1.5);	(568040.3,	4181594.5,	15.0,	1.5);
(568050.3,	4181594.5,	15.0,	1.5);	(568060.3,	4181594.5,	15.0,	1.5);
(568000.3,	4181604.5,	14.7,	1.5);	(568010.3,	4181604.5,	14.9,	1.5);
(568020.3,	4181604.5,	14.9,	1.5);	(568030.3,	4181604.5,	14.9,	1.5);
(568040.3,	4181604.5,	15.2,	1.5);	(568050.3,	4181604.5,	15.2,	1.5);
(568060.3,	4181604.5,	15.2,	1.5);	(568000.3,	4181614.5,	14.8,	1.5);
(568010.3,	4181614.5,	14.9,	1.5);	(568020.3,	4181614.5,	14.9,	1.5);
(568030.3,	4181614.5,	15.1,	1.5);	(568040.3,	4181614.5,	15.2,	1.5);
(568050.3,	4181614.5,	15.2,	1.5);	(568000.3,	4181624.5,	14.9,	1.5);
(568010.3,	4181624.5,	15.1,	1.5);	(568020.3,	4181624.5,	15.1,	1.5);
(568030.3,	4181624.5,	15.2,	1.5);	(568010.3,	4181634.5,	15.5,	1.5);
(568020.3,	4181634.5,	15.5,	1.5);				

Model Input
Unit Emission Rates (1 g/s)

CONC URBAN ELEV FLGPOL NOSTD

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

*** WIND PROFILE EXPONENTS ***

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
B	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00	.15000E+00
C	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00	.20000E+00
D	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00	.25000E+00
E	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00
F	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00	.30000E+00

*** VERTICAL POTENTIAL TEMPERATURE GRADIENTS ***
(DEGREES KELVIN PER METER)

STABILITY CATEGORY	WIND SPEED CATEGORY 1	2	3	4	5	6
A	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
B	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
C	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
D	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00	.00000E+00
E	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01	.20000E-01
F	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01	.35000E-01

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

FILE: C:\!METFI~1\BAAQMD~1\OST983~1.ASC
FORMAT: (4I2,2F9.4,F6.1,I2,2F7.1,f9.4,f10.1,f8.4,i4,f7.2)
SURFACE STATION NO.: 1804 UPPER AIR STATION NO.: 1804
NAME: UNKNOWN NAME: UNKNOWN
YEAR: 1998 YEAR: 1998

YR	MN	DY	HR	FLOW VECTOR	SPEED (M/S)	TEMP (K)	STAB CLASS	MIXING HEIGHT (M) RURAL	MIXING HEIGHT (M) URBAN	USTAR (M/S)	M-O LENGTH (M)	Z-0 (M)	IPCODE	PRATE (mm/HR)
98	01	01	01	286.5	2.01	283.9	5	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	02	330.5	1.97	283.6	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	03	316.8	1.52	283.4	5	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	04	311.3	1.21	283.5	6	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	05	356.3	1.03	283.4	6	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	06	20.0	1.00	283.3	6	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	07	123.1	1.65	282.9	6	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	08	155.1	2.50	282.4	5	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	09	316.6	1.00	282.5	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	10	14.3	1.25	283.3	3	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	11	341.9	2.10	284.4	3	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	12	336.5	2.68	284.9	3	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	13	326.3	3.22	285.4	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	14	18.3	1.74	285.9	3	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	15	10.3	2.32	285.6	2	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	16	1.0	4.02	286.1	3	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	17	5.8	4.34	286.0	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	18	335.8	3.58	285.8	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	19	315.4	2.91	285.4	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	20	349.8	3.93	285.3	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	21	325.1	3.80	285.0	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	22	324.4	3.71	284.8	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	23	323.7	4.16	284.5	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00
98	01	01	24	327.9	5.45	284.5	4	300.0	300.0	0.0000	0.0	0.0000	0	0.00

*** NOTES: STABILITY CLASS 1=A, 2=B, 3=C, 4=D, 5=E AND 6=F.
FLOW VECTOR IS DIRECTION TOWARD WHICH WIND IS BLOWING.

Model Input
Unit Emission Rates (1 g/s)

**MODELOPTs:
CONC URBAN ELEV FLGPOL NOSTD

*** THE SUMMARY OF MAXIMUM PERIOD (26304 HRS) RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC		RECEPTOR (XR, YR, ZELEV, ZFLAG)		OF TYPE	NETWORK GRID-ID
1	1ST HIGHEST VALUE IS	1.87163	AT (568060.31, 4181604.50, 15.19, 1.50)			DC	NA
	2ND HIGHEST VALUE IS	1.79338	AT (568060.31, 4181594.50, 14.97, 1.50)			DC	NA
	3RD HIGHEST VALUE IS	1.61817	AT (568060.31, 4181584.50, 14.75, 1.50)			DC	NA
	4TH HIGHEST VALUE IS	1.49316	AT (568050.31, 4181614.50, 15.25, 1.50)			DC	NA
	5TH HIGHEST VALUE IS	1.43220	AT (568050.31, 4181604.50, 15.18, 1.50)			DC	NA
	6TH HIGHEST VALUE IS	1.30974	AT (568050.31, 4181594.50, 15.02, 1.50)			DC	NA
	7TH HIGHEST VALUE IS	1.16753	AT (568040.31, 4181614.50, 15.23, 1.50)			DC	NA
	8TH HIGHEST VALUE IS	1.13859	AT (568050.31, 4181584.50, 14.86, 1.50)			DC	NA
	9TH HIGHEST VALUE IS	1.07962	AT (568040.31, 4181604.50, 15.22, 1.50)			DC	NA
	10TH HIGHEST VALUE IS	0.96931	AT (568030.31, 4181624.50, 15.16, 1.50)			DC	NA
2	1ST HIGHEST VALUE IS	0.88830	AT (568010.31, 4181564.50, 14.57, 1.50)			DC	NA
	2ND HIGHEST VALUE IS	0.85212	AT (568000.31, 4181574.50, 14.58, 1.50)			DC	NA
	3RD HIGHEST VALUE IS	0.82335	AT (568010.31, 4181574.50, 14.65, 1.50)			DC	NA
	4TH HIGHEST VALUE IS	0.81457	AT (567990.31, 4181584.50, 14.67, 1.50)			DC	NA
	5TH HIGHEST VALUE IS	0.79441	AT (568020.31, 4181574.50, 14.66, 1.50)			DC	NA
	6TH HIGHEST VALUE IS	0.79056	AT (568000.31, 4181584.50, 14.66, 1.50)			DC	NA
	7TH HIGHEST VALUE IS	0.76636	AT (568030.31, 4181574.50, 14.73, 1.50)			DC	NA
	8TH HIGHEST VALUE IS	0.76499	AT (568010.31, 4181584.50, 14.67, 1.50)			DC	NA
	9TH HIGHEST VALUE IS	0.76221	AT (568050.31, 4181564.50, 14.65, 1.50)			DC	NA
	10TH HIGHEST VALUE IS	0.75562	AT (567990.31, 4181594.50, 14.68, 1.50)			DC	NA
3	1ST HIGHEST VALUE IS	0.48966	AT (568010.31, 4181564.50, 14.57, 1.50)			DC	NA
	2ND HIGHEST VALUE IS	0.48031	AT (568000.31, 4181574.50, 14.58, 1.50)			DC	NA
	3RD HIGHEST VALUE IS	0.47072	AT (567990.31, 4181584.50, 14.67, 1.50)			DC	NA
	4TH HIGHEST VALUE IS	0.46575	AT (568010.31, 4181574.50, 14.65, 1.50)			DC	NA
	5TH HIGHEST VALUE IS	0.45682	AT (568000.31, 4181584.50, 14.66, 1.50)			DC	NA
	6TH HIGHEST VALUE IS	0.45173	AT (568020.31, 4181574.50, 14.66, 1.50)			DC	NA
	7TH HIGHEST VALUE IS	0.44763	AT (567990.31, 4181594.50, 14.68, 1.50)			DC	NA
	8TH HIGHEST VALUE IS	0.44341	AT (568010.31, 4181584.50, 14.67, 1.50)			DC	NA
	9TH HIGHEST VALUE IS	0.43822	AT (568030.31, 4181574.50, 14.73, 1.50)			DC	NA
	10TH HIGHEST VALUE IS	0.43484	AT (568000.31, 4181594.50, 14.69, 1.50)			DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

Model Input
Unit Emission Rates (1 g/s)

CONC URBAN ELEV FLGPOL NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF OTHER IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
1 HIGH 1ST HIGH VALUE IS	548.90399	ON 99102509:	AT (568050.31, 4181574.50, 14.73, 1.50)	DC	NA
2 HIGH 1ST HIGH VALUE IS	264.46133	ON 98031209:	AT (568010.31, 4181564.50, 14.57, 1.50)	DC	NA
3 HIGH 1ST HIGH VALUE IS	63.30856	ON 99112509:	AT (568000.31, 4181574.50, 14.58, 1.50)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

Model Input
Unit Emission Rates (1 g/s)

CONC URBAN ELEV FLGPOL NOSTD

*** Message Summary : ISCST3 Model Execution ***

 --------- Summary of Total Messages --------

A Total of 0 Fatal Error Message(s)
A Total of 2 Warning Message(s)
A Total of 235 Informational Message(s)

A Total of 235 Calm Hours Identified

   ******** FATAL ERROR MESSAGES ********
             *** NONE ***

   ********   WARNING MESSAGES   ********
SO W320 98 PPARM :Input Parameter May Be Out-of-Range for Parameter DS
SO W320 99 PPARM :Input Parameter May Be Out-of-Range for Parameter DS

   ****
   *** ISCST3 Finishes Successfully ***
   ****

Appendix

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Appendix E. Risk Calculations

Appendix

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Table E1 - Stationary Sources and Railroad
Pollutant Concentration Worksheet
Toxic Air Contaminants and PM2.5

Source No.	Source	Contaminant	Weight Fraction	Emission Rates[1] **Annual Avg** (g/s)	Model Output[2] **Annual Avg** ($\mu g/m^3$)	Annual Average MER Concentration ($\mu g/m^3$)	Model Output[2] **1-Hour** ($\mu g/m^3$)	Acute (1-Hour) MER Concentration ($\mu g/m^3$)
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(i)	(j)
Staff and Student Scenarios								
1	Pro Speed Auto Body	Isopropanol	2.92E-01	2.05E-03	1.872	0.00112	548.90	0.32790
		Toluene	4.16E-01			0.00160		0.46785
		Xylenes	2.92E-01			0.00112		0.32790
2	H&H Auto Collision,	Isopropanol	2.92E-01	4.51E-04	0.888	0.00012	264.46	0.03479
		Toluene	4.16E-01			0.00017		0.04964
		Xylenes	2.92E-01			0.00012		0.03479
3	Amtrak/UP Railroad	Diesel Particulate	1.00E+00	1.15E-03	0.490	0.00056	n/a	
Note: Maximum Exposed Receptor (MER)						For Cancer/Chronic Calculation		For Acute Calculation

[1] Emission Rates, per source, from Source Emissions Inventories (Appendix C).

[2] Model Output (Appendix D) at the maximum exposed receptor (MER) are based on unit emission rates for emission sources (1 g/s per source).

Table E2 - High Volume Roadway Screening

High Volume Roadway - Screening Evaluation

70-Year Residential Exposure Scenario

Source No.	Source	Roadway Orientation	Annual Average Daily Trips	Distance	Cancer Risk (per million)	Chronic Hazard Index	Acute Hazard Index	$PM_{2.5}$ ($\mu g/m^3$)	Comments
4	International Blvd	East-West	15,100	95 ft	7.41	0.030	0.030	0.14	Roadway Screening Analysis Calculator
5	Fruitvale Avenue	North-South	10,680	500 ft	0.92	0.030	0.030	0.02	
6	East 12th Street	East-West	11,530	575 ft	1.58	0.030	0.030	0.03	
BAAQMD Significance Threshold					10.0	1.0	1.0	0.30	For each individual source
Exceeds Threshold?					Yes	No	No	No	

25-Year Staff Exposure Scenario - Screening Level Risk Values [1]

Source No.	Source	Roadway Orientation	Annual Average Daily Trips	Age Sensitivity Factor	Cancer Risk (per million)	Chronic Hazard Index	Acute Hazard Index	$PM_{2.5}$ ($\mu g/m^3$)	Comments
4	International Blvd	East-West	15,100	1.0	2.65	0.03	0.030	0.14	Roadway Screening Analysis Calculator
5	Fruitvale Avenue	North-South	10,680	1.0	0.33	0.03	0.030	0.02	
6	East 12th Street	East-West	11,530	1.0	0.56	0.03	0.030	0.03	
BAAQMD Significance Threshold					10.0	1.0	1.0	0.30	For each individual source
Exceeds Threshold?					**No**	**No**	**No**	**No**	

9-Year Student Exposure Scenario - Screening Level Risk Values [2]

Source No.	Source	Roadway Orientation	Annual Average Daily Trips	Age Sensitivity Factor	Cancer Risk (per million)	Chronic Hazard Index	Acute Hazard Index	$PM_{2.5}$ ($\mu g/m^3$)	Comments
4	International Blvd	East-West	15,100	3.0	2.86	0.03	0.030	0.14	Roadway Screening Analysis Calculator
5	Fruitvale Avenue	North-South	10,680	3.0	0.35	0.03	0.030	0.02	
6	East 12th Street	East-West	11,530	3.0	0.61	0.03	0.030	0.03	
BAAQMD Significance Threshold					10.0	1.0	1.0	0.30	For each individual source
Exceeds Threshold?					**No**	**No**	**No**	**No**	

Sources: BAAQMD Roadway Screening Analysis Calculator (2015), County Surface Street Screening Tables - Alameda County (2011), and Traffic Impact Analysis for Project (Stantec, 2015).

[1] BAAQMD Screening Level Cancer Risk Values are for 70-year residential exposures. Therefore, the cancer risk values were adjusted for a shorter 25-year exposure scenario for staff.

[2] The cancer risk values were adjusted for a shorter 9-year (grades K-8) exposure scenario for students of the proposed school site.

Table E3
HARP2 Results for Cancer Risk and Chronic Hazards
School Scenario

No.	Source	Contaminant	Carcinogenic Risks		Chronic Non-Cancer Risks - Toxicological Endpoints*											
			Staff	Students	CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
			per million	per million												
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)
1	Pro Speed Auto Body	Isopropanol						1.60E-07		1.60E-07						
		Toluene				5.33E-06				5.33E-06	5.33E-06					
		Xylenes				1.60E-06					1.60E-06		1.60E-06			
		Source Total	**0.00**	**0.00**	0.00E+00	6.93E-06	0.00E+00	1.60E-07	0.00E+00	5.49E-06	**6.93E-06**	0.00E+00	1.60E-06	0.00E+00	0.00E+00	0.00E+00
2	H&H Auto Collision,	Isopropanol						1.71E-08		1.71E-08						
		Toluene				5.67E-07				5.67E-07	5.67E-07					
		Xylenes				1.71E-07					1.71E-07		1.71E-07			
		Source Total	**0.00**	**0.00**	0.00E+00	7.38E-07	0.00E+00	1.71E-08	0.00E+00	5.84E-07	**7.38E-07**	0.00E+00	1.71E-07	0.00E+00	0.00E+00	0.00E+00
3	Amtrak/UP Railroad	Diesel Particulate	**3.5E-02**	**6.1E-02**							**1.12E-04**					

Risk Factors used in CARB's HARP2 for School-Based Receptors

	Staff	Students	
	16 < 70 years	2 < 16 years	age bin
Dose Exposure Factors:	250	180	exposure frequency (days/year)
	230	520	8-hour inhalation rate (L/kg-8 hours) [1]
	1	1	inhalation absorption factor
Risk Calculation Factors:	1	3	age sensitivity factor
	25	9	exposure duration (years)
	70	70	averaging time (years)

[1] 8-hour inhalation rate taken as the 95th percentile breathing rates for Moderate Intensity Activities (OEHHA, 2015).

* Key to Toxicological Endpoints

CV	Cardiovascular System
CNS	Central Nervous System
IMMUN	Immune System
KIDN	Kidneys
GILV	Gastrointestinal Tract and Liver/Alimentary Tract
RESP	Respiratory System
REPRO	Reproductive System
SKIN	Skin irritation and/or other effects
EYE	Eye irritation and/or other effects
BONE	Bones and Teeth
ENDO	Endocrine System
BLOOD	Hematological System

Table E4
HARP2 Results for Acute Hazards
School Scenario

Source No.	Source	Contaminant	Acute Non-Cancer Risks - Toxicological Endpoints*											
			CV	CNS	IMMUN	KIDNEY	GILV	REPRO	RESP	SKIN	EYE	BONE	ENDO	BLOOD
(a)	(b)	(c)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)
1	Pro Speed Auto Body	Isopropanol							1.02E-04		1.02E-04			
		Toluene		1.26E-05				1.26E-05	1.26E-05		1.26E-05			
		Xylenes		1.49E-05					1.49E-05		1.49E-05			
		Source Total	0.00E+00	2.76E-05	0.00E+00	0.00E+00	0.00E+00	1.26E-05	**1.30E-04**	0.00E+00	1.30E-04	0.00E+00	0.00E+00	0.00E+00
2	H&H Auto Collision,	Isopropanol							1.09E-05		1.09E-05			
		Toluene		1.34E-06				1.34E-06	1.34E-06		1.34E-06			
		Xylenes		1.58E-06					1.58E-06		1.58E-06			
		Source Total	0.00E+00	2.92E-06	0.00E+00	0.00E+00	0.00E+00	1.34E-06	**1.38E-05**	0.00E+00	1.38E-05	0.00E+00	0.00E+00	0.00E+00
3	Amtrak/UP Railroad	Diesel Particulate												

* Key to Toxicological Endpoints

CV	Cardiovascular System	RESP	Respiratory System
CNS	Central Nervous System	SKIN	Skin irritation and/or other effects
IMMUN	Immune System	EYE	Eye irritation and/or other effects
KIDN	Kidneys	BONE	Bones and Teeth
GILV	Gastrointestinal Tract and Liver/Alimentary Tract	ENDO	Endocrine System
REPRO	Reproductive System	BLOOD	Hematological System

Table E5 - Summary of Health Risks
Individual Sources and Cumulative

Health Risk Summary

Source No.	Source	Cancer Risk - Staff (per	Cancer Risk - Students (per	Chronic Hazard	Acute Hazard	$PM_{2.5}$ (µg/m3)	Methodology
REFINED MODELING VALUES							
1	Pro Speed Auto Body	0.00	0.00	0.000	0.000	n/a	Air dispersion modeling
2	H&H Auto Collision, Inc.	0.00	0.00	0.000	0.000	n/a	
3	Amtrak/UP Railroad	0.03	0.06	0.000	0.000	n/a	
SCREENING ANALYSIS VALUES							
4	International Bouelvard [1]	2.65	2.86	0.030	0.030	0.14	Roadway Screening Analysis Calculator, adjusted for school based receptors
5	Fruitvale Avenue [1]	0.33	0.35	0.030	0.030	0.02	
6	East 12th Street [1]	0.56	0.61	0.030	0.030	0.03	
	BAAQMD Significance Threshold	10.0	10.0	1.0	1.0	0.30	For each individual source
	Exceeds Threhold?	**No**	**No**	**No**	**No**	**No**	
	Cumulative Total	3.57	3.88	0.09	0.09	0.19	For ALL Sources
	BAAQMD Significance Threshold	100	100	10.0	10.0	0.80	
	Exceeds Threhold?	**No**	**No**	**No**	**No**	**No**	

[1] BAAQMD Screening Level Cancer Risk Values for stationary and mobile sources are for 70-year residential exposures. Therefore, the cancer risk values were adjusted to a 25-year exposure scenario for staff and 9-year exposure scenario for students.

ATTACHMENT E

Traffic Impact Study for Aspire Public School in the City of Oakland

Prepared for:
The City of Oakland

Prepared by:
Stantec Consulting Services



March 7, 2018

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1.0 INTRODUCTION AND SUMMARY

1.1 INTRODUCTION

This report presents the results of a traffic impact analysis for the proposed Aspire Public School (herein referred to as "Project") located at 3007 E. 15th Street at the west side of the cul-de-sac on E. 15th Street north of Derby Avenue. The proposed Project consists of replacing the existing building at the corner of Derby Avenue and E. 15th Street to build a school building with surface parking. As currently programmed, the enrollment for the school is expected to be 620 students, from kindergarten to eighth grade (i.e. ages 4 years, 8 months to 14 years), and would include approximately 51 faculty/staff members.

The classes at the proposed Project are anticipated to begin early August and end in mid-June the following year. The proposed Project would operate Monday through Thursday between the hours of 7:15 a.m. and 3:30 p.m., and 7:15 a.m. and 12:00 p.m. on Friday, with faculty/staff members arriving to the school slightly earlier and departing after school hours. After school programs would be provided between 3:30 p.m. and 6:00 p.m. Monday through Thursday, and between 12:00 p.m. and 5:00 p.m. on Friday, with an attendance of approximately 100 students.

Vehicular traffic would be directed onsite in one direction through the drop-off/pick-up entrance driveway on Derby Avenue and exit the site through the drop-off/pick-up driveway on E. 15th Street. Students would be picked-up and dropped-off along the street curb area of the pick-up and drop-off lane on the north side of the school building along E. 15th Street. Between Monday and Thursday, the morning drop-off time would occur between 7:15 a.m. and 8:15 a.m., and the afternoon pick-up time would occur between 3:15 p.m. and 3:45 p.m. Pick-up time for the after-school programs would occur between 6:00 p.m. and 6:30 p.m. Pick-up and drop-off activities would be distributed and staggered with the proposed staggered start time between Grade K-5 (Kindergarten) and Grade 6-8 (middle school). The middle school breakfast would start at 7:15 a.m. and school would start at 7:45 a.m. The kindergarten breakfast would start at 7:45 a.m. and school would start at 8:15 a.m. There would be no school bus transportation provided to the students.

For drop-off activities (passenger unloading), at least one faculty/staff member (e.g. teacher) would be outside of the building during the drop-off period to help usher students into the school and to avoid double parking on the drop-off/pick-up driveway. Parents/guardians would be provided instructions by faculty/staff to notify them that students shall always exit on the curbside of the vehicle.

The purpose of this traffic study is to evaluate the effect of the proposed Project on the existing roadway network. The report includes the results of a traffic operations analysis, as well as an evaluation of internal circulation; external site access and driveway operations; on-street parking conditions; adequacy of Project-provided parking; transit, bicycle, and pedestrian access.

1.2 SUMMARY

The proposed Project is expected to generate approximately 318 net new trips during the a.m. peak hour and 212 net new trips during the p.m. peak hour.

The proposed two-lane access driveway would provide adequate access for cars and small trucks to the site. In addition, the internal circulation is expected to be adequate for the on-site faculty parking. Also, assuming school timings are staggered, the proposed drop-off area would be able to accommodate the estimated queuing of 15 cars within the school boundaries, without spilling over to Derby Avenue.

The project sponsor and subsequent property owner will implement a Transportation Demand Management (TDM) Plan that annually reduces the number of single occupancy vehicle (SOV) trips generated by the proposed Project.

The Project would include 11on-site parking spaces. The Project sponsor would file a Joint Use Agreement with the City for the use of four (4) parking spaces at the adjacent property. Thus, the Project would meet the City requirements of 15 off-street parking spaces. In addition, on average, on-street parking spaces in the Project vicinity were approximately 68 percent occupied with approximately 74 spaces available in the weekday morning peak hour. Per Project sponsor, on-street parking would not be allowed along Project frontages with the implementation of the proposed Project, which would reduce up to ten (10) on-street parking spaces in the Project vicinity.

2.0 SETTING

This section describes the existing transportation conditions in the vicinity of the proposed Project, including descriptions of the existing roadway network, intersection operating conditions, transit network, pedestrian conditions and bicycle conditions near the Project site.

Figure 1 illustrates the proposed Project vicinity. **Figure 2** shows the Project site plan.

2.1 ROADWAY NETWORK

International Boulevard/ SR 185 is a four-lane urban arterial roadway that runs approximately north-south parallel to Interstate 880 (I-880), beginning at the Lake Merritt area, passing through east Oakland and City of San Leandro, and ending in the City of Hayward where it becomes Mission Street.

Derby Avenue is a two-lane local street running approximately east-west between E. 10th Street and E. 15th Street.

E. 15th Street is a two-lane local street that runs approximately north-south between Fruitvale Avenue and the cul-de-sec north of Derby Avenue in the Project vicinity.

29th Avenue is a collector street with two to four lanes that runs approximately east-west between E. 17th Street and I-880. 29th Avenue provides access to and from Northbound I-880.

Fruitvale Avenue is an urban arterial roadway with two to four lanes that runs approximately east-west providing access between Interstate 580 (I-580) and City of Alameda. East of I-580, Fruitvale Avenue becomes Lyman Road, and it becomes Tilden Way west of Tidal Canal between Oakland and Alameda.

34th Avenue is a two-lane collector street that runs discontinuously between E. 9th Street and Henrietta Street. In the Project vicinity, 34th Avenue intersects with International Boulevard as a T-intersection.

35th Avenue is a collector street with two to four lanes that runs discontinuously between E. 9th Street and I-580. East of I-580, 35th Avenue runs as an urban arterial roadway and becomes Redwood Road before the interchange with Highway 13.

36th Avenue is a two-lane collector street that runs discontinuously between E. 9th Street and Harper Street.

E. 12th Street is an urban arterial roadway with two to four lanes that runs approximately north-south between 14th Avenue and 42nd Avenue. North of 14th Avenue, E. 12th Street becomes E. 8th Street; and south of 42nd Avenue, it becomes a collector street until the cul-de-sac south of 54th Avenue.

2.2 TRANSIT SERVICE

The proposed Project site is served by AC Transit service. AC Transit provides bus transit service to the greater San Francisco East Bay Area, including Oakland and several other cities in Alameda and Contra Costa Counties, and also Transbay service to downtown San Francisco. The proposed Project is well served by transit, with six (6) AC Transit lines operating within the study area. The lines listed below have stops on International Boulevard, Fruitvale Avenue or 35th Avenue in the study area:

- Line 20 provides local service in Oakland between Oakland Diamond District and 12th Street BART station, via Fruitvale Avenue, Fruitvale BART, Park Street., Alameda Towne Centre, Shoreline Drive, Grand Street, Otis Drive, Westline Drive, Central Avenue and Webster Street. This line provides daily service between 5:00 a.m. and 12:30 a.m. at 30 minute headways.
- Line 21 provides local service in Oakland between Oakland Diamond District and Oakland International Airport, via Fruitvale Avenue, Fruitvale BART station, Park Street, Alameda Towne Centre, and Bay Farm Island. This line provides daily service between 6:15 a.m. and 10:10 p.m. at 25 to 30 minute headways.
- Line 54 provides local service in Oakland between Fruitvale BART station and Merritt College via 35th Avenue and Redwood Road. This line provides daily service between 6:30 a.m. and 10:30 p.m. at 25 to 30 minute headways.
- *Line 1*provides service between Berkeley BART station, San Leandro BART station and Bay Fair BART station via Telegraph Avenue, International Boulevard and E. 14th Street. This line operates daily at 8 to 20 minute headways between 5:00 a.m. and 1:10 a.m..
- *Line 801 (International-Mission All Nighter)* provides service between the 12th Street BART station and the Fremont BART station via International Boulevard, E. 14th Street, Mission

Boulevard, Union City BART station, Decoto Road and Fremont Boulevard. This line provides hourly service on weekdays and half-hourly service on weekends, between 11:40 a.m. and 7:50 a.m.

2.3 BICYCLE FACILITIES

Stantec assessed existing bicycle conditions through field surveys on March 3, 2016 and review of the *2007 Bicycle Master Plan*[1].

Currently, a Class III bike route runs on Fruitvale Avenue east of E. 12th Street. The shared lane marking is placed on the outer lane of Fruitvale Avenue for both directions. West of E. 12th Street, Fruitvale Avenue becomes a Class II bike route with one striped bike lane on each direction.

According to the Bicycle Master Plan Recommended Network for the City of Oakland, International Boulevard and 35th Avenue are designated as corridors for future Class II (on-street striped) bicycle facilities in the Project vicinity.

2.4 PEDESTRIAN FACILITIES

Stantec also reviewed existing pedestrian conditions in the Project vicinity area during the field visit on March 3, 2016. Pedestrian activity was moderate during both a.m. and p.m. peak periods. Pedestrian sidewalks are provided on all streets in the Project vicinity area. Six-foot wide and 7-foot wide sidewalks are installed on E. 15th Street north of Derby Avenue on the west side and east side of the street, respectively. A 10-foot wide sidewalk is installed along the Project frontage on Derby Avenue. Generally, the Project site is well served by pedestrian facilities.

[1] *City of Oakland Bicycle Master Plan, part of the Land Use & Transportation Element of the Oakland General Plan,* City of Oakland, December 2007

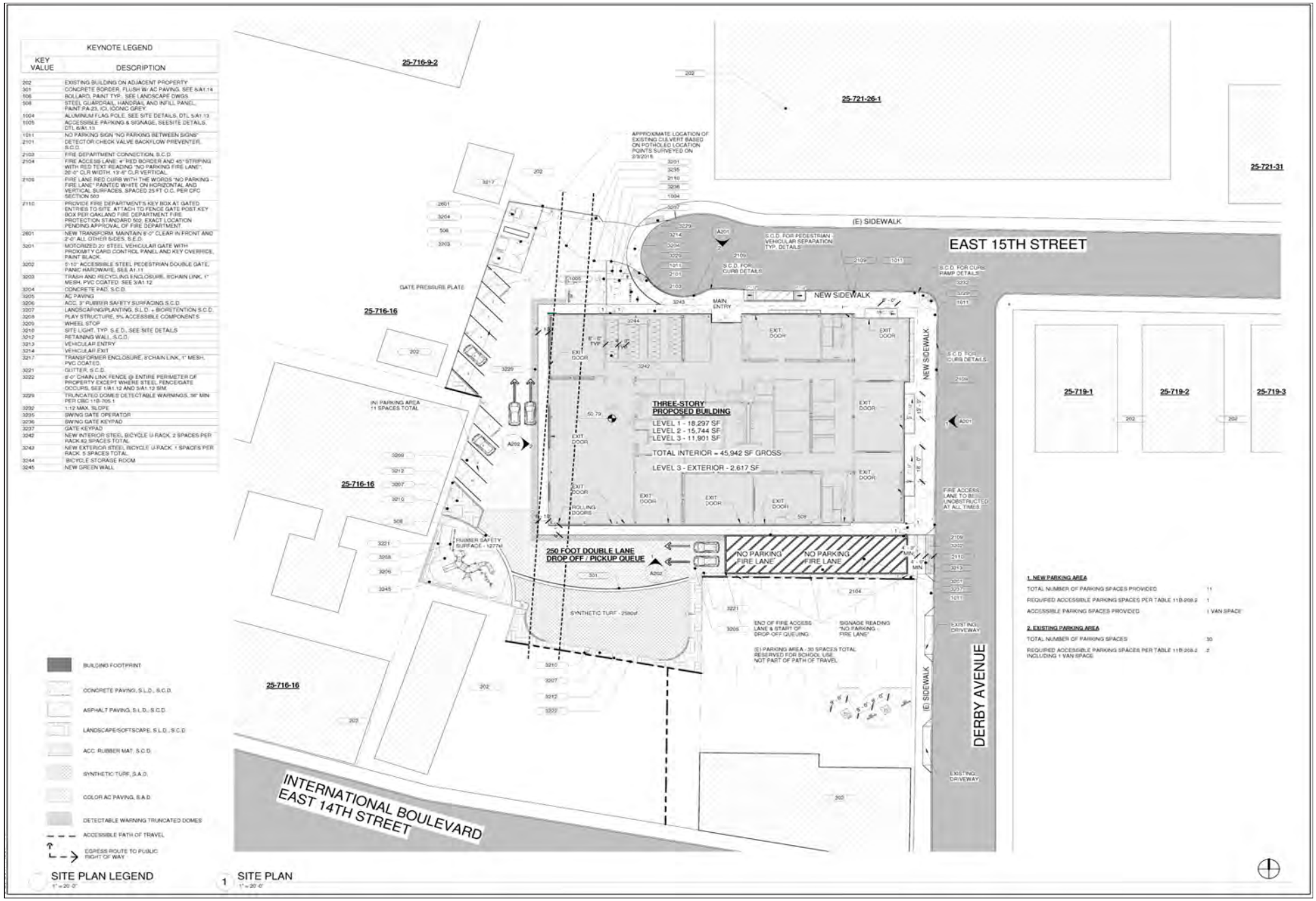


City of Oakland
Traffic Impact Study for Aspire Public School

Vicinity Map

Figure 1

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City of Oakland
Traffic Impact Study for Aspire Public School
Proposed Site Plan

Figure 2

Stantec

3.0 STUDY SCOPE AND APPROACH

3.1 SIGNIFICANCE CRITERIA

Based on the City of Oakland's Traffic Impact Review Guidelines (TIRG), a proposed project would have a significant effect on the environment if it would:

1. Conflict with a plan, ordinance, or policy addressing the safety or performance of the circulation system, including transit, roadways, bicycle lanes, and pedestrian paths (except for automobile level of service or other measures of vehicle delay); or
2. Cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure; or
3. Substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow lanes) or by adding new roadways to the network.

3.2 SIGNIFICANT IMPACT CRITERIA / VEHICLE MILES TRAVELED (VMT) STANDARDS

According to Bureau of Planning's *Update to CEQA Thresholds of significance and Transportation Impact Study guidelines*[2], on September 21, 2016, the City of Oakland's Planning Commission directed staff to update the City of Oakland's California Environmental Quality Act (CEQA) Thresholds of Significance Guidelines related to transportation impacts in order to implement the directive from Senate Bill 743 (Steinberg 2013) to modify local environmental review processes by removing automobile delay, as described solely by level of service (LOS) or similar measures of vehicular capacity or traffic congestion, as a significant impact on the environment pursuant to CEQA. The new Thresholds replace LOS with vehicle miles traveled (VMT) criteria to determine whether a project causes a significant impact on the environment related to transportation. According to Bureau of Planning's City of Oakland Transportation Impact Review Guidelines[3], the project would have a significant effect on the environment if it would cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure. The following are thresholds of significance related to substantial additional VMT:

- For residential projects, a project would cause substantial additional VMT if it exceeds existing regional household VMT per capita minus 15 percent.
- For office projects, a project would cause substantial additional VMT if it exceeds the existing regional VMT per employee minus 15 percent.
- For retail projects, a project would cause substantial additional VMT if it exceeds the existing regional VMT per employee minus 15 percent.

[2] Update to CEQA Thresholds of Significance and Transportation Impact Study Guidelines, Darin Fanelletti, Interim Director of Planning and Building Department Environmental Review Officer, October 17, 2016.
[3] City of Oakland Transportation Impact Review Guidelines, April 14, 2017

There are three key screening criteria for land use development projects: small size, project location in a low-VMT area, and project location near transit stations.

1. Presumption of Less Than Significant Impact for Small Projects – Absence of substantial evidence indicating that a project would generate a potentially significant level of VMT, projects that generate fewer than 100 vehicle trips per day generally may be assumed to cause a less-than-significant transportation impact.

2. Presumption of Less Than Significant Impact for Residential, Retail, and/or Office Projects in Low-VMT Areas – Residential, retail, and office projects that are located in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility) will tend to exhibit similarly low VMT.

3. Presumption of Less Than Significant Impact Near Transit Stations – Presume that residential, retail, and office projects, as well as mixed use projects, proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor4 will have a less than significant impact on VMT. The presumption would not apply, however, if project-specific or location-specific information indicates that the project will still generate significant levels of VMT.

3.3 VEHICLE MILES TRAVELED (VMT)

This section summarizes vehicle miles traveled (VMT) analysis for the Existing plus Project conditions. The analysis is based on the information provided in the Bureau of Planning – Strategic Planning Division's maps.[5]

For residential development, the regional average daily VMT per worker is 20.7.[6] Refer to **Table 1**, the traffic analysis zone (TAZ) in which the project site is located is TAZ 927.

Table 1: Year 2020 Daily Vehicle Miles Traveled

Land Use	TAZ 927	Bay Area	
		Regional Average	Regional Average minus 15% (Threshold)
Office (workers)	20.7	23.2	19.7
TAZ Percent Difference	-	-(10.8%)	4.8%

A project would have a significant effect on the environment if it would cause substantial additional VMT. The Bureau of Planning's Transportation Impact Study Guidelines[7] recommends screening criteria to identify types, characteristics, or locations of projects that would not result in significant impacts to VMT. If a project meets any of the below screening criteria, then it is

[4] Major transit stop is defined in CEQA Section 21064.3 as a rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.
[5] Data for these maps can be obtained via the Bureau of Planning – Strategic Planning Division's Dropbox using this link: https://www.dropbox.com/s/tev0hbvezo5dukl/VMT_Layers.gdb.zip?dl=0.
[6] Includes the VMT generated by the school.
[7] City of Oakland Transportation Impact Review Guidelines, April 14, 2017

presumed that VMT impacts would be less than significant for the project and a detailed VMT analysis is not required.

Presumption of Less Than Significant Impact for Small Projects
The proposed Project would generate more than 100 vehicle trips per day, and therefore, does not meet this screening criteria.

Presumption of Less Than Significant Impact or Residential, Retail, and/or Office Projects in Low-VMT Areas
As shown in **Table 1** above, in 2020, the average daily VMT per worker in TAZ 927 is 20.7 miles. This is 10.8 percent below the regional average daily VMT per capita of 23.2 in 2020. Given the project site is located in an area where the VMT is less than 15 percent below the regional average, the proposed project does not meet this screening criteria.

Presumption of Less Than Significant Impact Near Transit Stations
The proposed Project site is located within 0.5 mile of Fruitvale BART Station, which is an existing major transit stop[8]. However, the proposed Project will still generate significant levels of VMT since students typically come by vehicles. Therefore, the proposed Project does not meet this screening criteria.

Therefore, the proposed Project does not meet any of the screen criteria. However, it is expected that the application of required TDM measures would reduce VMT impacts to less-than-significant levels. Therefore, a detailed VMT analysis is not required. The TDM program has been prepared to reduce auto trips by 20% and improve traffic circulation in the vicinity of the proposed school.

3.4 TRIP GENERATION

The Institute of Transportation Engineers (ITE) has compiled the results of trip generation research from over 4,250 individual land use studies throughout the United States and Canada. The 9th edition of the *Trip Generation* contains trip generation rates for over 140 different land use codes. Trip generation rates for the proposed Project are based on data published in this manual. ITE Land Use Code 534 (Private School K-8) was used for the trip generation calculation.

AC Transit is constructing a Bus Rapid Transit (BRT) system along International Boulevard that would stretch 9.5 miles from the north end of San Leandro and connect to downtown Oakland. This would increase transit accessibility for the proposed project and would encourage residents to use transit. According to City of Oakland standards[9], it is suggested to use 43% reduction to reflect the transit trips for a development located within 0.5 miles from BART. The proposed Project site is less than 0.5 mile from Fruitvale BART station and it is expected that the proposed Bus Rapid Transit (BRT) route along International Boulevard would provide a service with quality that would increase bus ridership. Therefore, 43% of trip reduction was applied in the trip generation estimation for the proposed Project.

[8] Major transit stop is defined in CEQA Section 21064.3 as a rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.
[9] *City of Oakland Transportation Impact Study Guidelines, City of Oakland Transportation Planning and Funding Division, November 26, 2013*

The proposed Project's estimated net new trips are shown in **Table 2**. It is expected that the Project would generate approximately 318 vehicle trips on a typical weekday during the a.m. peak hour, with 175 inbound trips and 143 outbound trips. The proposed project is expected to generate approximately 212 p.m. peak hour trips, including 100 inbound trips and 112 outbound trips during the p.m. peak hour.

Table 2: Project Trip Generation

Land Use (ITE Code)	Size	A.M. Peak Hour				P.M. Peak Hour				Daily Trips	
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	Total
Private School (K-8) (534)	620 Students	0.9	307	251	558	0.6	175	197	372	2.48	1538
Transit/Bike/Walk Trips Reduction	43.0%		132	108	240		75	85	160		661
Totals			**175**	**143**	**318**		**100**	**112**	**212**		**877**

Source: ITE Trip Generation, 9th Edition, 2012; City of Oakland Transportation Impact Study Guidelines, City of Oakland Transportation Planning and Funding Division, November 26, 2013; Stantec, 2017.
Note: * The proposed Project would include program from Kindergarten to eighth grade. ITE land use category "Private School (K-8)" would provide closest trip generation estimates compared to other public school land use categories.

3.5 TRIP DISTRIBUTION AND ASSIGNMENT

Stantec developed the proposed Project's trip distribution based on knowledge of the study area and input from City staff. The trip distribution is assumed to be as follows:

- 30 percent to/from Fruitvale Avenue East
- 30 percent to/from Fruitvale Avenue West
- 20 percent to/from International Boulevard North
- 20 percent to/from International Boulevard South

Figure 5 shows the Project trips distributed to the area roadway network.

3.6 INTERSECTION STUDY

This information is for reference only.

Stantec evaluated traffic conditions at nine (9) study intersections during a.m. and p.m. peak hours for a typical weekday. The peak periods observed were between 7:00-9:00 a.m. and 4:00-6:00 p.m. The study intersections are as follows:

1. E 15th Street / Derby Avenue
2. E 15th Street / Fruitvale Avenue
3. International Boulevard / Fruitvale Avenue
4. E 12th Street / Fruitvale Avenue
5. International Boulevard / 29th Avenue
6. International Boulevard / Derby Avenue
7. International Boulevard / 34th Avenue

8. International Boulevard / 35th Avenue
9. International Boulevard / 36th Avenue

Figure 3 illustrates the existing lane geometry and traffic controls for the study intersections.

For reference, the following four (4) traffic scenarios have been studied:

- *Existing Conditions* – This scenario evaluates current intersection conditions based on field surveys and existing vehicle, bicycle, and pedestrian counts.
- *Existing Plus Project Conditions* – This scenario is identical to Existing Conditions, but with the addition of proposed Project traffic.

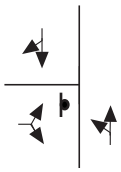
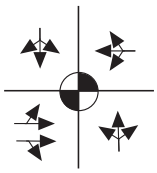
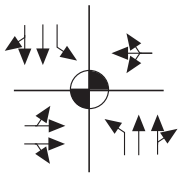
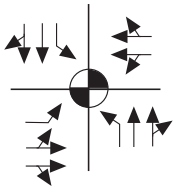
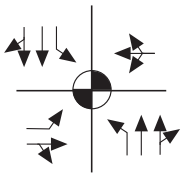
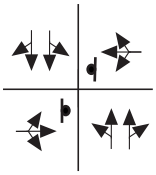
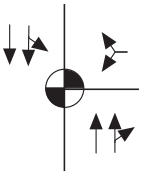
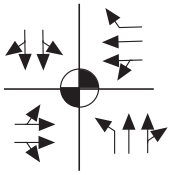
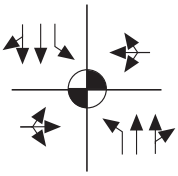
3.7 INTERSECTION OPERATING CONDITIONS – EXISTING CONDITIONS

Table 3 summarizes peak hour levels of service at the study intersections under the Existing Conditions. LOS worksheets are provided in Appendix B. As shown, under the Existing Conditions, all study intersections are currently operating at LOS C or better.

Table 3: Peak Hour Intersection LOS - Existing Conditions

ID	Intersection	Traffic Control	A.M. Peak		P.M. Peak	
			Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	E. 15th Street / Derby Avenue	1-Way Stop	8.9	A	8.7	A
2	E. 15th Street / Fruitvale Avenue	Signal	5.8	A	8.8	A
3	International Boulevard / Fruitvale Avenue	Signal	17.7	B	21.5	C
4	E. 12th Street / Fruitvale Avenue	Signal	35.0	C	34.5	C
5	International Boulevard / 29th Avenue	Signal	17.0	B	17.0	B
6	International Boulevard / Derby Avenue	2-Way Stop	17.7	C	21.2	C
7	International Boulevard / 34th Avenue	Signal	7.2	A	15.5	B
8	International Boulevard / 35th Avenue	Signal	16.0	B	14.7	B
9	International Boulevard / 36th Avenue	Signal	17.5	B	18.9	B

Source: Stantec, 2016
Notes: Delay is presented in seconds per vehicle; LOS = Level of Service

Intersection #1 E 15th St/Derby Ave	Intersection #2 E 15th St/Fruitvale Ave	Intersection #3 Fruitvale Ave/International	Intersection #4 E 12th St/Fruitvale Ave	Intersection #5 29th Ave/International
				
Intersection #6 **Derby Ave/International**	**Intersection #7** **34th Ave/International**	**Intersection #8** **35th Ave/International**	**Intersection #9** **36th Ave/International**	
				



NORTH
Not to Scale

LEGEND

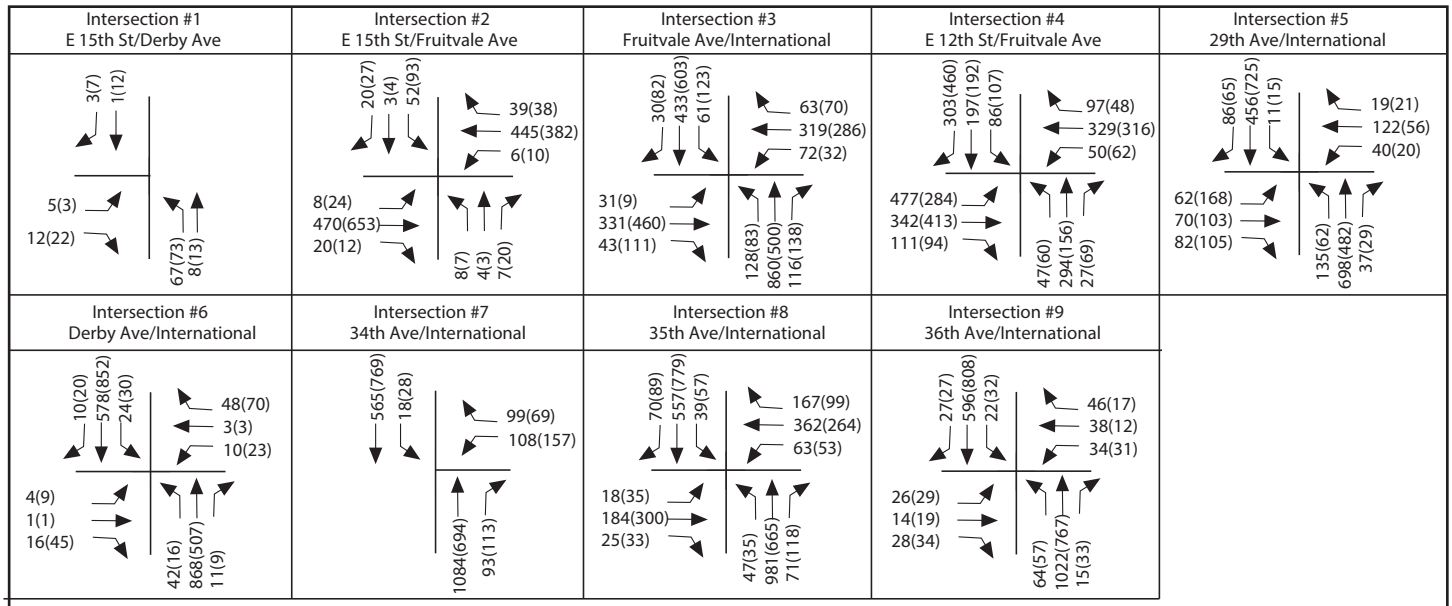
- **Study Intersection**
- **Traffic Signal**
- **Stop Sign**

City of Oakland
Traffic Impact Study for Aspire Public School Project

Existing Lane Geometry and Traffic Controls

Figure
3

Stantec





NORTH
Not to Scale

LEGEND

- ● **Study Intersection**
- **XX AM Peak Hour Volume**
- **(XX) PM Peak Hour Volume**

City of Oakland
Traffic Impact Study for Aspire Public School Project

Existing Turning Movement Volumes

Figure 4

Stantec

4.0 EXISTING PLUS PROJECT CONDITIONS

This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed Aspire Public School at 3007 E. 15th Street at the west side of the cul-de-sac on E. 15th Street north of Derby Avenue in the City of Oakland.

4.1 INTERSECTION OPERATING CONDITIONS – EXISTING PLUS PROJECT CONDITIONS

Table 4 summarizes peak hour levels of service at the study intersections under the Existing Plus Project Conditions. LOS worksheets are provided in Appendix C. **Figure 6** shows the turning movement volumes under the Existing Plus Project Conditions resulting from Project trip assignment.

As shown, with the addition of the proposed Project trips, all study intersections are expected to continue operating at LOS D or better during both a.m. and p.m. peak hours, with minimal change in delay.

Table 4: Peak Hour Intersection LOS - Existing Plus Project Conditions

ID	Intersection	Existing Conditions					Existing Plus Project Conditions					Project Trips (Critical Movement)	
		Traffic Control	A.M. Peak		P.M. Peak		Traffic Control	A.M. Peak		P.M. Peak			
			Avg. Delay	LOS	Avg. Delay	LOS		Avg. Delay	LOS	Avg. Delay	LOS	AM	PM
1	E. 15th Street / Derby Avenue	1-Way Stop	8.9	A	8.7	A	4-Way Stop	7.8	A	7.7	A	0 (EB)	0 (EB)
2	E. 15th Street / Fruitvale Avenue	Signal	5.8	A	8.8	A	Signal	10.8	B	13.9	B	-	-
3	International Boulevard / Fruitvale Avenue	Signal	17.7	B	21.5	C	Signal	20.7	C	22.1	C	-	-
4	E. 12th Street / Fruitvale Avenue	Signal	35.0	C	34.5	C	Signal	35.0	D	34.3	C	-	-
5	International Boulevard / 29th Avenue	Signal	17.0	B	17.0	B	Signal	16.8	B	16.8	B	-	-
6	International Boulevard / Derby Avenue	2-Way Stop	17.7	C	21.2	C	2-Way Stop	24.7	C	24.2	C	35 (WB)	26 (WB)
7	International Boulevard / 34th Avenue	Signal	7.2	A	15.5	B	Signal	7.8	A	14.4	B	-	-
8	International Boulevard / 35th Avenue	Signal	16.0	B	14.7	B	Signal	16.6	B	14.8	B	-	-
9	International Boulevard / 36th Avenue	Signal	17.5	B	18.9	B	Signal	16.8	B	18.8	B	-	-

Source: Stantec, 2016
Notes: Delay is presented in seconds per vehicle; LOS = Level of Service

Table 4 also shows the number of project trips added to the critical movement at the two unsignalized intersections under Existing Plus Project Conditions. Appendix F contains details of

Peak Hour Signal Warrant Analyses for both unsignalized intersections. As shown in **Table 4**, the project is not expected to add any project trips to the critical movement of the intersection of E. 15th Street and Derby Avenue during either a.m. or p.m. peak hour. The project is expected to add approximately 35 and 26 project trips to the critical movement (Westbound) of the intersection of International Boulevard and Derby Avenue during the a.m. and p.m. peak hour, respectively. However, as shown in Appendix F, peak hour traffic signal warrant does not meet at either intersection during either a.m. or p.m. peak hour under Existing Plus Project Conditions.



City of Oakland
Traffic Impact Study for Aspire Public School

Proposed Project Trip Distribution

Figure 5

Stantec

Intersection #1 E 15th St/Derby Ave	Intersection #2 E 15th St/Fruitvale Ave	Intersection #3 Fruitvale Ave/International	Intersection #4 E 12th St/Fruitvale Ave	Intersection #5 29th Ave/International
38(33) 109(98) 5(3) 12(22) 119(103) 8(13)	85(79) 3(4) 95(127) 75(59) 461(391) 6(10) 24(33) 470(653) 20(12) 8(7) 4(3) 7(20)	30(82) 448(614) 61(123) 87(86) 362(320) 86(43) 68(30) 347(469) 43(111) 128(83) 895(520) 116(138)	303(460) 197(192) 86(107) 97(48) 372(350) 50(62) 477(284) 395(443) 111(94) 47(60) 294(156) 27(69)	86(65) 491(745) 11(15) 19(21) 122(56) 40(20) 62(168) 70(103) 82(105) 135(62) 726(504) 37(29)

Intersection #6 Derby Ave/International	Intersection #7 34th Ave/International	Intersection #8 35th Ave/International	Intersection #9 36th Ave/International
10(20) 578(852) 59(50) 68(85) 3(3) 25(34) 4(9) 1(1) 16(45) 42(16) 876(514) 99(59)	594(791) 18(28) 99(69) 108(157) 1119(714) 93(113)	70(89) 586(801) 39(57) 167(99) 362(264) 63(53) 18(35) 184(300) 25(33) 47(35) 1016(685) 71(118)	27(27) 625(830) 22(32) 46(17) 38(12) 34(31) 26(29) 14(19) 28(34) 64(57) 1056(787) 15(33)



NORTH
Not to Scale

LEGEND

- ● **Study Intersection**
- **XX AM Peak Hour Volume**
- **(XX) PM Peak Hour Volume**

City of Oakland
Traffic Impact Study for Aspire Public School Project

Existing Plus Project Turning Movement Volumes

Figure 6

Stantec

5.0 2040 NO PROJECT CONDITIONS

5.1 2040 TRAFFIC FORECASTS

Stantec conducted the 2040 traffic forecasts by utilizing the latest Alameda County Transportation Commissions (ACTC) traffic and land use projections for the City of Oakland[10]. Stantec calculated the difference between 2010 and 2040 model link volumes to estimate a thirty-year growth increment. This increment was interpolated to estimate a twenty-four year growth between 2016 and 2040. The growth was then added to the existing turning movement volumes proportionately based on the existing turning movement distribution pattern at each study intersection to calculate 2040 turning movements. **Figure 7** shows the resulting 2040 No Project turning movement volumes.

In addition, it is assumed that the proposed BRT route would be implemented by 2040, which would generally reduce travel lanes for regular vehicles along International Boulevard to one lane within the Project vicinity for both northbound and southbound directions, while adding a center bus-only lane for both directions. **Figure 8** illustrates the 2040 lane geometry and traffic controls for the study intersections.

5.2 INTERSECTION OPERATING CONDITIONS – 2040 NO PROJECT CONDITIONS

Table 5 shows the intersection peak hour levels of service at the study intersections under the 2040 No Project Conditions. LOS worksheets are provided in Appendix D.

Table 5: Peak Hour Intersection LOS – 2040 No Project Conditions

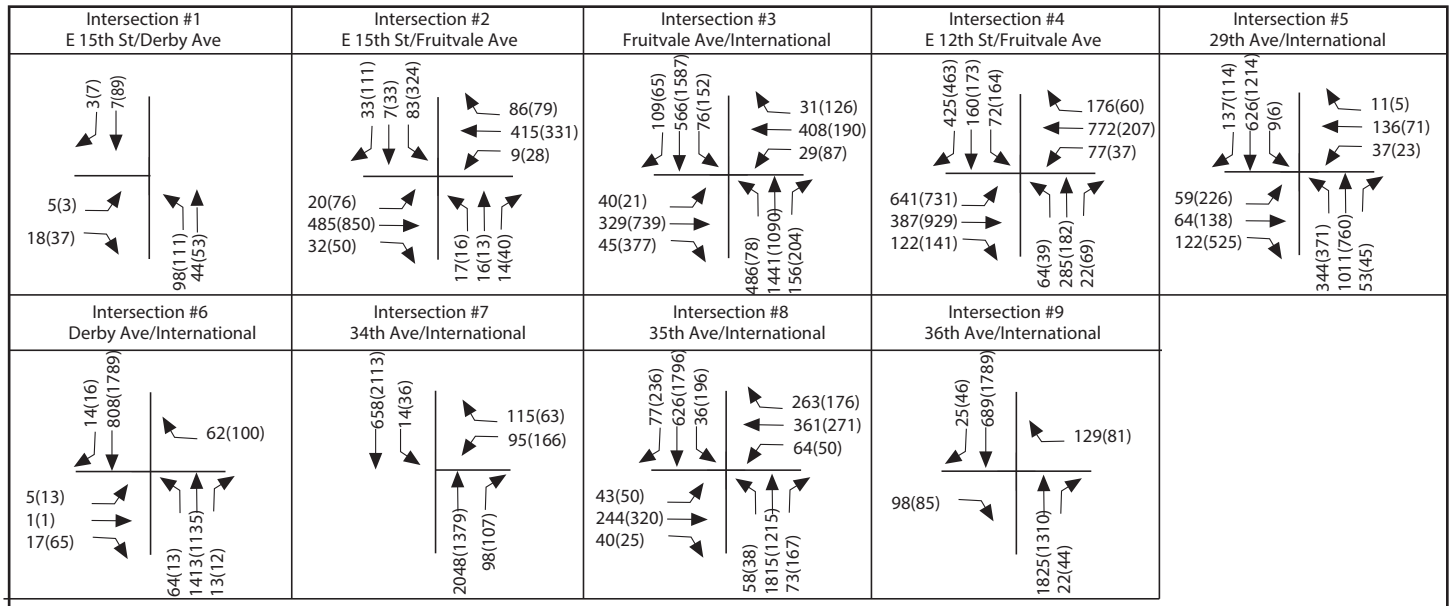
ID	Intersection	Traffic Control	A.M. Peak		P.M. Peak	
			Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	E. 15th Street / Derby Avenue	1-Way Stop	9.0	A	9.1	A
2	E. 15th Street / Fruitvale Avenue	Signal	8.3	A	25.0	C
3	International Boulevard / Fruitvale Avenue	Signal	**>80**	**F**	**>80**	**F**
4	E. 12th Street / Fruitvale Avenue	Signal	44.2	D	39.0	D
5	International Boulevard / 29th Avenue	Signal	25.8	C	**>80**	**F**
6	International Boulevard / Derby Avenue	2-Way Stop	**>50**	**F**	**>50**	**F**
7	International Boulevard / 34th Avenue	Signal	**>80**	**F**	**>80**	**F**
8	International Boulevard / 35th Avenue	Signal	**>80**	**F**	**>80**	**F**
9	International Boulevard / 36th Avenue	2-Way Stop	**>50**	**F**	**>50**	**F**

Source: Stantec, 2016
Notes: Delay is presented in seconds per vehicle; LOS = Level of Service
Bold indicates unacceptable LOS

[10] http://www.alamedactc.org/app_pages/view/8079, March 2, 2016

As shown, under 2040 No Project Conditions, three (3) of the nine (9) study intersections are expected to operate at LOS D or better during both a.m. and p.m. peak hours. The following six (6) intersections are expected to operate at LOS F under 2040 No Project Conditions:

- International Boulevard and Fruitvale Avenue – LOS F during both a.m. and p.m. peak hours
- International Boulevard and 29th Avenue – LOS F during p.m. peak hour
- International Boulevard and Derby Avenue – LOS F during both a.m. and p.m. peak hours
- International Boulevard and 34th Avenue – LOS F during both a.m. and p.m. peak hours
- International Boulevard and 35th Avenue – LOS F during both a.m. and p.m. peak hours
- International Boulevard and 36th Avenue – LOS F during both a.m. and p.m. peak hours





NORTH
Not to Scale

LEGEND

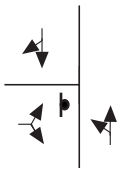
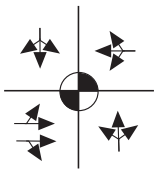
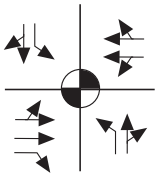
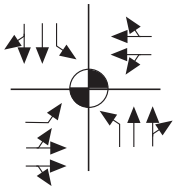
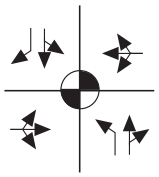
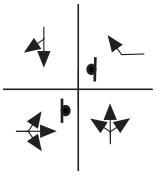
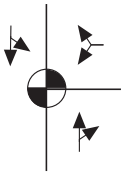
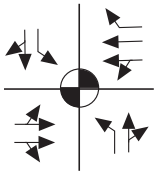
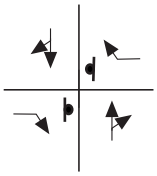
- ● **Study Intersection**
- **XX AM Peak Hour Volume**
- **(XX) PM Peak Hour Volume**

City of Oakland
Traffic Impact Study for Aspire Public School Project

2040 No Project Turning Movement Volumes

Figure 7

Stantec

Intersection #1 E 15th St/Derby Ave	Intersection #2 E 15th St/Fruitvale Ave	Intersection #3 Fruitvale Ave/International	Intersection #4 E 12th St/Fruitvale Ave	Intersection #5 29th Ave/International
				
Intersection #6 **Derby Ave/International**	**Intersection #7** **34th Ave/International**	**Intersection #8** **35th Ave/International**	**Intersection #9** **36th Ave/International**	
				



NORTH
Not to Scale

LEGEND

- **Study Intersection**
- **Traffic Signal**
- **Stop Sign**

City of Oakland
Traffic Impact Study for Aspire Public School Project

2040 Lane Geometry and Traffic Controls

Figure
8

Stantec

6.0 2040 PLUS PROJECT CONDITIONS

This scenario is identical to the 2040 No Project Conditions, but with the addition of traffic from the proposed Aspire Public School. **Figure 9** shows the resulting intersection volumes under the 2040 Plus Project Conditions.

6.1 INTERSECTION OPERATING CONDITIONS – 2040 PLUS PROJECT CONDITIONS

Table 6 shows intersection peak hour levels of service at the study intersections under the 2040 Plus Project Conditions. LOS worksheets are provided in Appendix E.

Table 6: Peak Hour Intersection LOS - 2040 Plus Project Conditions

ID	Intersection	2040 No Project Conditions					2040 Plus Project Conditions					Project Trips (Critical Movement)	
		Traffic Control	A.M. Peak		P.M. Peak		Traffic Control	A.M. Peak		P.M. Peak			
			Avg. Delay	LOS	Avg. Delay	LOS		Avg. Delay	LOS	Avg. Delay	LOS	AM	PM
1	E. 15th Street / Derby Avenue	1-Way Stop	9.0	A	9.1	A	4-Way Stop	8.4	A	8.6	A	0 (EB)	0 (EB)
2	E. 15th Street / Fruitvale Avenue	Signal	8.3	A	25.0	C	Signal	13.8	B	33.8	C	-	-
3	International Boulevard / Fruitvale Avenue	Signal	>80	F	>80	F	Signal	>80	F	>80	F	-	-
4	E. 12th Street / Fruitvale Avenue	Signal	44.2	D	39.0	D	Signal	48.5	D	39.7	D	-	-
5	International Boulevard / 29th Avenue	Signal	25.8	C	>80	F	Signal	27.3	C	>80	F	-	-
6	International Boulevard / Derby Avenue	2-Way Stop	>50	F	>50	F	2-Way Stop	>50	F	>50	F	0 (EB)	0 (EB)
7	International Boulevard / 34th Avenue	Signal	>80	F	>80	F	Signal	>80	F	>80	F	-	-
8	International Boulevard / 35th Avenue	Signal	>80	F	>80	F	Signal	>80	F	>80	F	-	-
9	International Boulevard / 36th Avenue	2-Way Stop	>50	F	>50	F	2-Way Stop	>50	F	>50	F	0 (WB)	0 (EB)

Source: Stantec, 2016
Notes: Delay is presented in seconds per vehicle; LOS = Level of Service

As shown, under 2040 Plus Project Conditions, all study intersections that would operate at LOS D or better under 2040 No Project Conditions are expected to continue operating at LOS D or better. All study intersections that would operate at LOS F under 2040 No Project Conditions would continue operating at LOS F under the 2040 Plus Project Conditions.

Table 6 also shows the number of project trips added to the critical movement of the three unsignalized intersections and whether these three intersections meet signal warrant under 2040 Plus Project Conditions. As shown, no project trips would be added to the critical movement of any of these three unsignalized intersections during either a.m. or p.m. peak hour under 2040 Plus Project Conditions.

Table 7 shows the overall V/C ratio and the critical movement V/C ratio increases due to Project trips for all the signalized intersections which would operate at LOS F under both 2040 No Project and 2040 Plus Project Conditions.

As shown, at the intersection of International Boulevard and Fruitvale Avenue, it would operate at LOS F during both a.m. and p.m. peak hours under both 2040 No Project and 2040 Plus Project Conditions. With the addition of the Project trips, the overall V/C ratio would increase by 0.12 during the a.m. peak hour and 0.17 during the p.m. peak hour. In addition, the critical movement V/C ratio would increase by 0.24/0.03 during the a.m. peak hour and 0/0.26 during the p.m. peak hour.

At the intersection of International Boulevard and 29th Avenue, it would operate at LOS F during the p.m. peak hour under both 2040 No Project and 2040 Plus Project Conditions. With the addition of the Project trips, the overall V/C ratio would increase by 0.18 during the p.m. peak hour, which meets the threshold of 0.03 for a significant impact. In addition, the critical movement V/C ratio would increase by 0/0.02/0.78 during the p.m. peak hour.

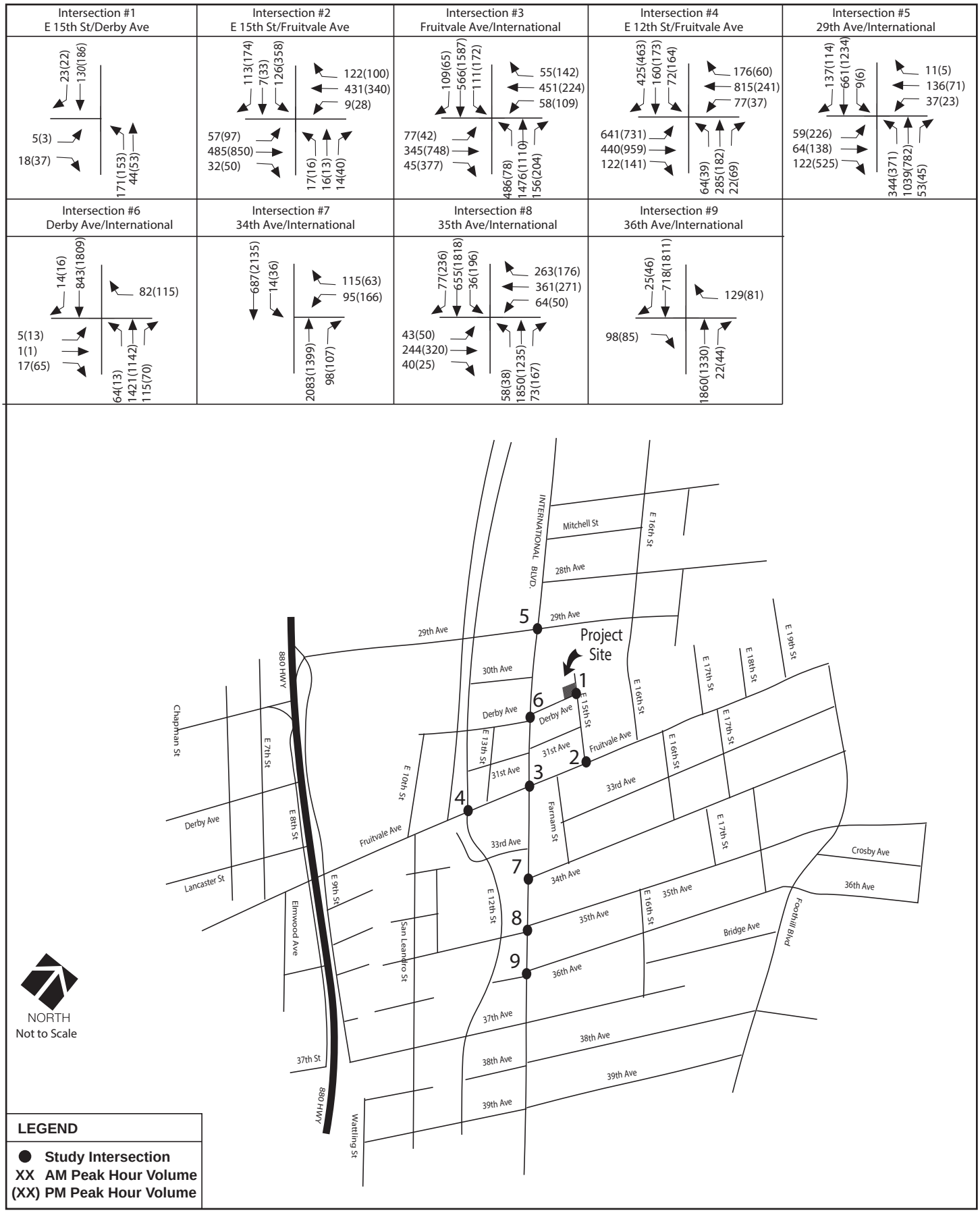
At the intersection of International Boulevard and 34th Avenue, it would operate at LOS F during both a.m. and p.m. peak hours under both 2040 No Project and 2040 Plus Project Conditions. With the addition of the Project trips, the overall V/C ratio would increase by 0.02 during the a.m. peak hour and 0.04 during the p.m. peak hour. In addition, the critical movement V/C ratio would increase by 0/0.02 during the a.m. peak hour and 0/0.05 during the p.m. peak hour.

At the intersection of International Boulevard and 35th Avenue, it would operate at LOS F during both a.m. and p.m. peak hours under both 2040 No Project and 2040 Plus Project Conditions.

Table 7: Peak Hour Intersection LOS and V/C Ratio - 2040 Plus Project Conditions

ID	Intersection	A.M. Peak Hour					P.M. Peak Hour					Δ(Plus Proj.-No Proj.)	
		Traffic Control/Critical Movement	2035 No Project Conditions		2035 Plus Project Conditions		Traffic Control/Critical Movement	2035 No Project Conditions		2035 Plus Project Conditions			
			LOS	V/C	LOS	V/C		LOS	V/C	LOS	V/C	AM	PM
3	International Boulevard / Fruitvale Avenue	Signal	F		F		Signal	F		F			
		Overall		1.15		1.27	*Overall*		1.74		1.91	0.12	0.17
		Critical Movement (WBL/T/R)		0.61		0.85	*Critical Movement (EBR)*		1.24		1.24	0.24	0.00
		Critical Movement (NBT/R)		1.35		1.38	*Critical Movement (SBL)*		1.95		2.21	0.03	0.26
5	International Boulevard / 29th Avenue	-	-		-		Signal	F		F			
		-		-		-	*Overall*		1.88		2.06	-	0.18
		-		-		-	*Critical Movement (EBL/T/R)*		1.31		1.31	-	0.00
		-		-		-	*Critical Movement (NBT/R)*		0.98		1.00	-	0.02
							Critical Movement (SBT)		4.22		5.00	-	0.78
7	International Boulevard / 34th Avenue	Signal	F		F		Signal	F		F			
		Overall		1.45		1.47	*Overall*		3.76		3.80	0.02	0.04
		Critical Movement (WBL/R)		0.73		0.73	*Critical Movement (WBL/R)*		1.05		1.05	0.00	0.00
		Critical Movement (NBT/R)		1.69		1.71	*Critical Movement (SBL/T)*		4.63		4.68	0.02	0.05
8	International Boulevard / 35th Avenue	Signal	F		F		Signal	F		F			
		Overall		1.40		1.42	*Overall*		1.97		1.97	0.02	0.00
		Critical Movement (WBR)		0.84		0.84	*Critical Movement (EBL/T/R)*		0.55		0.55	0.00	0.00
		Critical Movement (NBT/R)		1.61		1.64	*Critical Movement (SBL)*		2.51		2.51	0.02	0.00

Source: Stantec, 2016
Notes: LOS = Level of Service; V/C = volume-to-capacity ratio
NB – Northbound; SB – Southbound; T –Through Movement; L – Left-Turn Movement; R – Right-Turn Movement



City of Oakland

Traffic Impact Study for Aspire Public School Project

2040 Plus Project Turning Movement Volumes

Figure 9

Stantec

7.0 PROJECT SITE CIRCULATION AND QUEUE LENGTH ESTIMATION

Stantec reviewed the Project site plan to evaluate on-site circulation and access. The site plan shows that the Project driveway on the north side of Derby Avenue between International Boulevard and E. 15th Street would be used as entry only for pick-up and drop-off activities and the cul-de-sac on E. 15th Street north of Derby Avenue would be used for exiting during picking up and dropping off. This two-lane access driveway is proposed to be 20-feet wide, which would provide adequate access for cars and small trucks to the site. In addition, it is assumed that most faculty/staff would arrive and depart the school before and after business hours and would not arrive/depart during student drop-off/pick-up periods; therefore, the internal circulation is expected to be adequate for the on-site faculty parking.

As summarized above, the proposed Project would generate a total of 175 vehicle arrival trips to the school during the morning peak hour. This includes vehicle trips by parents/guardians of students to drop off their kids and vehicle trips by faculty/staff and part-time staff. Similarly, the afternoon pick-up period would result in an estimated approximately 100 vehicle arrival trips to the school. Because the afternoon pick-up period does not correspond with the peak hour of the adjacent roadways, it is not anticipated to create an impact to the surrounding roadways. For this reason, arrival/departure queuing and circulation was not studied for the afternoon period. It is reasonable to assume that most faculty/staff would arrive and depart the school before and after business hours and not arrive/depart during student drop-off/pick-up periods. The proposed school is expected to have 51 part-time/full-time staff members.

Table 8: Estimated Arrival of Student Vehicle Trips

Arrival Period	**Proposed Project**	
Time Period	Vehicle Trips	Percent
7:15 - 7:30 AM	35	20%
7:30 – 7:45 AM	44	25%
7:45 – 8:00 AM	44	25%
8:00 – 8:15 AM	52	30%
Total	**175**	**100%**

Source: Stantec, 2017

The school would provide a drop-off window between 7:15 a.m. and 8:15 a.m., and assign specific drop-off times for students by grade. Typically, during the morning drop-off period, the highest amount of arrivals typically occurs within the last 15-minute window before the classes start. However, the start time and end time for grades would be staggered to avoid all vehicles arriving at the same time (i.e. middle school breakfast starts at 7:15 a.m. and the school starts at 7:45 a.m. and kindergarten breakfast starts at 7:45 a.m. and school starts at 8:15 a.m.). Current analysis assumed that 10% of the students would attend breakfast program and there would be 422 students at Grade K-5 and 198 students at Grade 6-8. The estimated student drop-off activities for the proposed Project are summarized in **Table 8**.

As shown, due to staggered school timing, it is estimated that about 52 vehicles would arrive 8:00 a.m. – 8:15 a.m. This assumes that kindergarten school starts at 8:15 a.m. and middle school

starts at 7:45 a.m. During this 15-minute window, the estimated number of vehicles to arrive at the school would equate to about three (3) vehicles per minute.
Based on an average arrival of three (3) vehicles per minute and a drop-off time of approximately 15 seconds, the expected queuing at the drop-off area is 7 cars.[11] According to the latest Project site plan, the proposed drop-off area would be designed to accommodate 32 cars within the school boundaries, without spilling over to Derby Avenue. Also, the school has developed a detailed Transportation Demand Management (TDM) plan that will direct students to use transit/bike/walk to school and utilize car sharing and carpooling to school.

In addition, all vehicles would be utilizing the intersection of Derby Avenue and E. 15th Street either to drop off or pick up students. At a minimum a school crossing guard should be present at this intersection during the a.m. and the p.m. peak hours.

7.1 PROJECT ON-SITE PARKING REQUIREMENTS

Stantec examined the City municipal code to determine whether the Project meets City parking requirements given the proposed land uses and current City zoning. According to the City of Oakland's online geographic information system (GIS) database, the Project site is currently zoned RM-4. According to the City municipal code[12], three employees of the community educational uses other than high schools in this zone require one (1) off-street parking space.

Table 9: Project Parking Requirements and Supply

Land Use	Size		City Requirements		Proposed Project Supply	Differential
			Code	Requirements		
K-8 Schools	51	Staff	1 space per 3.5 employees	15	11	-4

Source: Stantec, 2016

According to the latest Project site plan, the proposed Project would provide a total of 11 parking stalls. **Table 9** illustrates the Project off-street parking requirements and proposed on-site parking supply. As shown in the table, the Project will need to provide additional six (6) parking spaces to meet the City's requirement. However, the Project sponsor would file a Joint Use Agreement with the City for use of four (4) parking spaces at the adjacent property. Therefore, the proposed Project would meet the City's off-street parking requirement.

Existing on-street parking supply and occupancy conditions were surveyed in the study area bounded by International Boulevard, E. 16th Street, 29th Avenue and Fruitvale Avenue, during the a.m. peak hour (7:00 a.m. to 8:00 a.m.) on March 3, 2016. **Table 10** presents the survey results for the on-street parking in the study area. As shown, on average, on-street parking spaces were approximately 68 percent occupied with approximately 74 spaces available in the weekday morning peak hour. Per Project sponsor, on-street parking would not be allowed along Project frontages with the implementation of the proposed Project, which would reduce up to ten (10) on-street parking spaces in the Project vicinity. However, any further parking demand at this

[11] Queueing Theory Calculator, http://www.supositorio.com/rcalc/rcalclite.htm, March 2016
[12] *Oakland Municipal Code, Section 17.116.070 – Off-Street Parking – Civic Activities*

location would still be expected to be accommodated by the on-street parking spaces in the study area.

Table 10: Existing On-Street Parking Supply and Occupancy Conditions

Street	Segment	Side of Street	No. of Spaces	Occupied Spaces	% Occupied
North / South Streets					
E. 16th Street	29th Ave to Fruitvale Ave	E	22	16	73%
E. 16th Street	29th Ave to Fruitvale Ave	W	22	16	73%
E. 15th Street	Culdesac to Derby Ave	E	3	3	100%
E. 15th Street	Culdesac to Derby Ave	W	2	2	100%
E. 15th Street	Derby Ave to 31st Ave	E	7	6	86%
E. 15th Street	Derby Ave to 31st Ave	W	8	8	100%
E. 15th Street	31st Ave to Fruitvale Ave	E	7	7	100%
E. 15th Street	31st Ave to Fruitvale Ave	W	8	7	88%
International Blvd	29th Ave to 30th Ave	E	9	3	33%
International Blvd	29th Ave to 30th Ave	W	0	0	0%
International Blvd	30th Ave to Derby Ave	E	5	0	0%
International Blvd	30th Ave to Derby Ave	W	6	0	0%
International Blvd	Derby Ave to 31st Ave	E	6	2	33%
International Blvd	Derby Ave to 31st Ave	W	6	0	0%
International Blvd	31st Ave to Fruitvale Ave	E	7	1	14%
International Blvd	31st Ave to Fruitvale Ave	W	2	0	0%
East / West Streets					
29th Ave	International Blvd to E 16th St	S	23	22	96%
29th Ave	International Blvd to E 16th St	N	18	15	83%
Derby Ave	International Blvd to E 15th St	S	11	8	73%
Derby Ave	International Blvd to E 15th St	N	10	7	70%
31st Ave	International Blvd to E 15th St	S	7	6	86%
31st Ave	International Blvd to E 15th St	N	12	10	83%
Fruitvale Ave	International Blvd to Farnam St	S	1	1	100%
Fruitvale Ave	International Blvd to Farnam St	N	4	4	100%
Fruitvale Ave	Farnam St to E 15th St	S	5	4	80%
Fruitvale Ave	Farnam St to E 15th St	N	7	2	29%
Fruitvale Ave	E 15th St to E 16th St	S	4	3	75%
Fruitvale Ave	E 15th St to E 16th St	N	10	5	50%
Total			**232**	**158**	**68%**

Source: Stantec, 2016

7.2 TRAVEL DEMAND MANAGEMENT (TDM) PLAN

The project sponsor and subsequent property owner will implement a Transportation Demand Management (TDM) Plan to annually reduce the number of single occupancy vehicle (SOV) trips and VMT generated by the proposed Project by 20%. The TDM Plan targets a reduction in SOV trips by encouraging persons to select other modes of transportation, including: walking, bicycling, transit, car-share, carpooling and/or other modes.

The specific measures and requirements can be found in Aspire's TDM Plan.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Stantec has reached the following conclusions regarding the proposed Aspire Public School located at 3007 E. 15th Street in Oakland, CA:

- The proposed Project is expected to generate approximately 318 net new trips during the a.m. peak hour and 212 net new trips during the p.m. peak hour.
- The proposed two-lane access driveway would provide adequate access for cars and small trucks to the site. In addition, the internal circulation is expected to be adequate for the on-site faculty parking. Also, assuming school timings are staggered, the proposed drop-off area would be able to accommodate the estimated queuing of 7 cars within the school boundaries, without spilling over to Derby Avenue.
- The project sponsor and subsequent property owner will implement a Transportation Demand Management (TDM) Plan that seeks to annually reduce the number of single occupancy vehicle (SOV) trips and VMT generated by the proposed Project by 20%.
- Under Existing Plus Project Conditions, the proposed Project would potentially bring significant VMT impacts; however, the project TDM measures will reduce VMT impacts to less-than-significant levels and a detailed VMT analysis is not required.
- The Project would include 11 on-site parking spaces. The Project sponsor would file a Joint Use Agreement with the City for use of six (4) parking spaces at the adjacent property. Thus, the Project would meet the City requirements of 15 spaces. In addition, on average, on-street parking spaces in the Project vicinity were approximately 68 percent occupied with approximately 74 spaces available in the weekday morning peak hour. Per Project sponsor, on-street parking would not be allowed along Project frontages with the implementation of the proposed Project, which would reduce up to ten (10) on-street parking spaces in the Project vicinity. However, any further parking demand would still be expected to be accommodated by the on-street parking spaces in the Project vicinity.

Appendix A INTERSECTION TURNING MOVEMENT COUTNS

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-001 Derby Avenue & E 15th Street
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	0	0	0	0	7	6	0	0	13	2	0	1	0	3	0	6	1	0	7	23	0
7:15	0	0	0	0	0	13	3	0	0	16	1	0	3	1	5	0	3	1	0	4	25	1
7:30	0	0	0	0	0	15	1	0	0	16	2	0	1	0	3	0	1	0	0	1	20	0
7:45	0	0	0	0	0	15	1	0	0	16	1	0	3	2	6	0	0	1	0	1	23	2
Total	0	0	0	0	0	50	11	0	0	61	6	0	8	3	17	0	10	3	0	13	91	3
8:00	0	0	0	0	0	19	2	0	0	21	0	0	3	0	3	0	0	0	0	0	24	0
8:15	0	0	0	0	0	21	2	0	1	24	0	0	4	0	4	0	0	0	0	0	28	1
8:30	0	0	0	0	0	11	3	0	0	14	2	0	2	0	4	0	1	2	0	3	21	0
8:45	0	0	0	0	0	9	4	0	0	13	2	0	2	0	4	0	2	1	0	3	20	0
Total	0	0	0	0	0	60	11	0	1	72	4	0	11	0	15	0	3	3	0	6	93	1
16:00	0	0	0	0	0	13	4	0	1	18	2	0	1	2	5	0	1	2	0	3	26	3
16:15	0	0	0	0	0	16	2	0	0	18	3	0	4	0	7	0	3	1	0	4	29	0
16:30	0	0	0	0	0	21	1	0	2	24	0	0	2	0	2	0	1	1	0	2	28	2
16:45	0	0	0	0	0	15	2	0	1	18	2	0	3	1	6	0	6	0	0	6	30	2
Total	0	0	0	0	0	65	9	0	4	78	7	0	10	3	20	0	11	4	0	15	113	7
17:00	0	0	0	0	0	12	6	0	1	19	0	0	5	0	5	0	6	2	0	8	32	1
17:15	0	0	0	0	0	17	2	0	0	19	1	0	5	0	6	0	1	3	0	4	29	0
17:30	0	0	0	0	0	16	5	0	1	22	1	0	6	0	7	0	3	1	0	4	33	1
17:45	0	0	0	0	0	24	0	0	2	26	0	0	6	1	7	0	2	1	0	3	36	3
Total	0	0	0	0	0	69	13	0	4	86	2	0	22	1	25	0	12	7	0	19	130	5
Grand Total	0	0	0	0	0	244	44	0	9	297	19	0	51	7	77	0	36	17	0	53	427	16
Apprch %	0.0%	0.0%	0.0%	0.0%		82.2%	14.8%	0.0%	3.0%		24.7%	0.0%	66.2%	9.1%		0.0%	67.9%	32.1%	0.0%			
Total %	0.0%	0.0%	0.0%	0.0%	0.0%	57.1%	10.3%	0.0%	2.1%	69.6%	4.4%	0.0%	11.9%	1.6%	18.0%	0.0%	8.4%	4.0%	0.0%	12.4%	100.0%	

AM PEAK HOUR	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
7:45	0	0	0	0	0	15	1	0	0	16	1	0	3	2	6	0	0	1	0	1	23
8:00	0	0	0	0	0	19	2	0	0	21	0	0	3	0	3	0	0	0	0	0	24
8:15	0	0	0	0	0	21	2	0	1	24	0	0	4	0	4	0	0	0	0	0	28
8:30	0	0	0	0	0	11	3	0	0	14	2	0	2	0	4	0	1	2	0	3	21
Total Volume	0	0	0	0	0	66	8	0	1	75	3	0	12	2	17	0	1	3	0	4	96
% App Total	0.0%	0.0%	0.0%	0.0%		88.0%	10.7%	0.0%	1.3%		17.6%	0.0%	70.6%	11.8%		0.0%	25.0%	75.0%	0.0%		
PHF	.000	.000	.000	.000	.000	.786	.667	.000	.250	.781	.375	.000	.750	.250	.708	.000	.250	.375	.000	.333	.857

PM PEAK HOUR	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	12	6	0	1	19	0	0	5	0	5	0	6	2	0	8	32
17:15	0	0	0	0	0	17	2	0	0	19	1	0	5	0	6	0	1	3	0	4	29
17:30	0	0	0	0	0	16	5	0	1	22	1	0	6	0	7	0	3	1	0	4	33
17:45	0	0	0	0	0	24	0	0	2	26	0	0	6	1	7	0	2	1	0	3	36
Total Volume	0	0	0	0	0	69	13	0	4	86	2	0	22	1	25	0	12	7	0	19	130
% App Total	0.0%	0.0%	0.0%	0.0%		80.2%	15.1%	0.0%	4.7%		8.0%	0.0%	88.0%	4.0%		0.0%	63.2%	36.8%	0.0%		
PHF	.000	.000	.000	.000	.000	.719	.542	.000	.500	.827	.500	.000	.917	.250	.893	.000	.500	.583	.000	.594	.903

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-001 Derby Avenue & E 15th Street
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
7:15	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	3
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2	0	0	7
Total	0	0	0	0	0	0	0	0	1	0	0	0	0	6	0	0	0	0	7	0	0	14
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	2
8:15	0	0	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	2	0	0	8
8:30	0	0	0	0	0	0	0	0	2	0	0	0	0	7	0	0	0	0	3	0	0	12
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	0	4
Total	0	0	0	0	0	0	0	0	6	0	0	0	0	11	0	0	0	0	9	0	0	26
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	1	1	2
16:15	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	3	0	1	4
16:30	0	0	0	0	0	0	1	0	1	1	0	0	0	2	0	0	0	0	2	0	1	5
16:45	0	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	1	0	3	1	1	7
Total	0	0	0	0	0	1	1	0	4	2	0	0	0	6	0	0	2	0	8	2	4	18
17:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	4	0	1	5
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4	1	1	5
17:30	0	0	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	0	2	0	2	3
17:45	0	0	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	1	0	1	2	2
Total	0	0	0	0	0	2	1	0	3	3	1	0	0	2	1	0	0	2	10	2	6	15
Grand Total	0	0	0	0	0	3	2	0	14	5	1	0	0	25	1	0	2	2	34	4	10	73
Apprch %	0.0%	0.0%	0.0%			60.0%	40.0%	0.0%			100.0%	0.0%	0.0%			0.0%	50.0%	50.0%				
Total %	0.0%	0.0%	0.0%		0.0%	30.0%	20.0%	0.0%		50.0%	10.0%	0.0%	0.0%		10.0%	0.0%	20.0%	20.0%		40.0%	100.0%	

AM PEAK HOUR	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	2	0	0
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
8:15	0	0	0	0	0	0	0	0	4	0	0	0	0	2	0	0	0	0	2	0	0
8:30	0	0	0	0	0	0	0	0	2	0	0	0	0	7	0	0	0	0	3	0	0
Total Volume	0	0	0	0	0	0	0	0	6	0	0	0	0	15	0	0	0	0	8	0	0
% App Total	0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000	.000	.000		.000	.000

PM PEAK HOUR	Derby Avenue Southbound					E 15th Street Westbound					Derby Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	4	0	1
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	4	1	1
17:30	0	0	0	0	0	2	0	0	0	2	0	0	0	1	0	0	0	0	2	0	2
17:45	0	0	0	0	0	0	0	0	2	0	1	0	0	0	1	0	0	1	0	1	2
Total Volume	0	0	0	0	0	2	1	0	3	3	1	0	0	2	1	0	0	2	10	2	6
% App Total	0.0%	0.0%	0.0%			66.7%	33.3%	0.0%			100.0%	0.0%	0.0%			0.0%	0.0%	100.0%			
PHF	.000	.000	.000		.000	.250	.250	.000		.375	.250	.000	.000		.250	.000	.000	.500		.500	.750

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-002 Fruitvale Avenue & E 15th Street
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	0	106	9	0	115	0	1	1	0	2	3	73	0	1	77	4	0	3	0	7	201	1
7:15	1	92	9	0	102	0	0	4	0	4	3	66	3	1	73	11	1	4	0	16	195	1
7:30	0	119	8	0	127	0	0	1	0	1	5	92	2	0	99	7	0	3	0	10	237	0
7:45	0	101	9	0	110	1	1	1	0	3	2	116	5	0	123	10	1	4	0	15	251	0
Total	1	418	35	0	454	1	2	7	0	10	13	347	10	2	372	32	2	14	0	48	884	2
8:00	0	115	12	0	127	1	2	2	0	5	2	128	2	0	132	7	1	9	0	17	281	0
8:15	2	108	10	1	121	2	2	1	0	5	2	131	4	0	137	20	0	5	0	25	288	1
8:30	3	111	6	0	120	3	0	1	0	4	3	104	8	0	115	9	1	3	0	13	252	0
8:45	0	111	11	0	122	2	0	3	0	5	1	107	6	0	114	16	1	3	0	20	261	0
Total	5	445	39	1	490	8	4	7	0	19	8	470	20	0	498	52	3	20	0	75	1082	1
16:00	2	111	11	0	124	3	1	5	0	9	4	159	7	0	170	17	2	4	0	23	326	0
16:15	1	95	15	0	111	2	0	5	0	7	3	156	4	0	163	19	1	5	0	25	306	0
16:30	5	95	12	0	112	2	0	5	0	7	7	175	1	0	183	22	1	7	0	30	332	0
16:45	0	98	4	0	102	1	3	2	0	6	6	146	6	0	158	26	1	9	0	36	302	0
Total	8	399	42	0	449	8	4	17	0	29	20	636	18	0	674	84	5	25	0	114	1266	0
17:00	4	94	7	0	105	2	0	8	0	10	8	176	1	0	185	26	1	6	0	33	333	0
17:15	1	94	8	0	103	0	0	3	0	3	7	140	2	0	149	15	0	11	0	26	281	0
17:30	6	117	9	0	132	2	2	6	0	10	8	149	5	0	162	21	0	4	0	25	329	0
17:45	4	84	12	0	100	2	2	5	0	9	9	167	7	0	183	20	3	5	0	28	320	0
Total	15	389	36	0	440	6	4	22	0	32	32	632	15	0	679	82	4	26	0	112	1263	0
Grand Total	29	1651	152	1	1833	23	14	53	0	90	73	2085	63	2	2223	250	14	85	0	349	4495	3
Apprch %	1.6%	90.1%	8.3%	0.1%		25.6%	15.6%	58.9%	0.0%		3.3%	93.8%	2.8%	0.1%		71.6%	4.0%	24.4%	0.0%			
Total %	0.6%	36.7%	3.4%	0.0%	40.8%	0.5%	0.3%	1.2%	0.0%	2.0%	1.6%	46.4%	1.4%	0.0%	49.5%	5.6%	0.3%	1.9%	0.0%	7.8%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	115	12	0	127	1	2	2	0	5	2	128	2	0	132	7	1	9	0	17	281
8:15	2	108	10	1	121	2	2	1	0	5	2	131	4	0	137	20	0	5	0	25	288
8:30	3	111	6	0	120	3	0	1	0	4	3	104	8	0	115	9	1	3	0	13	252
8:45	0	111	11	0	122	2	0	3	0	5	1	107	6	0	114	16	1	3	0	20	261
Total Volume	5	445	39	1	490	8	4	7	0	19	8	470	20	0	498	52	3	20	0	75	1082
% App Total	1.0%	90.8%	8.0%	0.2%		42.1%	21.1%	36.8%	0.0%		1.6%	94.4%	4.0%	0.0%		69.3%	4.0%	26.7%	0.0%		
PHF	.417	.967	.813	.250	.965	.667	.500	.583	.000	.950	.667	.897	.625	.000	.909	.650	.750	.556	.000	.750	.939

PM PEAK HOUR	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	1	95	15	0	111	2	0	5	0	7	3	156	4	0	163	19	1	5	0	25	306
16:30	5	95	12	0	112	2	0	5	0	7	7	175	1	0	183	22	1	7	0	30	332
16:45	0	98	4	0	102	1	3	2	0	6	6	146	6	0	158	26	1	9	0	36	302
17:00	4	94	7	0	105	2	0	8	0	10	8	176	1	0	185	26	1	6	0	33	333
Total Volume	10	382	38	0	430	7	3	20	0	30	24	653	12	0	689	93	4	27	0	124	1273
% App Total	2.3%	88.8%	8.8%	0.0%		23.3%	10.0%	66.7%	0.0%		3.5%	94.8%	1.7%	0.0%		75.0%	3.2%	21.8%	0.0%		
PHF	.500	.974	.633	.000	.960	.875	.250	.625	.000	.750	.750	.928	.500	.000	.931	.894	1.000	.750	.000	.861	.956

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-002 Fruitvale Avenue & E 15th Street
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	2	0	2	2	0	0	0	15	0	0	0	0	2	0	0	0	0	20	0	2	39
7:15	0	5	0	5	5	0	0	0	27	0	0	2	0	1	2	0	0	0	19	0	7	52
7:30	0	9	0	4	9	0	0	0	20	0	0	2	0	10	2	0	0	0	38	0	11	72
7:45	0	5	0	5	5	0	0	0	39	0	0	1	0	11	1	0	0	0	31	0	6	86
Total	0	21	0	16	21	0	0	0	101	0	0	5	0	24	5	0	0	0	108	0	26	249
8:00	0	7	0	10	7	0	0	0	42	0	0	1	0	6	1	0	0	0	40	0	8	98
8:15	0	11	0	5	11	0	0	0	29	0	0	0	0	3	0	0	0	0	31	0	11	68
8:30	0	4	0	17	4	0	0	0	28	0	0	1	0	4	1	0	0	0	13	0	5	62
8:45	0	3	0	9	3	0	0	0	23	0	0	0	0	12	0	0	0	0	44	0	3	88
Total	0	25	0	41	25	0	0	0	122	0	0	2	0	25	2	0	0	0	128	0	27	316
16:00	0	4	0	7	4	0	0	0	53	0	0	2	0	10	2	0	0	0	51	0	6	121
16:15	0	6	0	9	6	1	0	0	38	1	0	1	1	11	2	1	0	0	34	1	10	92
16:30	0	2	0	26	2	0	0	0	41	0	1	6	0	17	7	0	0	0	53	0	9	137
16:45	0	2	2	13	4	0	0	0	38	0	1	9	0	26	10	1	0	1	49	2	16	126
Total	0	14	2	55	16	1	0	0	170	1	2	18	1	64	21	2	0	1	187	3	41	476
17:00	0	2	1	13	3	0	0	0	41	0	0	4	1	11	5	0	1	0	45	1	9	110
17:15	0	4	0	17	4	1	0	0	56	1	0	9	0	11	9	0	0	0	38	0	14	122
17:30	0	1	1	8	2	0	0	0	40	0	0	7	0	11	7	0	0	0	38	0	9	97
17:45	0	2	0	20	2	0	0	0	36	0	1	5	0	16	6	0	0	1	44	1	9	116
Total	0	9	2	58	11	1	0	0	173	1	1	25	1	49	27	0	1	1	165	2	41	445
Grand Total	0	69	4	170	73	2	0	0	566	2	3	50	2	162	55	2	1	2	588	5	135	1486
Apprch %	0.0%	94.5%	5.5%			100.0%	0.0%	0.0%			5.5%	90.9%	3.6%			40.0%	20.0%	40.0%				
Total %	0.0%	51.1%	3.0%		54.1%	1.5%	0.0%	0.0%		1.5%	2.2%	37.0%	1.5%		40.7%	1.5%	0.7%	1.5%		3.7%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	7	0	10	7	0	0	0	42	0	0	1	0	6	1	0	0	0	40	0	8
8:15	0	11	0	5	11	0	0	0	29	0	0	0	0	3	0	0	0	0	31	0	11
8:30	0	4	0	17	4	0	0	0	28	0	0	1	0	4	1	0	0	0	13	0	5
8:45	0	3	0	9	3	0	0	0	23	0	0	0	0	12	0	0	0	0	44	0	3
Total Volume	0	25	0	41	25	0	0	0	122	0	0	2	0	25	2	0	0	0	128	0	27
% App Total	0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			
PHF	.000	.568	.000		.568	.000	.000	.000		.000	.000	.500	.000		.500	.000	.000	.000		.000	.614

PM PEAK HOUR	Fruitvale Avenue Southbound					E 15th Street Westbound					Fruitvale Avenue Northbound					E 15th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	0	6	0	9	6	1	0	0	38	1	0	1	1	11	2	1	0	0	34	1	10
16:30	0	2	0	26	2	0	0	0	41	0	1	6	0	17	7	0	0	0	53	0	9
16:45	0	2	2	13	4	0	0	0	38	0	1	9	0	26	10	1	0	1	49	2	16
17:00	0	2	1	13	3	0	0	0	41	0	0	4	1	11	5	0	1	0	45	1	9
Total Volume	0	12	3	61	15	1	0	0	158	1	2	20	2	65	24	2	1	1	181	4	44
% App Total	0.0%	80.0%	20.0%			100.0%	0.0%	0.0%			8.3%	83.3%	8.3%			50.0%	25.0%	25.0%			
PHF	.000	.500	.375		.625	.250	.000	.000		.250	.500	.556	.500		.600	.500	.250	.250		.500	.688

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-003 Fruitvale Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	20	75	11	0	106	16	78	20	0	114	2	44	11	0	57	9	65	7	0	81	358	0
7:15	13	74	14	0	101	27	101	14	0	142	6	44	8	0	58	12	53	6	0	71	372	0
7:30	19	86	11	0	116	37	166	21	0	224	4	76	6	0	86	15	60	7	0	82	508	0
7:45	19	75	17	0	111	35	202	30	0	267	4	96	11	0	111	13	84	8	0	105	594	0
Total	71	310	53	0	434	115	547	85	0	747	16	260	36	0	312	49	262	28	0	339	1832	0
8:00	11	89	18	0	118	38	245	22	0	305	9	88	7	0	104	13	81	9	0	103	630	0
8:15	25	74	14	0	113	25	214	33	0	272	9	91	11	0	111	16	123	7	0	146	642	0
8:30	16	71	18	0	105	35	208	24	0	267	4	78	15	0	97	16	124	7	0	147	616	0
8:45	20	85	13	0	118	30	193	37	0	260	9	74	10	0	93	16	105	7	0	128	599	0
Total	72	319	63	0	454	128	860	116	0	1104	31	331	43	0	405	61	433	30	0	524	2487	0
16:00	12	88	18	0	118	25	125	31	0	181	2	120	30	0	152	34	126	16	0	176	627	0
16:15	8	67	19	0	94	22	116	32	0	170	2	117	27	0	146	27	166	15	0	208	618	0
16:30	8	62	19	0	89	21	124	38	1	184	2	126	28	0	156	30	164	23	0	217	646	1
16:45	4	69	14	0	87	14	135	37	0	186	3	97	26	0	126	32	147	28	0	207	606	0
Total	32	286	70	0	388	82	500	138	1	721	9	460	111	0	580	123	603	82	0	808	2497	1
17:00	6	66	13	0	85	18	111	33	0	162	3	122	24	0	149	41	161	19	0	221	617	0
17:15	6	66	18	0	90	12	115	30	1	158	4	89	26	0	119	31	170	26	0	227	594	1
17:30	3	79	21	0	103	22	108	35	0	165	4	108	27	0	139	31	147	18	0	196	603	0
17:45	6	63	17	0	86	21	128	28	0	177	3	125	24	0	152	40	143	23	1	207	622	1
Total	21	274	69	0	364	73	462	126	1	662	14	444	101	0	559	143	621	86	1	851	2436	2
Grand Total	196	1189	255	0	1640	398	2369	465	2	3234	70	1495	291	0	1856	376	1919	226	1	2522	9252	3
Apprch %	12.0%	72.5%	15.5%	0.0%		12.3%	73.3%	14.4%	0.1%		3.8%	80.5%	15.7%	0.0%		14.9%	76.1%	9.0%	0.0%			
Total %	2.1%	12.9%	2.8%	0.0%	17.7%	4.3%	25.6%	5.0%	0.0%	35.0%	0.8%	16.2%	3.1%	0.0%	20.1%	4.1%	20.7%	2.4%	0.0%	27.3%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	11	89	18	0	118	38	245	22	0	305	9	88	7	0	104	13	81	9	0	103	630
8:15	25	74	14	0	113	25	214	33	0	272	9	91	11	0	111	16	123	7	0	146	642
8:30	16	71	18	0	105	35	208	24	0	267	4	78	15	0	97	16	124	7	0	147	616
8:45	20	85	13	0	118	30	193	37	0	260	9	74	10	0	93	16	105	7	0	128	599
Total Volume	72	319	63	0	454	128	860	116	0	1104	31	331	43	0	405	61	433	30	0	524	2487
% App Total	15.9%	70.3%	13.9%	0.0%		11.6%	77.9%	10.5%	0.0%		7.7%	81.7%	10.6%	0.0%		11.6%	82.6%	5.7%	0.0%		
PHF	.720	.896	.875	.000	.962	.842	.878	.784	.000	.905	.861	.909	.717	.000	.912	.953	.873	.833	.000	.891	.968

PM PEAK HOUR	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	12	88	18	0	118	25	125	31	0	181	2	120	30	0	152	34	126	16	0	176	627
16:15	8	67	19	0	94	22	116	32	0	170	2	117	27	0	146	27	166	15	0	208	618
16:30	8	62	19	0	89	21	124	38	1	184	2	126	28	0	156	30	164	23	0	217	646
16:45	4	69	14	0	87	14	135	37	0	186	3	97	26	0	126	32	147	28	0	207	606
Total Volume	32	286	70	0	388	82	500	138	1	721	9	460	111	0	580	123	603	82	0	808	2497
% App Total	8.2%	73.7%	18.0%	0.0%		11.4%	69.3%	19.1%	0.1%		1.6%	79.3%	19.1%	0.0%		15.2%	74.6%	10.1%	0.0%		
PHF	.667	.813	.921	.000	.822	.820	.926	.908	.250	.969	.750	.913	.925	.000	.929	.904	.908	.732	.000	.931	.966

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-003 Fruitvale Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	1	1	0	21	2	0	2	0	21	2	0	0	0	15	0	0	2	0	10	2	6	67
7:15	4	1	0	16	5	1	0	1	13	2	0	2	0	11	2	0	2	0	8	2	11	48
7:30	4	6	0	33	10	0	3	0	22	3	0	1	0	19	1	1	2	0	15	3	17	89
7:45	2	3	0	30	5	1	1	0	23	2	0	0	0	18	0	0	1	0	16	1	8	87
Total	11	11	0	100	22	2	6	1	79	9	0	3	0	63	3	1	7	0	49	8	42	291
8:00	3	4	0	30	7	0	1	0	19	1	0	2	0	17	2	0	1	0	21	1	11	87
8:15	3	6	0	38	9	0	2	0	32	2	0	0	0	23	0	0	0	0	25	0	11	118
8:30	1	4	0	35	5	1	1	1	21	3	0	0	0	21	0	1	1	0	5	2	10	82
8:45	1	2	0	35	3	0	0	0	19	0	0	0	0	16	0	0	0	0	14	0	3	84
Total	8	16	0	138	24	1	4	1	91	6	0	2	0	77	2	1	2	0	65	3	35	371
16:00	0	2	0	45	2	0	2	0	43	2	0	2	0	44	2	0	1	0	46	1	7	178
16:15	0	5	0	33	5	0	1	0	35	1	1	1	0	39	2	0	3	0	10	3	11	117
16:30	0	1	0	35	1	0	1	2	42	3	0	4	0	29	4	0	1	0	41	1	9	147
16:45	0	0	0	32	0	0	3	0	33	3	0	6	0	45	6	0	2	0	29	2	11	139
Total	0	8	0	145	8	0	7	2	153	9	1	13	0	157	14	0	7	0	126	7	38	581
17:00	2	0	0	59	2	0	3	2	48	5	0	6	1	44	7	1	1	0	35	2	16	186
17:15	0	3	0	41	3	0	2	0	43	2	0	5	0	54	5	0	1	0	33	1	11	171
17:30	1	3	0	27	4	1	1	0	28	2	2	4	0	41	6	0	2	0	31	2	14	127
17:45	1	1	0	26	2	1	2	0	18	3	0	1	0	43	1	0	0	0	32	0	6	119
Total	4	7	0	153	11	2	8	2	137	12	2	16	1	182	19	1	4	0	131	5	47	603
Grand Total	23	42	0	536	65	5	25	6	460	36	3	34	1	479	38	3	20	0	371	23	162	1846
Apprch %	35.4%	64.6%	0.0%			13.9%	69.4%	16.7%			7.9%	89.5%	2.6%			13.0%	87.0%	0.0%				
Total %	14.2%	25.9%	0.0%		40.1%	3.1%	15.4%	3.7%		22.2%	1.9%	21.0%	0.6%		23.5%	1.9%	12.3%	0.0%		14.2%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	3	4	0	30	7	0	1	0	19	1	0	2	0	17	2	0	1	0	21	1	11
8:15	3	6	0	38	9	0	2	0	32	2	0	0	0	23	0	0	0	0	25	0	11
8:30	1	4	0	35	5	1	1	1	21	3	0	0	0	21	0	1	1	0	5	2	10
8:45	1	2	0	35	3	0	0	0	19	0	0	0	0	16	0	0	0	0	14	0	3
Total Volume	8	16	0	138	24	1	4	1	91	6	0	2	0	77	2	1	2	0	65	3	35
% App Total	33.3%	66.7%	0.0%			16.7%	66.7%	16.7%			0.0%	100.0%	0.0%			33.3%	66.7%	0.0%			
PHF	.667	.667	.000		.667	.250	.500	.250		.500	.000	.250	.000		.250	.250	.500	.000		.375	.795

PM PEAK HOUR	Fruitvale Avenue Southbound					International Boulevard Westbound					Fruitvale Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	0	2	0	45	2	0	2	0	43	2	0	2	0	44	2	0	1	0	46	1	7
16:15	0	5	0	33	5	0	1	0	35	1	1	1	0	39	2	0	3	0	10	3	11
16:30	0	1	0	35	1	0	1	2	42	3	0	4	0	29	4	0	1	0	41	1	9
16:45	0	0	0	32	0	0	3	0	33	3	0	6	0	45	6	0	2	0	29	2	11
Total Volume	0	8	0	145	8	0	7	2	153	9	1	13	0	157	14	0	7	0	126	7	38
% App Total	0.0%	100.0%	0.0%			0.0%	77.8%	22.2%			7.1%	92.9%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.400	.000		.400	.000	.583	.250		.750	.250	.542	.000		.583	.000	.583	.000		.583	.864

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-004 Fruitvale Avenue & E 12th Street
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	14	70	8	0	92	6	21	3	0	30	43	49	16	0	108	4	14	26	2	46	276	2
7:15	10	89	7	0	106	7	23	6	0	36	78	55	23	0	156	5	13	40	0	58	356	0
7:30	9	78	22	0	109	9	56	5	0	70	85	69	27	0	181	10	21	48	1	80	440	1
7:45	16	99	21	0	136	8	74	4	0	86	112	101	27	0	240	15	36	60	0	111	573	0
Total	49	336	58	0	443	30	174	18	0	222	318	274	93	0	685	34	84	174	3	295	1645	3
8:00	8	81	27	0	116	11	80	4	0	95	132	91	27	0	250	20	57	74	0	151	612	0
8:15	15	69	22	0	106	22	65	12	0	99	116	79	23	0	218	24	51	84	0	159	582	0
8:30	11	80	27	0	118	6	75	7	0	88	117	71	34	0	222	27	53	85	0	165	593	0
8:45	10	81	19	0	110	16	55	5	0	76	104	83	32	0	219	16	35	72	1	124	529	1
Total	44	311	95	0	450	55	275	28	0	358	469	324	116	0	909	87	196	315	1	599	2316	1
16:00	26	88	12	0	126	15	37	19	0	71	53	99	20	0	172	25	55	99	0	179	548	0
16:15	18	88	9	0	115	18	29	19	0	66	86	110	14	0	210	24	48	95	1	168	559	1
16:30	14	72	14	0	100	17	47	18	0	82	50	113	30	0	193	25	53	117	0	195	570	0
16:45	17	90	8	0	115	14	36	14	0	64	80	95	28	0	203	25	47	124	0	196	578	0
Total	75	338	43	0	456	64	149	70	0	283	269	417	92	0	778	99	203	435	1	738	2255	1
17:00	13	66	17	0	96	11	44	18	0	73	68	95	22	0	185	31	44	124	1	200	554	1
17:15	16	80	9	0	105	17	33	13	0	63	57	92	17	0	166	26	42	113	0	181	515	0
17:30	16	74	3	0	93	19	49	25	0	93	52	89	29	0	170	28	59	121	2	210	566	2
17:45	22	82	8	0	112	21	46	26	0	93	46	98	24	0	168	35	63	119	0	217	590	0
Total	67	302	37	0	406	68	172	82	0	322	223	374	92	0	689	120	208	477	3	808	2225	3
Grand Total	235	1287	233	0	1755	217	770	198	0	1185	1279	1389	393	0	3061	340	691	1401	8	2440	8441	8
Apprch %	13.4%	73.3%	13.3%	0.0%		18.3%	65.0%	16.7%	0.0%		41.8%	45.4%	12.8%	0.0%		13.9%	28.3%	57.4%	0.3%			
Total %	2.8%	15.2%	2.8%	0.0%	20.8%	2.6%	9.1%	2.3%	0.0%	14.0%	15.2%	16.5%	4.7%	0.0%	36.3%	4.0%	8.2%	16.6%	0.1%	28.9%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
7:45	16	99	21	0	136	8	74	4	0	86	112	101	27	0	240	15	36	60	0	111	573
8:00	8	81	27	0	116	11	80	4	0	95	132	91	27	0	250	20	57	74	0	151	612
8:15	15	69	22	0	106	22	65	12	0	99	116	79	23	0	218	24	51	84	0	159	582
8:30	11	80	27	0	118	6	75	7	0	88	117	71	34	0	222	27	53	85	0	165	593
Total Volume	50	329	97	0	476	47	294	27	0	368	477	342	111	0	930	86	197	303	0	586	2360
% App Total	10.5%	69.1%	20.4%	0.0%		12.8%	79.9%	7.3%	0.0%		51.3%	36.8%	11.9%	0.0%		14.7%	33.6%	51.7%	0.0%		
PHF	.781	.831	.898	.000	.875	.534	.919	.563	.000	.929	.903	.847	.816	.000	.930	.796	.864	.891	.000	.888	.964

PM PEAK HOUR	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	18	88	9	0	115	18	29	19	0	66	86	110	14	0	210	24	48	95	1	168	559
16:30	14	72	14	0	100	17	47	18	0	82	50	113	30	0	193	25	53	117	0	195	570
16:45	17	90	8	0	115	14	36	14	0	64	80	95	28	0	203	25	47	124	0	196	578
17:00	13	66	17	0	96	11	44	18	0	73	68	95	22	0	185	31	44	124	1	200	554
Total Volume	62	316	48	0	426	60	156	69	0	285	284	413	94	0	791	105	192	460	2	759	2261
% App Total	14.6%	74.2%	11.3%	0.0%		21.1%	54.7%	24.2%	0.0%		35.9%	52.2%	11.9%	0.0%		13.8%	25.3%	60.6%	0.3%		
PHF	.861	.878	.706	.000	.926	.833	.830	.908	.000	.869	.826	.914	.783	.000	.942	.847	.906	.927	.500	.949	.978

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-004 Fruitvale Avenue & E 12th Street
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	7	0	1	1	0	8	2	0	1	0	0	1	0	1	0	25	1	4	40
7:15	0	2	0	9	2	0	0	1	4	1	0	1	0	5	1	0	0	0	35	0	4	53
7:30	0	2	0	5	2	3	4	0	3	7	1	2	0	4	3	0	1	2	54	3	15	66
7:45	0	6	0	5	6	2	0	0	5	2	0	0	0	7	0	0	0	2	49	2	10	66
Total	0	10	0	26	10	6	5	1	20	12	1	4	0	16	5	0	2	4	163	6	33	225
8:00	0	0	0	5	0	3	1	0	4	4	1	2	0	5	3	0	1	2	39	3	10	53
8:15	0	6	0	2	6	3	3	0	4	6	0	2	0	5	2	0	0	0	57	0	14	68
8:30	0	1	0	2	1	2	3	0	3	5	0	0	0	8	0	0	0	0	37	0	6	50
8:45	0	1	0	3	1	1	1	0	5	2	1	0	0	2	1	0	0	3	26	3	7	36
Total	0	8	0	12	8	9	8	0	16	17	2	4	0	20	6	0	1	5	159	6	37	207
16:00	0	2	0	18	2	2	0	0	6	2	1	3	1	2	5	0	1	0	16	1	10	42
16:15	0	3	0	3	3	0	2	0	10	2	1	3	0	4	4	0	0	2	15	2	11	32
16:30	0	2	0	18	2	3	0	0	13	3	0	0	2	2	2	0	2	0	18	2	9	51
16:45	0	1	0	6	1	0	0	0	5	0	1	2	2	7	5	1	1	0	24	2	8	42
Total	0	8	0	45	8	5	2	0	34	7	3	8	5	15	16	1	4	2	73	7	38	167
17:00	1	1	0	6	2	0	0	0	13	0	1	5	3	6	9	0	0	0	26	0	11	51
17:15	0	1	0	4	1	0	1	0	3	1	0	1	1	8	2	0	1	0	16	1	5	31
17:30	0	1	0	5	1	0	3	0	5	3	0	2	2	4	4	0	2	0	34	2	10	48
17:45	0	0	0	1	0	1	0	0	7	1	2	0	0	4	2	2	1	0	37	3	6	49
Total	1	3	0	16	4	1	4	0	28	5	3	8	6	22	17	2	4	0	113	6	32	179
Grand Total	1	29	0	99	30	21	19	1	98	41	9	24	11	73	44	3	11	11	508	25	140	778
Apprch %	3.3%	96.7%	0.0%			51.2%	46.3%	2.4%			20.5%	54.5%	25.0%			12.0%	44.0%	44.0%				
Total %	0.7%	20.7%	0.0%		21.4%	15.0%	13.6%	0.7%		29.3%	6.4%	17.1%	7.9%		31.4%	2.1%	7.9%	7.9%		17.9%	100.0%	

AM PEAK HOUR	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 07:45 to 08:45																					
Peak Hour For Entire Intersection Begins at 07:45																					
7:45	0	6	0	5	6	2	0	0	5	2	0	0	0	7	0	0	0	2	49	2	10
8:00	0	0	0	5	0	3	1	0	4	4	1	2	0	5	3	0	1	2	39	3	10
8:15	0	6	0	2	6	3	3	0	4	6	0	2	0	5	2	0	0	0	57	0	14
8:30	0	1	0	2	1	2	3	0	3	5	0	0	0	8	0	0	0	0	37	0	6
Total Volume	0	13	0	14	13	10	7	0	16	17	1	4	0	25	5	0	1	4	182	5	40
% App Total	0.0%	100.0%	0.0%			58.8%	41.2%	0.0%			20.0%	80.0%	0.0%			0.0%	20.0%	80.0%			
PHF	.000	.542	.000		.542	.833	.583	.000		.708	.250	.500	.000		.417	.000	.250	.500		.417	.714

PM PEAK HOUR	Fruitvale Avenue Southbound					E 12th Street Westbound					Fruitvale Avenue Northbound					E 12th Street Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:15 to 17:15																					
Peak Hour For Entire Intersection Begins at 16:15																					
16:15	0	3	0	3	3	0	2	0	10	2	1	3	0	4	4	0	0	2	15	2	11
16:30	0	2	0	18	2	3	0	0	13	3	0	0	2	2	2	0	2	0	18	2	9
16:45	0	1	0	6	1	0	0	0	5	0	1	2	2	7	5	1	1	0	24	2	8
17:00	1	1	0	6	2	0	0	0	13	0	1	5	3	6	9	0	0	0	26	0	11
Total Volume	1	7	0	33	8	3	2	0	41	5	3	10	7	19	20	1	3	2	83	6	39
% App Total	12.5%	87.5%	0.0%			60.0%	40.0%	0.0%			15.0%	50.0%	35.0%			16.7%	50.0%	33.3%			
PHF	.250	.583	.000		.667	.250	.250	.000		.417	.750	.500	.583		.556	.250	.375	.250		.750	.886

ALL TRAFFIC DATA

City of Oakland
(916) 771-8700
orders@atdtraffic.com

All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

File Name : 16-7081-005 29th Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	5	9	4	0	18	3	78	0	0	81	8	7	4	0	19	1	70	7	1	79	197	1
7:15	3	13	1	0	17	11	105	6	0	122	7	5	12	0	24	0	71	11	0	82	245	0
7:30	8	19	5	0	32	22	141	4	0	167	10	12	12	0	34	0	61	13	0	74	307	0
7:45	11	21	4	0	36	37	161	6	0	204	16	14	10	0	40	0	89	10	0	99	379	0
Total	27	62	14	0	103	73	485	16	0	574	41	38	38	0	117	1	291	41	1	334	1128	1
8:00	7	32	4	0	43	48	182	7	1	238	9	24	15	0	48	3	93	23	1	120	449	2
8:15	15	47	6	0	68	34	152	18	0	204	15	17	24	0	56	2	116	29	0	147	475	0
8:30	9	25	4	0	38	36	189	8	0	233	17	17	23	0	57	1	126	20	0	147	475	0
8:45	9	18	5	0	32	15	175	4	1	195	21	12	20	0	53	4	121	14	0	139	419	1
Total	40	122	19	0	181	133	698	37	2	870	62	70	82	0	214	10	456	86	1	553	1818	3
16:00	7	10	5	0	22	7	136	6	1	150	24	14	20	0	58	2	141	15	0	158	388	1
16:15	9	6	8	0	23	9	108	5	0	122	30	21	22	0	73	1	179	9	1	190	408	1
16:30	3	17	6	0	26	14	120	7	1	142	41	28	30	0	99	5	192	14	0	211	478	1
16:45	5	12	6	0	23	14	130	7	0	151	43	27	28	0	98	2	165	16	0	183	455	0
Total	24	45	25	0	94	44	494	25	2	565	138	90	100	0	328	10	677	54	1	742	1729	3
17:00	4	10	4	0	18	15	107	7	2	131	45	24	28	0	97	3	188	19	0	210	456	2
17:15	8	17	5	0	30	15	125	8	1	149	39	24	19	0	82	4	180	16	1	201	462	2
17:30	9	8	11	0	28	14	112	9	0	135	36	18	18	0	72	4	190	25	1	220	455	1
17:45	5	20	9	0	34	21	126	12	0	159	33	29	22	0	84	10	169	19	1	199	476	1
Total	26	55	29	0	110	65	470	36	3	574	153	95	87	0	335	21	727	79	3	830	1849	6
Grand Total	117	284	87	0	488	315	2147	114	7	2583	394	293	307	0	994	42	2151	260	6	2459	6524	13
Apprch %	24.0%	58.2%	17.8%	0.0%		12.2%	83.1%	4.4%	0.3%		39.6%	29.5%	30.9%	0.0%		1.7%	87.5%	10.6%	0.2%			
Total %	1.8%	4.4%	1.3%	0.0%	7.5%	4.8%	32.9%	1.7%	0.1%	39.6%	6.0%	4.5%	4.7%	0.0%	15.2%	0.6%	33.0%	4.0%	0.1%	37.7%	100.0%	

AM PEAK HOUR	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	7	32	4	0	43	48	182	7	1	238	9	24	15	0	48	3	93	23	1	120	449
8:15	15	47	6	0	68	34	152	18	0	204	15	17	24	0	56	2	116	29	0	147	475
8:30	9	25	4	0	38	36	189	8	0	233	17	17	23	0	57	1	126	20	0	147	475
8:45	9	18	5	0	32	15	175	4	1	195	21	12	20	0	53	4	121	14	0	139	419
Total Volume	40	122	19	0	181	133	698	37	2	870	62	70	82	0	214	10	456	86	1	553	1818
% App Total	22.1%	67.4%	10.5%	0.0%		15.3%	80.2%	4.3%	0.2%		29.0%	32.7%	38.3%	0.0%		1.8%	82.5%	15.6%	0.2%		
PHF	.667	.649	.792	.000	.665	.693	.923	.514	.500	.914	.738	.729	.854	.000	.939	.625	.905	.741	.250	.940	.957

PM PEAK HOUR	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	3	17	6	0	26	14	120	7	1	142	41	28	30	0	99	5	192	14	0	211	478
16:45	5	12	6	0	23	14	130	7	0	151	43	27	28	0	98	2	165	16	0	183	455
17:00	4	10	4	0	18	15	107	7	2	131	45	24	28	0	97	3	188	19	0	210	456
17:15	8	17	5	0	30	15	125	8	1	149	39	24	19	0	82	4	180	16	1	201	462
Total Volume	20	56	21	0	97	58	482	29	4	573	168	103	105	0	376	14	725	65	1	805	1851
% App Total	20.6%	57.7%	21.6%	0.0%		10.1%	84.1%	5.1%	0.7%		44.7%	27.4%	27.9%	0.0%		1.7%	90.1%	8.1%	0.1%		
PHF	.625	.824	.875	.000	.808	.967	.927	.906	.500	.949	.933	.920	.875	.000	.949	.700	.944	.855	.250	.954	.968

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-005 29th Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	9	0	0	2	0	0	2	0	0	0	5	0	0	2	0	0	2	4	14
7:15	0	0	0	8	0	0	0	0	4	0	1	0	0	2	1	0	2	0	2	2	3	16
7:30	0	0	0	15	0	0	0	0	9	0	0	0	0	5	0	0	0	1	1	1	1	30
7:45	0	1	0	9	1	0	1	0	13	1	0	0	0	7	0	0	0	1	8	1	3	37
Total	0	1	0	41	1	0	3	0	26	3	1	0	0	19	1	0	4	2	11	6	11	97
8:00	0	0	0	16	0	1	2	0	32	3	0	0	0	13	0	0	1	0	16	1	4	77
8:15	0	0	0	31	0	0	0	1	29	1	0	0	0	26	0	0	0	1	59	1	2	145
8:30	0	0	0	26	0	0	1	0	17	1	0	1	0	32	1	0	1	1	18	2	4	93
8:45	0	0	0	28	0	0	0	0	10	0	0	0	0	16	0	0	0	0	5	0	0	59
Total	0	0	0	101	0	1	3	1	88	5	0	1	0	87	1	0	2	2	98	4	10	374
16:00	0	0	0	18	0	0	3	0	5	3	0	0	0	8	0	0	0	0	8	0	3	39
16:15	0	0	0	22	0	0	1	0	14	1	0	1	0	6	1	0	2	0	7	2	4	49
16:30	0	0	0	13	0	0	1	0	16	1	0	0	0	3	0	1	0	1	6	2	3	38
16:45	0	0	0	23	0	0	1	0	7	1	1	0	0	7	1	0	3	0	3	3	5	40
Total	0	0	0	76	0	0	6	0	42	6	1	1	0	24	2	1	5	1	24	7	15	166
17:00	0	0	0	19	0	0	4	0	14	4	2	0	0	9	2	0	2	0	12	2	8	54
17:15	0	0	0	27	0	0	2	0	12	2	0	0	0	8	0	0	2	0	7	2	4	54
17:30	0	0	1	17	1	0	3	0	11	3	0	0	0	7	0	0	2	0	6	2	6	41
17:45	0	1	0	8	1	0	1	0	2	1	1	0	0	14	1	0	0	0	4	0	3	28
Total	0	1	1	71	2	0	10	0	39	10	3	0	0	38	3	0	6	0	29	6	21	177
Grand Total	0	2	1	289	3	1	22	1	195	24	5	2	0	168	7	1	17	5	162	23	57	814
Apprch %	0.0%	66.7%	33.3%			4.2%	91.7%	4.2%			71.4%	28.6%	0.0%			4.3%	73.9%	21.7%				
Total %	0.0%	3.5%	1.8%		5.3%	1.8%	38.6%	1.8%		42.1%	8.8%	3.5%	0.0%		12.3%	1.8%	29.8%	8.8%		40.4%	100.0%	

AM PEAK HOUR	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	0	0	16	0	1	2	0	32	3	0	0	0	13	0	0	1	0	16	1	4
8:15	0	0	0	31	0	0	0	1	29	1	0	0	0	26	0	0	0	1	59	1	2
8:30	0	0	0	26	0	0	1	0	17	1	0	1	0	32	1	0	1	1	18	2	4
8:45	0	0	0	28	0	0	0	0	10	0	0	0	0	16	0	0	0	0	5	0	0
Total Volume	0	0	0	101	0	1	3	1	88	5	0	1	0	87	1	0	2	2	98	4	10
% App Total	0.0%	0.0%	0.0%			20.0%	60.0%	20.0%			0.0%	100.0%	0.0%			0.0%	50.0%	50.0%			
PHF	.000	.000	.000		.000	.250	.375	.250		.417	.000	.250	.000		.250	.000	.500	.500		.500	.625

PM PEAK HOUR	29th Avenue Southbound					International Boulevard Westbound					29th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	0	0	0	13	0	0	1	0	16	1	0	0	0	3	0	1	0	1	6	2	3
16:45	0	0	0	23	0	0	1	0	7	1	1	0	0	7	1	0	3	0	3	3	5
17:00	0	0	0	19	0	0	4	0	14	4	2	0	0	9	2	0	2	0	12	2	8
17:15	0	0	0	27	0	0	2	0	12	2	0	0	0	8	0	0	2	0	7	2	4
Total Volume	0	0	0	82	0	0	8	0	49	8	3	0	0	27	3	1	7	1	28	9	20
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			100.0%	0.0%	0.0%			11.1%	77.8%	11.1%			
PHF	.000	.000	.000		.000	.000	.500	.000		.500	.375	.000	.000		.375	.250	.583	.250		.750	.625

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-006 Derby Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	2	0	7	0	9	1	92	0	0	93	0	0	1	0	1	1	78	2	0	81	184	0
7:15	2	3	10	0	15	4	116	2	0	122	2	0	2	0	4	4	71	1	0	76	217	0
7:30	4	1	11	0	16	14	185	3	0	202	2	0	3	0	5	6	82	5	0	93	316	0
7:45	4	0	13	0	17	16	193	3	0	212	1	1	3	0	5	2	124	4	2	132	366	2
Total	12	4	41	0	57	35	586	8	0	629	5	1	9	0	15	13	355	12	2	382	1083	2
8:00	1	1	18	0	20	10	243	1	0	254	0	0	4	0	4	1	122	4	1	128	406	1
8:15	4	1	16	0	21	17	220	3	0	240	1	0	4	0	5	5	160	2	0	167	433	0
8:30	3	1	9	0	13	6	199	1	0	206	3	1	5	0	9	7	157	2	1	167	395	1
8:45	2	0	5	0	7	8	206	6	1	221	0	0	3	0	3	7	139	2	2	150	381	3
Total	10	3	48	0	61	41	868	11	1	921	4	1	16	0	21	20	578	10	4	612	1615	5
16:00	7	1	14	0	22	4	132	4	2	142	0	0	3	0	3	2	189	3	0	194	361	2
16:15	11	1	13	0	25	4	118	4	1	127	1	0	9	0	10	6	201	4	2	213	375	3
16:30	5	1	20	0	26	1	143	2	1	147	3	1	12	0	16	4	220	4	0	228	417	1
16:45	9	1	18	0	28	6	124	3	0	133	2	0	10	0	12	6	203	4	3	216	389	3
Total	32	4	65	0	101	15	517	13	4	549	6	1	34	0	41	18	813	15	5	851	1542	9
17:00	4	1	15	0	20	5	112	3	0	120	4	0	9	0	13	7	208	5	1	221	374	1
17:15	5	0	17	0	22	2	128	1	1	132	0	0	14	0	14	7	221	7	2	237	405	3
17:30	2	1	16	0	19	7	123	0	1	131	1	0	10	0	11	12	196	6	0	214	375	1
17:45	7	1	23	0	31	2	138	1	0	141	0	0	4	0	4	8	191	3	0	202	378	0
Total	18	3	71	0	92	16	501	5	2	524	5	0	37	0	42	34	816	21	3	874	1532	5
Grand Total	72	14	225	0	311	107	2472	37	7	2623	20	3	96	0	119	85	2562	58	14	2719	5772	21
Apprch %	23.2%	4.5%	72.3%	0.0%		4.1%	94.2%	1.4%	0.3%		16.8%	2.5%	80.7%	0.0%		3.1%	94.2%	2.1%	0.5%			
Total %	1.2%	0.2%	3.9%	0.0%	5.4%	1.9%	42.8%	0.6%	0.1%	45.4%	0.3%	0.1%	1.7%	0.0%	2.1%	1.5%	44.4%	1.0%	0.2%	47.1%	100.0%	

AM PEAK HOUR	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	1	1	18	0	20	10	243	1	0	254	0	0	4	0	4	1	122	4	1	128	406
8:15	4	1	16	0	21	17	220	3	0	240	1	0	4	0	5	5	160	2	0	167	433
8:30	3	1	9	0	13	6	199	1	0	206	3	1	5	0	9	7	157	2	1	167	395
8:45	2	0	5	0	7	8	206	6	1	221	0	0	3	0	3	7	139	2	2	150	381
Total Volume	10	3	48	0	61	41	868	11	1	921	4	1	16	0	21	20	578	10	4	612	1615
% App Total	16.4%	4.9%	78.7%	0.0%		4.5%	94.2%	1.2%	0.1%		19.0%	4.8%	76.2%	0.0%		3.3%	94.4%	1.6%	0.7%		
PHF	.625	.750	.667	.000	.726	.603	.893	.458	.250	.906	.333	.250	.800	.000	.583	.714	.903	.625	.500	.916	.932

PM PEAK HOUR	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	5	1	20	0	26	1	143	2	1	147	3	1	12	0	16	4	220	4	0	228	417
16:45	9	1	18	0	28	6	124	3	0	133	2	0	10	0	12	6	203	4	3	216	389
17:00	4	1	15	0	20	5	112	3	0	120	4	0	9	0	13	7	208	5	1	221	374
17:15	5	0	17	0	22	2	128	1	1	132	0	0	14	0	14	7	221	7	2	237	405
Total Volume	23	3	70	0	96	14	507	9	2	532	9	1	45	0	55	24	852	20	6	902	1585
% App Total	24.0%	3.1%	72.9%	0.0%		2.6%	95.3%	1.7%	0.4%		16.4%	1.8%	81.8%	0.0%		2.7%	94.5%	2.2%	0.7%		
PHF	.639	.750	.875	.000	.857	.583	.886	.750	.500	.905	.563	.250	.804	.000	.859	.857	.964	.714	.500	.951	.950

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-006 Derby Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	0	0	11	0	0	2	0	1	2	0	0	0	5	0	0	1	0	0	1	3	17
7:15	0	0	0	17	0	0	0	0	2	0	0	0	0	6	0	0	2	0	0	2	2	25
7:30	0	0	0	14	0	0	1	0	3	1	0	0	0	13	0	0	1	0	0	1	2	30
7:45	0	0	0	18	0	0	1	0	1	1	0	0	0	8	0	0	0	0	0	0	1	27
Total	0	0	0	60	0	0	4	0	7	4	0	0	0	32	0	0	4	0	0	4	8	99
8:00	0	0	0	33	0	0	1	0	0	1	0	0	0	14	0	0	1	0	0	1	2	47
8:15	0	0	0	26	0	0	1	0	0	1	0	0	0	20	0	0	0	0	0	0	1	46
8:30	0	0	0	47	0	0	2	0	3	2	0	0	0	13	0	0	2	0	0	2	4	63
8:45	0	0	0	28	0	0	0	0	5	0	0	0	0	17	0	0	0	0	0	0	0	50
Total	0	0	0	134	0	0	4	0	8	4	0	0	0	64	0	0	3	0	0	3	7	206
16:00	0	0	0	32	0	0	2	0	1	2	0	0	0	21	0	0	1	0	0	1	3	54
16:15	0	0	1	39	1	0	1	0	3	1	0	0	0	23	0	0	2	0	0	2	4	65
16:30	0	0	0	29	0	0	1	0	8	1	0	0	0	17	0	0	2	0	0	2	3	54
16:45	0	0	0	33	0	0	1	0	9	1	0	0	0	19	0	0	4	0	0	4	5	61
Total	0	0	1	133	1	0	5	0	21	5	0	0	0	80	0	0	9	0	0	9	15	234
17:00	0	0	0	37	0	0	3	0	5	3	0	0	0	41	0	0	5	0	0	5	8	83
17:15	0	0	0	24	0	0	2	0	0	2	0	0	0	19	0	0	1	0	0	1	3	43
17:30	0	0	1	30	1	0	4	0	6	4	0	1	0	25	1	0	2	0	0	2	8	61
17:45	0	0	1	24	1	0	2	0	5	2	0	0	0	22	0	0	2	0	0	2	5	51
Total	0	0	2	115	2	0	11	0	16	11	0	1	0	107	1	0	10	0	0	10	24	238
Grand Total	0	0	3	442	3	0	24	0	52	24	0	1	0	283	1	0	26	0	0	26	54	777
Apprch %	0.0%	0.0%	100.0%			0.0%	100.0%	0.0%			0.0%	100.0%	0.0%			0.0%	100.0%	0.0%				
Total %	0.0%	0.0%	5.6%		5.6%	0.0%	44.4%	0.0%		44.4%	0.0%	1.9%	0.0%		1.9%	0.0%	48.1%	0.0%		48.1%	100.0%	

AM PEAK HOUR	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	0	0	33	0	0	1	0	0	1	0	0	0	14	0	0	1	0	0	1	2
8:15	0	0	0	26	0	0	1	0	0	1	0	0	0	20	0	0	0	0	0	0	1
8:30	0	0	0	47	0	0	2	0	3	2	0	0	0	13	0	0	2	0	0	2	4
8:45	0	0	0	28	0	0	0	0	5	0	0	0	0	17	0	0	0	0	0	0	0
Total Volume	0	0	0	134	0	0	4	0	8	4	0	0	0	64	0	0	3	0	0	3	7
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.500	.000		.500	.000	.000	.000		.000	.000	.375	.000		.375	.438

PM PEAK HOUR	Derby Avenue Southbound					International Boulevard Westbound					Derby Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:30 to 17:30																					
Peak Hour For Entire Intersection Begins at 16:30																					
16:30	0	0	0	29	0	0	1	0	8	1	0	0	0	17	0	0	2	0	0	2	3
16:45	0	0	0	33	0	0	1	0	9	1	0	0	0	19	0	0	4	0	0	4	5
17:00	0	0	0	37	0	0	3	0	5	3	0	0	0	41	0	0	5	0	0	5	8
17:15	0	0	0	24	0	0	2	0	0	2	0	0	0	19	0	0	1	0	0	1	3
Total Volume	0	0	0	123	0	0	7	0	22	7	0	0	0	96	0	0	12	0	0	12	19
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.000		.000	.000	.583	.000		.583	.000	.000	.000		.000	.000	.600	.000		.600	.594

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-007 34th Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	10	0	6	0	16	0	116	7	0	123	0	0	0	0	0	0	94	0	0	94	233	0
7:15	15	0	13	0	28	0	133	8	0	141	0	0	0	0	0	0	79	0	0	79	248	0
7:30	25	0	19	0	44	0	225	29	0	254	0	0	0	0	0	3	80	0	0	83	381	0
7:45	40	0	32	0	72	0	249	32	0	281	0	0	0	0	0	6	99	0	0	105	458	0
Total	90	0	70	0	160	0	723	76	0	799	0	0	0	0	0	9	352	0	0	361	1320	0
8:00	32	0	35	0	67	0	282	22	1	305	0	0	0	0	0	5	115	0	0	120	492	1
8:15	24	0	21	0	45	0	289	28	0	317	0	0	0	0	0	3	157	0	0	160	522	0
8:30	20	0	25	0	45	0	254	22	0	276	0	0	0	0	0	6	151	0	1	158	479	1
8:45	32	0	18	0	50	0	259	21	0	280	0	0	0	0	0	3	142	0	0	145	475	0
Total	108	0	99	0	207	0	1084	93	1	1178	0	0	0	0	0	17	565	0	1	583	1968	2
16:00	44	0	13	0	57	0	180	27	0	207	0	0	0	0	0	8	185	0	1	194	458	1
16:15	29	0	15	0	44	0	157	32	0	189	0	0	0	0	0	6	195	0	1	202	435	1
16:30	47	0	24	0	71	0	172	30	0	202	0	0	0	0	0	4	191	0	1	196	469	1
16:45	37	0	17	0	54	0	185	24	0	209	0	0	0	0	0	7	198	0	0	205	468	0
Total	157	0	69	0	226	0	694	113	0	807	0	0	0	0	0	25	769	0	3	797	1830	3
17:00	43	0	18	0	61	0	152	28	0	180	0	0	0	0	0	7	188	0	0	195	436	0
17:15	26	0	15	0	41	0	150	20	0	170	0	0	0	0	0	11	215	0	1	227	438	1
17:30	47	0	17	0	64	0	155	35	0	190	0	0	0	0	0	7	179	0	0	186	440	0
17:45	33	0	20	0	53	0	172	25	0	197	0	0	0	0	0	8	186	0	0	194	444	0
Total	149	0	70	0	219	0	629	108	0	737	0	0	0	0	0	33	768	0	1	802	1758	1
Grand Total	504	0	308	0	812	0	3130	390	1	3521	0	0	0	0	0	84	2454	0	5	2543	6876	6
Apprch %	62.1%	0.0%	37.9%	0.0%		0.0%	88.9%	11.1%	0.0%		0.0%	0.0%	0.0%	0.0%		3.3%	96.5%	0.0%	0.2%			
Total %	7.3%	0.0%	4.5%	0.0%	11.8%	0.0%	45.5%	5.7%	0.0%	51.2%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	35.7%	0.0%	0.1%	37.0%	100.0%	

AM PEAK HOUR	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	32	0	35	0	67	0	282	22	1	305	0	0	0	0	0	5	115	0	0	120	492
8:15	24	0	21	0	45	0	289	28	0	317	0	0	0	0	0	3	157	0	0	160	522
8:30	20	0	25	0	45	0	254	22	0	276	0	0	0	0	0	6	151	0	1	158	479
8:45	32	0	18	0	50	0	259	21	0	280	0	0	0	0	0	3	142	0	0	145	475
Total Volume	108	0	99	0	207	0	1084	93	1	1178	0	0	0	0	0	17	565	0	1	583	1968
% App Total	52.2%	0.0%	47.8%	0.0%		0.0%	92.0%	7.9%	0.1%		0.0%	0.0%	0.0%	0.0%		2.9%	96.9%	0.0%	0.2%		
PHF	.844	.000	.707	.000	.772	.000	.938	.830	.250	.929	.000	.000	.000	.000	.000	.708	.900	.000	.250	.911	.943

PM PEAK HOUR	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	44	0	13	0	57	0	180	27	0	207	0	0	0	0	0	8	185	0	1	194	458
16:15	29	0	15	0	44	0	157	32	0	189	0	0	0	0	0	6	195	0	1	202	435
16:30	47	0	24	0	71	0	172	30	0	202	0	0	0	0	0	4	191	0	1	196	469
16:45	37	0	17	0	54	0	185	24	0	209	0	0	0	0	0	7	198	0	0	205	468
Total Volume	157	0	69	0	226	0	694	113	0	807	0	0	0	0	0	25	769	0	3	797	1830
% App Total	69.5%	0.0%	30.5%	0.0%		0.0%	86.0%	14.0%	0.0%		0.0%	0.0%	0.0%	0.0%		3.1%	96.5%	0.0%	0.4%		
PHF	.835	.000	.719	.000	.796	.000	.938	.883	.000	.965	.000	.000	.000	.000	.000	.781	.971	.000	.750	.972	.975

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-007 34th Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	2	0	1	30	3	0	2	0	21	2	0	0	0	0	0	0	1	0	13	1	6	64
7:15	0	0	0	45	0	0	1	0	31	1	0	0	0	0	0	0	3	0	35	3	4	111
7:30	1	0	1	28	2	0	1	0	31	1	0	0	0	0	0	0	1	0	18	1	4	77
7:45	0	0	4	25	4	0	1	0	45	1	0	0	0	0	0	0	0	0	35	0	5	105
Total	3	0	6	128	9	0	5	0	128	5	0	0	0	0	0	0	5	0	101	5	19	357
8:00	0	0	1	28	1	0	1	0	32	1	0	0	0	0	0	0	1	0	15	1	3	75
8:15	0	0	1	31	1	0	2	0	42	2	0	0	0	0	0	0	0	0	41	0	3	114
8:30	0	0	2	51	2	0	3	1	34	4	0	0	0	0	0	0	0	0	25	0	6	110
8:45	1	0	0	37	1	0	0	0	29	0	0	0	0	0	0	0	0	0	33	0	1	99
Total	1	0	4	147	5	0	6	1	137	7	0	0	0	0	0	0	1	0	114	1	13	398
16:00	3	0	1	60	4	0	3	1	66	4	0	0	0	0	0	0	2	0	65	2	10	191
16:15	1	0	0	36	1	0	1	1	63	2	0	0	0	0	0	1	1	0	46	2	5	145
16:30	1	0	0	58	1	0	2	2	76	4	0	0	0	0	0	0	2	0	54	2	7	188
16:45	1	0	0	49	1	0	2	2	50	4	0	0	0	0	0	0	3	0	56	3	8	155
Total	6	0	1	203	7	0	8	6	255	14	0	0	0	0	0	1	8	0	221	9	30	679
17:00	0	0	1	61	1	0	3	0	44	3	0	0	0	0	0	0	3	0	45	3	7	150
17:15	2	0	1	39	3	0	2	1	41	3	0	0	0	0	0	3	2	0	40	5	11	120
17:30	0	0	0	54	0	0	1	4	49	5	0	0	0	0	0	3	3	0	37	6	11	140
17:45	0	0	0	62	0	0	3	1	48	4	0	0	0	0	0	0	0	0	29	0	4	139
Total	2	0	2	216	4	0	9	6	182	15	0	0	0	0	0	6	8	0	151	14	33	549
Grand Total	12	0	13	694	25	0	28	13	702	41	0	0	0	0	0	7	22	0	587	29	95	1983
Apprch %	48.0%	0.0%	52.0%			0.0%	68.3%	31.7%			0.0%	0.0%	0.0%			24.1%	75.9%	0.0%				
Total %	12.6%	0.0%	13.7%		26.3%	0.0%	29.5%	13.7%		43.2%	0.0%	0.0%	0.0%		0.0%	7.4%	23.2%	0.0%		30.5%	100.0%	

AM PEAK HOUR	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	0	1	28	1	0	1	0	32	1	0	0	0	0	0	0	1	0	15	1	3
8:15	0	0	1	31	1	0	2	0	42	2	0	0	0	0	0	0	0	0	41	0	3
8:30	0	0	2	51	2	0	3	1	34	4	0	0	0	0	0	0	0	0	25	0	6
8:45	1	0	0	37	1	0	0	0	29	0	0	0	0	0	0	0	0	0	33	0	1
Total Volume	1	0	4	147	5	0	6	1	137	7	0	0	0	0	0	0	1	0	114	1	13
% App Total	20.0%	0.0%	80.0%			0.0%	85.7%	14.3%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.250	.000	.500		.625	.000	.500	.250		.438	.000	.000	.000		.000	.000	.250	.000		.250	.542

PM PEAK HOUR	34th Avenue Southbound					International Boulevard Westbound					34th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	3	0	1	60	4	0	3	1	66	4	0	0	0	0	0	0	2	0	65	2	10
16:15	1	0	0	36	1	0	1	1	63	2	0	0	0	0	0	1	1	0	46	2	5
16:30	1	0	0	58	1	0	2	2	76	4	0	0	0	0	0	0	2	0	54	2	7
16:45	1	0	0	49	1	0	2	2	50	4	0	0	0	0	0	0	3	0	56	3	8
Total Volume	6	0	1	203	7	0	8	6	255	14	0	0	0	0	0	1	8	0	221	9	30
% App Total	85.7%	0.0%	14.3%			0.0%	57.1%	42.9%			0.0%	0.0%	0.0%			11.1%	88.9%	0.0%			
PHF	.500	.000	.250		.438	.000	.667	.750		.875	.000	.000	.000		.000	.250	.667	.000		.750	.750

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-008 35th Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	27	64	19	0	110	10	107	24	1	142	1	23	3	0	27	4	91	8	0	103	382	1
7:15	18	56	18	0	92	13	120	19	0	152	1	34	8	0	43	6	76	11	0	93	380	0
7:30	16	83	47	0	146	17	208	30	0	255	4	35	1	0	40	6	85	16	0	107	548	0
7:45	27	86	32	0	145	9	254	38	0	301	3	42	4	0	49	7	126	7	0	140	635	0
Total	88	289	116	0	493	49	689	111	1	850	9	134	16	0	159	23	378	42	0	443	1945	1
8:00	12	86	42	0	140	10	253	16	0	279	5	46	4	0	55	6	124	11	0	141	615	0
8:15	13	103	45	0	161	10	257	13	0	280	5	52	7	0	64	14	143	16	0	173	678	0
8:30	11	86	40	0	137	12	232	19	0	263	4	49	7	0	60	11	150	16	0	177	637	0
8:45	27	87	40	0	154	15	239	23	0	277	4	37	7	0	48	8	140	27	0	175	654	0
Total	63	362	167	0	592	47	981	71	0	1099	18	184	25	0	227	39	557	70	0	666	2584	0
16:00	21	70	18	0	109	11	183	34	0	228	5	78	8	0	91	14	178	23	2	217	645	2
16:15	12	71	33	0	116	10	144	31	0	185	11	65	9	0	85	9	197	24	2	232	618	2
16:30	7	61	25	0	93	10	168	21	0	199	13	83	8	0	104	14	190	22	0	226	622	0
16:45	13	62	23	0	98	4	170	32	0	206	6	74	8	0	88	14	214	20	2	250	642	2
Total	53	264	99	0	416	35	665	118	0	818	35	300	33	0	368	51	779	89	6	925	2527	6
17:00	14	64	22	0	100	11	146	36	0	193	8	81	5	0	94	14	193	15	1	223	610	1
17:15	15	58	16	0	89	3	154	22	0	179	5	88	10	0	103	11	207	25	0	243	614	0
17:30	20	67	20	0	107	10	164	40	0	214	6	81	7	0	94	11	180	27	0	218	633	0
17:45	20	65	38	0	123	13	153	30	0	196	7	96	1	0	104	6	204	18	1	229	652	1
Total	69	254	96	0	419	37	617	128	0	782	26	346	23	0	395	42	784	85	2	913	2509	2
Grand Total	273	1169	478	0	1920	168	2952	428	1	3549	88	964	97	0	1149	155	2498	286	8	2947	9565	9
Apprch %	14.2%	60.9%	24.9%	0.0%		4.7%	83.2%	12.1%	0.0%		7.7%	83.9%	8.4%	0.0%		5.3%	84.8%	9.7%	0.3%			
Total %	2.9%	12.2%	5.0%	0.0%	20.1%	1.8%	30.9%	4.5%	0.0%	37.1%	0.9%	10.1%	1.0%	0.0%	12.0%	1.6%	26.1%	3.0%	0.1%	30.8%	100.0%	

AM PEAK HOUR	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	12	86	42	0	140	10	253	16	0	279	5	46	4	0	55	6	124	11	0	141	615
8:15	13	103	45	0	161	10	257	13	0	280	5	52	7	0	64	14	143	16	0	173	678
8:30	11	86	40	0	137	12	232	19	0	263	4	49	7	0	60	11	150	16	0	177	637
8:45	27	87	40	0	154	15	239	23	0	277	4	37	7	0	48	8	140	27	0	175	654
Total Volume	63	362	167	0	592	47	981	71	0	1099	18	184	25	0	227	39	557	70	0	666	2584
% App Total	10.6%	61.1%	28.2%	0.0%		4.3%	89.3%	6.5%	0.0%		7.9%	81.1%	11.0%	0.0%		5.9%	83.6%	10.5%	0.0%		
PHF	.583	.879	.928	.000	.919	.783	.954	.772	.000	.981	.900	.885	.893	.000	.887	.696	.928	.648	.000	.941	.953

PM PEAK HOUR	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	21	70	18	0	109	11	183	34	0	228	5	78	8	0	91	14	178	23	2	217	645
16:15	12	71	33	0	116	10	144	31	0	185	11	65	9	0	85	9	197	24	2	232	618
16:30	7	61	25	0	93	10	168	21	0	199	13	83	8	0	104	14	190	22	0	226	622
16:45	13	62	23	0	98	4	170	32	0	206	6	74	8	0	88	14	214	20	2	250	642
Total Volume	53	264	99	0	416	35	665	118	0	818	35	300	33	0	368	51	779	89	6	925	2527
% App Total	12.7%	63.5%	23.8%	0.0%		4.3%	81.3%	14.4%	0.0%		9.5%	81.5%	9.0%	0.0%		5.5%	84.2%	9.6%	0.6%		
PHF	.631	.930	.750	.000	.897	.795	.908	.868	.000	.897	.673	.904	.917	.000	.885	.911	.910	.927	.750	.925	.979

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-008 35th Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	0	1	0	30	1	0	2	0	6	2	0	0	0	7	0	0	1	0	11	1	4	54
7:15	0	1	0	39	1	1	1	0	13	2	0	1	0	14	1	0	3	0	28	3	7	94
7:30	0	0	0	26	0	0	1	0	14	1	0	0	0	8	0	0	1	0	10	1	2	58
7:45	0	0	1	50	1	0	2	0	12	2	0	0	0	12	0	0	1	0	23	1	4	97
Total	0	2	1	145	3	1	6	0	45	7	0	1	0	41	1	0	6	0	72	6	17	303
8:00	0	2	0	45	2	0	2	0	17	2	0	0	0	20	0	0	1	0	21	1	5	103
8:15	0	1	0	51	1	0	2	0	21	2	0	0	0	9	0	0	0	0	27	0	3	108
8:30	0	3	0	55	3	1	3	0	19	4	0	1	0	18	1	0	1	0	37	1	9	129
8:45	0	3	0	53	3	0	0	0	15	0	0	1	0	16	1	0	1	0	28	1	5	112
Total	0	9	0	204	9	1	7	0	72	8	0	2	0	63	2	0	3	0	113	3	22	452
16:00	0	0	1	57	1	0	1	0	30	1	0	1	0	35	1	0	3	0	20	3	6	142
16:15	0	0	0	85	0	1	4	0	18	5	0	4	0	49	4	0	3	0	18	3	12	170
16:30	0	0	0	52	0	0	2	0	26	2	0	1	0	58	1	0	1	0	41	1	4	177
16:45	0	2	0	66	2	1	3	0	25	4	1	0	0	56	1	0	2	0	37	2	9	184
Total	0	2	1	260	3	2	10	0	99	12	1	6	0	198	7	0	9	0	116	9	31	673
17:00	0	1	0	54	1	0	2	0	25	2	0	1	0	50	1	0	5	0	23	5	9	152
17:15	0	1	0	41	1	0	2	0	23	2	0	0	0	39	0	0	5	0	24	5	8	127
17:30	0	1	0	50	1	0	5	0	21	5	0	2	0	41	2	0	2	0	27	2	10	139
17:45	0	0	0	60	0	0	1	0	14	1	0	1	0	14	1	0	1	0	37	1	3	125
Total	0	3	0	205	3	0	10	0	83	10	0	4	0	144	4	0	13	0	111	13	30	543
Grand Total	0	16	2	814	18	4	33	0	299	37	1	13	0	446	14	0	31	0	412	31	100	1971
Apprch %	0.0%	88.9%	11.1%			10.8%	89.2%	0.0%			7.1%	92.9%	0.0%			0.0%	100.0%	0.0%				
Total %	0.0%	16.0%	2.0%		18.0%	4.0%	33.0%	0.0%		37.0%	1.0%	13.0%	0.0%		14.0%	0.0%	31.0%	0.0%		31.0%	100.0%	

AM PEAK HOUR	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	2	0	45	2	0	2	0	17	2	0	0	0	20	0	0	1	0	21	1	5
8:15	0	1	0	51	1	0	2	0	21	2	0	0	0	9	0	0	0	0	27	0	3
8:30	0	3	0	55	3	1	3	0	19	4	0	1	0	18	1	0	1	0	37	1	9
8:45	0	3	0	53	3	0	0	0	15	0	0	1	0	16	1	0	1	0	28	1	5
Total Volume	0	9	0	204	9	1	7	0	72	8	0	2	0	63	2	0	3	0	113	3	22
% App Total	0.0%	100.0%	0.0%			12.5%	87.5%	0.0%			0.0%	100.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.750	.000		.750	.250	.583	.000		.500	.000	.500	.000		.500	.000	.750	.000		.750	.611

PM PEAK HOUR	35th Avenue Southbound					International Boulevard Westbound					35th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	0	0	1	57	1	0	1	0	30	1	0	1	0	35	1	0	3	0	20	3	6
16:15	0	0	0	85	0	1	4	0	18	5	0	4	0	49	4	0	3	0	18	3	12
16:30	0	0	0	52	0	0	2	0	26	2	0	1	0	58	1	0	1	0	41	1	4
16:45	0	2	0	66	2	1	3	0	25	4	1	0	0	56	1	0	2	0	37	2	9
Total Volume	0	2	1	260	3	2	10	0	99	12	1	6	0	198	7	0	9	0	116	9	31
% App Total	0.0%	66.7%	33.3%			16.7%	83.3%	0.0%			14.3%	85.7%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.250	.250		.375	.500	.625	.000		.600	.250	.375	.000		.438	.000	.750	.000		.750	.646

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-009 36th Avenue & International Boulevard
Date : 2/3/2016

Unshifted Count = All Vehicles & Uturns

	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total	Uturns Total
7:00	4	2	5	0	11	10	127	3	0	140	6	0	2	0	8	1	106	4	0	111	270	0
7:15	7	2	7	0	16	12	145	3	0	160	0	1	0	0	1	1	102	4	0	107	284	0
7:30	4	5	9	0	18	9	247	1	0	257	3	1	0	0	4	1	97	7	0	105	384	0
7:45	8	6	9	0	23	14	288	1	0	303	1	0	0	0	1	1	145	6	0	152	479	0
Total	23	15	30	0	68	45	807	8	0	860	10	2	2	0	14	4	450	21	0	475	1417	0
8:00	10	7	15	0	32	14	261	1	0	276	3	5	4	0	12	5	128	5	0	138	458	0
8:15	10	10	13	0	33	19	262	6	0	287	9	2	7	0	18	12	147	9	0	168	506	0
8:30	10	9	7	0	26	17	246	3	0	266	6	4	6	0	16	3	158	7	0	168	476	0
8:45	4	12	11	0	27	14	253	5	0	272	8	3	11	0	22	2	163	6	0	171	492	0
Total	34	38	46	0	118	64	1022	15	0	1101	26	14	28	0	68	22	596	27	0	645	1932	0
16:00	9	5	4	0	18	18	222	10	0	250	9	6	5	0	20	5	202	5	1	213	501	1
16:15	10	2	7	0	19	12	167	6	0	185	4	2	6	0	12	8	192	7	0	207	423	0
16:30	8	4	3	0	15	13	192	11	0	216	7	7	13	0	27	9	199	5	1	214	472	1
16:45	4	1	3	0	8	13	186	6	1	206	9	4	10	0	23	8	215	10	0	233	470	1
Total	31	12	17	0	60	56	767	33	1	857	29	19	34	0	82	30	808	27	2	867	1866	3
17:00	5	2	7	0	14	15	166	8	0	189	15	6	6	0	27	7	196	6	1	210	440	1
17:15	8	5	1	0	14	12	172	9	0	193	6	4	17	0	27	8	215	4	0	227	461	0
17:30	7	5	3	0	15	13	200	4	0	217	12	12	15	0	39	5	202	6	1	214	485	1
17:45	8	4	10	0	22	9	167	4	0	180	15	6	11	0	32	7	207	6	0	220	454	0
Total	28	16	21	0	65	49	705	25	0	779	48	28	49	0	125	27	820	22	2	871	1840	2
Grand Total	116	81	114	0	311	214	3301	81	1	3597	113	63	113	0	289	83	2674	97	4	2858	7055	5
Apprch %	37.3%	26.0%	36.7%	0.0%		5.9%	91.8%	2.3%	0.0%		39.1%	21.8%	39.1%	0.0%		2.9%	93.6%	3.4%	0.1%			
Total %	1.6%	1.1%	1.6%	0.0%	4.4%	3.0%	46.8%	1.1%	0.0%	51.0%	1.6%	0.9%	1.6%	0.0%	4.1%	1.2%	37.9%	1.4%	0.1%	40.5%	100.0%	

AM PEAK HOUR	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	10	7	15	0	32	14	261	1	0	276	3	5	4	0	12	5	128	5	0	138	458
8:15	10	10	13	0	33	19	262	6	0	287	9	2	7	0	18	12	147	9	0	168	506
8:30	10	9	7	0	26	17	246	3	0	266	6	4	6	0	16	3	158	7	0	168	476
8:45	4	12	11	0	27	14	253	5	0	272	8	3	11	0	22	2	163	6	0	171	492
Total Volume	34	38	46	0	118	64	1022	15	0	1101	26	14	28	0	68	22	596	27	0	645	1932
% App Total	28.8%	32.2%	39.0%	0.0%		5.8%	92.8%	1.4%	0.0%		38.2%	20.6%	41.2%	0.0%		3.4%	92.4%	4.2%	0.0%		
PHF	.850	.792	.767	.000	.894	.842	.975	.625	.000	.959	.722	.700	.636	.000	.773	.458	.914	.750	.000	.943	.955

PM PEAK HOUR	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	9	5	4	0	18	18	222	10	0	250	9	6	5	0	20	5	202	5	1	213	501
16:15	10	2	7	0	19	12	167	6	0	185	4	2	6	0	12	8	192	7	0	207	423
16:30	8	4	3	0	15	13	192	11	0	216	7	7	13	0	27	9	199	5	1	214	472
16:45	4	1	3	0	8	13	186	6	1	206	9	4	10	0	23	8	215	10	0	233	470
Total Volume	31	12	17	0	60	56	767	33	1	857	29	19	34	0	82	30	808	27	2	867	1866
% App Total	51.7%	20.0%	28.3%	0.0%		6.5%	89.5%	3.9%	0.1%		35.4%	23.2%	41.5%	0.0%		3.5%	93.2%	3.1%	0.2%		
PHF	.775	.600	.607	.000	.789	.778	.864	.750	.250	.857	.806	.679	.654	.000	.759	.833	.940	.675	.500	.930	.931

ALL TRAFFIC DATA

City of Oakland
All Vehicles & Uturns On Unshifted
Bikes & Peds On Bank 1
Nothing On Bank 2

(916) 771-8700
orders@atdtraffic.com

File Name : 16-7081-009 36th Avenue & International Boulevard
Date : 2/3/2016

Bank 1 Count = Bikes & Peds

	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound						
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total	Peds Total
7:00	1	0	1	23	2	0	2	0	7	2	0	0	0	9	0	0	0	0	6	0	4	45
7:15	0	0	0	33	0	0	2	0	3	2	1	1	0	6	2	0	4	0	2	4	8	44
7:30	0	0	0	27	0	0	1	0	10	1	0	0	0	7	0	0	2	0	2	2	3	46
7:45	0	0	0	29	0	0	3	0	4	3	0	0	0	17	0	0	1	0	4	1	4	54
Total	1	0	1	112	2	0	8	0	24	8	1	1	0	39	2	0	7	0	14	7	19	189
8:00	0	0	0	21	0	0	2	0	8	2	0	0	0	9	0	0	1	0	3	1	3	41
8:15	0	0	0	19	0	0	1	0	3	1	0	0	0	11	0	0	0	0	6	0	1	39
8:30	0	0	1	28	1	0	3	0	6	3	0	0	0	19	0	0	1	0	6	1	5	59
8:45	0	0	0	17	0	0	0	0	5	0	0	0	0	12	0	0	1	0	4	1	1	38
Total	0	0	1	85	1	0	6	0	22	6	0	0	0	51	0	0	3	0	19	3	10	177
16:00	0	0	0	39	0	0	0	0	8	0	0	0	0	38	0	0	3	0	7	3	3	92
16:15	0	0	0	35	0	0	5	0	16	5	0	1	0	50	1	0	3	0	8	3	9	109
16:30	0	0	0	30	0	0	2	0	17	2	0	0	0	37	0	1	0	0	8	1	3	92
16:45	0	0	0	32	0	0	5	0	11	5	0	0	0	49	0	0	2	0	8	2	7	100
Total	0	0	0	136	0	0	12	0	52	12	0	1	0	174	1	1	8	0	31	9	22	393
17:00	0	0	0	38	0	0	1	0	17	1	0	0	0	40	0	0	6	0	13	6	7	108
17:15	0	0	0	36	0	0	2	1	13	3	0	0	1	42	1	0	4	1	11	5	9	102
17:30	1	0	0	35	1	0	6	1	5	7	0	0	0	43	0	0	1	1	14	2	10	97
17:45	0	0	0	13	0	0	0	0	11	0	0	0	0	25	0	0	1	0	12	1	1	61
Total	1	0	0	122	1	0	9	2	46	11	0	0	1	150	1	0	12	2	50	14	27	368
Grand Total	2	0	2	455	4	0	35	2	144	37	1	2	1	414	4	1	30	2	114	33	78	1127
Apprch %	50.0%	0.0%	50.0%			0.0%	94.6%	5.4%			25.0%	50.0%	25.0%			3.0%	90.9%	6.1%				
Total %	2.6%	0.0%	2.6%		5.1%	0.0%	44.9%	2.6%		47.4%	1.3%	2.6%	1.3%		5.1%	1.3%	38.5%	2.6%		42.3%	100.0%	

AM PEAK HOUR	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 08:00 to 09:00																					
Peak Hour For Entire Intersection Begins at 08:00																					
8:00	0	0	0	21	0	0	2	0	8	2	0	0	0	9	0	0	1	0	3	1	3
8:15	0	0	0	19	0	0	1	0	3	1	0	0	0	11	0	0	0	0	6	0	1
8:30	0	0	1	28	1	0	3	0	6	3	0	0	0	19	0	0	1	0	6	1	5
8:45	0	0	0	17	0	0	0	0	5	0	0	0	0	12	0	0	1	0	4	1	1
Total Volume	0	0	1	85	1	0	6	0	22	6	0	0	0	51	0	0	3	0	19	3	10
% App Total	0.0%	0.0%	100.0%			0.0%	100.0%	0.0%			0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			
PHF	.000	.000	.250		.250	.000	.500	.000		.500	.000	.000	.000		.000	.000	.750	.000		.750	.500

PM PEAK HOUR	36th Avenue Southbound					International Boulevard Westbound					36th Avenue Northbound					International Boulevard Eastbound					
START TIME	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	LEFT	THRU	RIGHT	PEDS	APP.TOTAL	Total
Peak Hour Analysis From 16:00 to 17:00																					
Peak Hour For Entire Intersection Begins at 16:00																					
16:00	0	0	0	39	0	0	0	0	8	0	0	0	0	38	0	0	3	0	7	3	3
16:15	0	0	0	35	0	0	5	0	16	5	0	1	0	50	1	0	3	0	8	3	9
16:30	0	0	0	30	0	0	2	0	17	2	0	0	0	37	0	1	0	0	8	1	3
16:45	0	0	0	32	0	0	5	0	11	5	0	0	0	49	0	0	2	0	8	2	7
Total Volume	0	0	0	136	0	0	12	0	52	12	0	1	0	174	1	1	8	0	31	9	22
% App Total	0.0%	0.0%	0.0%			0.0%	100.0%	0.0%			0.0%	100.0%	0.0%			11.1%	88.9%	0.0%			
PHF	.000	.000	.000		.000	.000	.600	.000		.600	.000	.250	.000		.250	.250	.667	.000		.750	.611

Appendix B LEVEL OF SERVICE WORKSHEETS: EXISTING CONDITIONS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	12	67	8	1	3
Future Volume (Veh/h)	5	12	67	8	1	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	12	67	8	1	3
Pedestrians	15			6	8	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				509		
pX, platoon unblocked						
vC, conflicting volume	168	24	19			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168	24	19			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	96			
cM capacity (veh/h)	771	1032	1575			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	17	75	4
Volume Left	5	67	0
Volume Right	12	0	3
cSH	939	1575	1700
Volume to Capacity	0.02	0.04	0.00
Queue Length 95th (ft)	1	3	0
Control Delay (s)	8.9	6.6	0.0
Lane LOS	A	A	
Approach Delay (s)	8.9	6.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	6.8		
Intersection Capacity Utilization	22.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	470	20	6	445	39	8	4	7	52	3	20
Future Volume (vph)	8	470	20	6	445	39	8	4	7	52	3	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.96			0.96			0.97	
Flpb, ped/bikes		1.00			1.00			0.97			0.94	
Frt		0.99			0.99			0.95			0.96	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3438			1766			1619			1583	
Flt Permitted		0.95			1.00			0.89			0.78	
Satd. Flow (perm)		3264			1758			1469			1280	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	470	20	6	445	39	8	4	7	52	3	20
RTOR Reduction (vph)	0	2	0	0	2	0	0	6	0	0	16	0
Lane Group Flow (vph)	0	496	0	0	488	0	0	13	0	0	59	0
Confl. Peds. (#/hr)	128		122	122		128	25		41	41		25
Confl. Bikes (#/hr)			2			25						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		75.9			75.9			10.6			10.6	
Effective Green, g (s)		75.9			75.9			10.6			10.6	
Actuated g/C Ratio		0.80			0.80			0.11			0.11	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2607			1404			163			142	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.28			0.01			c0.05	
v/c Ratio		0.19			0.35			0.08			0.42	
Uniform Delay, d1		2.3			2.7			37.8			39.3	
Progression Factor		0.65			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.7			0.2			1.4	
Delay (s)		1.6			3.3			38.0			40.7	
Level of Service		A			A			D			D	
Approach Delay (s)		1.6			3.3			38.0			40.7	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	5.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	331	43	72	319	63	128	860	116	61	433	30
Future Volume (vph)	31	331	43	72	319	63	128	860	116	61	433	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.99		1.00	0.97		1.00	0.99	
Flpb, ped/bikes		1.00			0.99		0.94	1.00		0.96	1.00	
Frt		0.98			0.98		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3417			1772		1657	3371		1701	3473	
Flt Permitted		0.90			0.87		0.46	1.00		0.22	1.00	
Satd. Flow (perm)		3071			1552		811	3371		400	3473	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	31	331	43	72	319	63	128	860	116	61	433	30
RTOR Reduction (vph)	0	12	0	0	8	0	0	9	0	0	4	0
Lane Group Flow (vph)	0	393	0	0	446	0	128	967	0	61	459	0
Confl. Peds. (#/hr)	65		91	91		65	77		138	138		77
Confl. Bikes (#/hr)			2			16			5			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)		34.0			34.0		51.5	51.5		52.0	52.0	
Effective Green, g (s)		34.0			34.0		51.5	51.5		52.0	52.0	
Actuated g/C Ratio		0.36			0.36		0.54	0.54		0.55	0.55	
Clearance Time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		1099			555		439	1827		218	1901	
v/s Ratio Prot								c0.29			0.13	
v/s Ratio Perm		0.13			c0.29		0.16			0.15		
v/c Ratio		0.36			0.80		0.29	0.53		0.28	0.24	
Uniform Delay, d1		22.5			27.5		11.8	14.0		11.5	11.2	
Progression Factor		1.00			0.89		0.58	0.60		1.70	1.68	
Incremental Delay, d2		0.1			7.5		1.5	1.0		3.1	0.3	
Delay (s)		22.5			32.1		8.4	9.3		22.6	19.1	
Level of Service		C			C		A	A		C	B	
Approach Delay (s)		22.5			32.1			9.2			19.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	477	342	111	50	329	97	47	294	27	86	197	303
Future Volume (vph)	477	342	111	50	329	97	47	294	27	86	197	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.99			0.95		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	0.98			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3166			3239		1770	3482		1770	1863	2681
Flt Permitted	0.95	0.63			0.81		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2035			2653		1770	3482		1770	1863	2681
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	477	342	111	50	329	97	47	294	27	86	197	303
RTOR Reduction (vph)	0	12	0	0	14	0	0	6	0	0	0	147
Lane Group Flow (vph)	310	608	0	0	462	0	47	315	0	86	197	156
Confl. Peds. (#/hr)	182		16	16		182	25		14	14		25
Confl. Bikes (#/hr)			4			13			7			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	29.6	86.0			52.4		7.4	21.3		9.7	23.6	53.2
Effective Green, g (s)	29.6	86.0			52.4		7.4	21.3		9.7	23.6	53.2
Actuated g/C Ratio	0.23	0.66			0.40		0.06	0.16		0.07	0.18	0.41
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	366	1603			1069		100	570		132	338	1097
v/s Ratio Prot	c0.19	0.09					0.03	c0.09		0.05	c0.11	0.03
v/s Ratio Perm		0.16			c0.17							0.03
v/c Ratio	0.85	0.38			0.43		0.47	0.55		0.65	0.58	0.14
Uniform Delay, d1	48.0	9.9			28.0		59.4	50.0		58.5	48.7	24.1
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.8	0.1			1.3		1.3	1.2		11.0	2.6	0.0
Delay (s)	63.8	10.0			29.3		60.7	51.1		69.5	51.2	24.1
Level of Service	E	A			C		E	D		E	D	C
Approach Delay (s)		27.9			29.3			52.4			39.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	70	82	40	122	19	135	698	37	11	456	86
Future Volume (vph)	62	70	82	40	122	19	135	698	37	11	456	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94			0.99		1.00	0.98		1.00	0.96	
Flpb, ped/bikes	0.92	1.00			0.98		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1602			1758		1770	3457		1770	3304	
Flt Permitted	0.55	1.00			0.91		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	943	1602			1610		1770	3457		1770	3304	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	70	82	40	122	19	135	698	37	11	456	86
RTOR Reduction (vph)	0	45	0	0	5	0	0	3	0	0	16	0
Lane Group Flow (vph)	62	107	0	0	176	0	135	732	0	11	526	0
Confl. Peds. (#/hr)	98		88	88		98	87		101	101		87
Confl. Bikes (#/hr)			1						4			4
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	23.0	23.0			23.0		11.5	58.2		1.3	48.0	
Effective Green, g (s)	23.0	23.0			23.0		11.5	58.2		1.3	48.0	
Actuated g/C Ratio	0.24	0.24			0.24		0.12	0.61		0.01	0.51	
Clearance Time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	228	387			389		214	2117		24	1669	
v/s Ratio Prot		0.07					c0.08	c0.21		0.01	0.16	
v/s Ratio Perm	0.07				c0.11							
v/c Ratio	0.27	0.28			0.45		0.63	0.35		0.46	0.32	
Uniform Delay, d1	29.2	29.2			30.7		39.7	9.0		46.5	13.8	
Progression Factor	1.00	1.00			1.00		1.40	0.34		1.00	1.00	
Incremental Delay, d2	0.2	0.1			0.3		3.9	0.4		5.0	0.5	
Delay (s)	29.4	29.4			31.0		59.4	3.5		51.5	14.3	
Level of Service	C	C			C		E	A		D	B	
Approach Delay (s)		29.4			31.0			12.2			15.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	16	10	3	48	42	868	11	24	578	10
Future Volume (Veh/h)	4	1	16	10	3	48	42	868	11	24	578	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	1	16	10	3	48	42	868	11	24	578	10
Pedestrians		64			134			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		6			13			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.86	0.86	0.95	0.86	0.86	0.84	0.95			0.84		
vC, conflicting volume	1262	1792	366	1453	1792	574	652			1013		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	711	1325	220	932	1325	98	522			623		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	92	97	93	95			97		
cM capacity (veh/h)	191	101	692	130	101	685	926			696		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	21	61	476	445	313	299
Volume Left	4	10	42	0	24	0
Volume Right	16	48	0	11	0	10
cSH	389	345	926	1700	696	1700
Volume to Capacity	0.05	0.18	0.05	0.26	0.03	0.18
Queue Length 95th (ft)	4	16	4	0	3	0
Control Delay (s)	14.8	17.7	1.3	0.0	1.2	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	14.8	17.7	0.7		0.6	
Approach LOS	B	C				

Intersection Summary				
Average Delay	1.5			
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	108	99	1084	93	18	565
Future Volume (vph)	108	99	1084	93	18	565
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.92		0.99			1.00
Flpb, ped/bikes	0.90		1.00			1.00
Frt	0.94		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1411		3462			3527
Flt Permitted	0.97		1.00			0.90
Satd. Flow (perm)	1411		3462			3189
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	99	1084	93	18	565
RTOR Reduction (vph)	37	0	6	0	0	0
Lane Group Flow (vph)	170	0	1171	0	0	583
Confl. Peds. (#/hr)	137	114		147	147	
Confl. Bikes (#/hr)		4		7		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.5		65.5			65.5
Effective Green, g (s)	21.5		65.5			65.5
Actuated g/C Ratio	0.23		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	319		2386			2198
v/s Ratio Prot			c0.34			
v/s Ratio Perm	c0.12					0.18
v/c Ratio	0.53		0.49			0.27
Uniform Delay, d1	32.3		6.9			5.6
Progression Factor	1.00		0.42			0.91
Incremental Delay, d2	0.9		0.7			0.3
Delay (s)	33.2		3.6			5.4
Level of Service	C		A			A
Approach Delay (s)	33.2		3.6			5.4
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	184	25	63	362	167	47	981	71	39	557	70
Future Volume (vph)	18	184	25	63	362	167	47	981	71	39	557	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.84	1.00	0.98			0.99	
Flpb, ped/bikes		0.99			0.99	1.00	0.96	1.00			1.00	
Frt		0.98			1.00	0.85	1.00	0.99			0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		3410			3479	1337	1701	3429			3420	
Flt Permitted		0.90			0.86	1.00	0.38	1.00			0.84	
Satd. Flow (perm)		3090			3010	1337	685	3429			2869	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	184	25	63	362	167	47	981	71	39	557	70
RTOR Reduction (vph)	0	12	0	0	0	26	0	4	0	0	7	0
Lane Group Flow (vph)	0	215	0	0	425	141	47	1048	0	0	659	0
Confl. Peds. (#/hr)	113		72	72		113	63		204	204		63
Confl. Bikes (#/hr)			2			9			7			3
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.7			23.7	23.7	60.3	60.3			60.3	
Effective Green, g (s)		23.7			23.7	23.7	60.3	60.3			60.3	
Actuated g/C Ratio		0.25			0.25	0.25	0.63	0.63			0.63	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)		770			750	333	434	2176			1821	
v/s Ratio Prot								c0.31				
v/s Ratio Perm		0.07			c0.14	0.11	0.07				0.23	
v/c Ratio		0.28			0.57	0.42	0.11	0.48			0.36	
Uniform Delay, d1		28.8			31.2	29.9	6.8	9.1			8.2	
Progression Factor		1.00			1.00	1.00	0.48	1.02			0.94	
Incremental Delay, d2		0.1			0.6	0.3	0.4	0.7			0.5	
Delay (s)		28.8			31.7	30.2	3.7	10.0			8.2	
Level of Service		C			C	C	A	B			A	
Approach Delay (s)		28.8			31.3			9.7			8.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	14	28	34	38	46	64	1022	15	22	596	27
Future Volume (vph)	26	14	28	34	38	46	64	1022	15	22	596	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.97		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1700			1683		1770	3515		1770	3485	
Flt Permitted		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1700			1683		1770	3515		1770	3485	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	14	28	34	38	46	64	1022	15	22	596	27
RTOR Reduction (vph)	0	23	0	0	109	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	9	0	64	1036	0	22	623	0
Confl. Peds. (#/hr)	19		22	22		19	51		85	85		51
Confl. Bikes (#/hr)						1			6			3
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		16.4			7.6		7.7	52.8		3.2	48.3	
Effective Green, g (s)		16.4			7.6		7.7	52.8		3.2	48.3	
Actuated g/C Ratio		0.17			0.08		0.08	0.56		0.03	0.51	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		293			134		143	1953		59	1771	
v/s Ratio Prot		c0.03			c0.01		c0.04	c0.29		0.01	0.18	
v/s Ratio Perm												
v/c Ratio		0.15			0.07		0.45	0.53		0.37	0.35	
Uniform Delay, d1		33.4			40.4		41.6	13.3		44.9	14.0	
Progression Factor		1.00			1.00		1.00	1.00		1.05	0.87	
Incremental Delay, d2		0.2			0.2		2.2	1.0		3.7	0.5	
Delay (s)		33.6			40.7		43.8	14.3		50.7	12.6	
Level of Service		C			D		D	B		D	B	
Approach Delay (s)		33.6			40.7			16.0			13.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Turn Type	Prot
Protected Phases	7
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	0.0
Approach LOS	A

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	22	73	13	12	7
Future Volume (Veh/h)	3	22	73	13	12	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	22	73	13	12	7
Pedestrians	2			3	10	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				509		
pX, platoon unblocked						
vC, conflicting volume	186	20	21			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	186	20	21			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	95			
cM capacity (veh/h)	757	1052	1592			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	25	86	19
Volume Left	3	73	0
Volume Right	22	0	7
cSH	1005	1592	1700
Volume to Capacity	0.02	0.05	0.01
Queue Length 95th (ft)	2	4	0
Control Delay (s)	8.7	6.3	0.0
Lane LOS	A	A	
Approach Delay (s)	8.7	6.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	22.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	653	12	10	382	38	7	3	20	93	4	27
Future Volume (vph)	24	653	12	10	382	38	7	3	20	93	4	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.95			0.90			0.94	
Flpb, ped/bikes		0.99			1.00			0.96			0.90	
Frt		1.00			0.99			0.91			0.97	
Flt Protected		1.00			1.00			0.99			0.96	
Satd. Flow (prot)		3459			1742			1462			1487	
Flt Permitted		0.93			0.98			0.94			0.76	
Satd. Flow (perm)		3232			1717			1389			1173	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	653	12	10	382	38	7	3	20	93	4	27
RTOR Reduction (vph)	0	1	0	0	3	0	0	17	0	0	12	0
Lane Group Flow (vph)	0	688	0	0	427	0	0	13	0	0	112	0
Confl. Peds. (#/hr)	181		158	158		181	65		61	61		65
Confl. Bikes (#/hr)			22			15						2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		71.1			71.1			15.4			15.4	
Effective Green, g (s)		71.1			71.1			15.4			15.4	
Actuated g/C Ratio		0.75			0.75			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2418			1285			225			190	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.25			0.01			c0.10	
v/c Ratio		0.28			0.33			0.06			0.59	
Uniform Delay, d1		3.8			4.0			33.7			36.9	
Progression Factor		1.12			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.7			0.1			4.1	
Delay (s)		4.5			4.7			33.7			41.0	
Level of Service		A			A			C			D	
Approach Delay (s)		4.5			4.7			33.7			41.0	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	460	111	32	286	70	83	500	138	123	603	82
Future Volume (vph)	9	460	111	32	286	70	83	500	138	123	603	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.96			0.97		1.00	0.94		1.00	0.97	
Flpb, ped/bikes		1.00			0.99		0.91	1.00		0.91	1.00	
Frt		0.97			0.98		1.00	0.97		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3298			1745		1618	3227		1605	3363	
Flt Permitted		0.95			0.92		0.35	1.00		0.38	1.00	
Satd. Flow (perm)		3129			1614		602	3227		641	3363	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	460	111	32	286	70	83	500	138	123	603	82
RTOR Reduction (vph)	0	29	0	0	12	0	0	18	0	0	7	0
Lane Group Flow (vph)	0	551	0	0	376	0	83	620	0	123	678	0
Confl. Peds. (#/hr)	126		153	153		126	157		145	145		157
Confl. Bikes (#/hr)			13			8			9			7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)		30.2			30.2		55.3	55.3		55.8	55.8	
Effective Green, g (s)		30.2			30.2		55.3	55.3		55.8	55.8	
Actuated g/C Ratio		0.32			0.32		0.58	0.58		0.59	0.59	
Clearance Time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		994			513		350	1878		376	1975	
v/s Ratio Prot								0.19			c0.20	
v/s Ratio Perm		0.18			c0.23		0.14			0.19		
v/c Ratio		0.55			0.73		0.24	0.33		0.33	0.34	
Uniform Delay, d1		26.8			28.8		9.6	10.3		10.0	10.1	
Progression Factor		1.00			1.09		1.49	1.54		1.45	1.42	
Incremental Delay, d2		0.4			4.4		1.5	0.4		2.2	0.5	
Delay (s)		27.2			35.7		15.8	16.3		16.8	14.8	
Level of Service		C			D		B	B		B	B	
Approach Delay (s)		27.2			35.7			16.2			15.1	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	21.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	413	94	62	316	48	60	156	69	107	192	460
Future Volume (vph)	284	413	94	62	316	48	60	156	69	107	192	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.98			0.99		1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97			0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3203			3381		1770	3304		1770	1863	2695
Flt Permitted	0.95	0.93			0.79		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2970			2685		1770	3304		1770	1863	2695
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	284	413	94	62	316	48	60	156	69	107	192	460
RTOR Reduction (vph)	0	12	0	0	6	0	0	42	0	0	0	213
Lane Group Flow (vph)	256	523	0	0	420	0	60	183	0	107	192	247
Confl. Peds. (#/hr)	83		41	41		83	19		33	33		19
Confl. Bikes (#/hr)			17			7			2			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	25.3	85.2			55.9		10.3	18.7		13.1	21.5	46.8
Effective Green, g (s)	25.3	85.2			55.9		10.3	18.7		13.1	21.5	46.8
Actuated g/C Ratio	0.19	0.66			0.43		0.08	0.14		0.10	0.17	0.36
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	313	1991			1154		140	475		178	308	970
v/s Ratio Prot	c0.16	0.05					0.03	c0.06		0.06	c0.10	0.05
v/s Ratio Perm		0.12			c0.16							0.04
v/c Ratio	0.82	0.26			0.36		0.43	0.39		0.60	0.62	0.25
Uniform Delay, d1	50.1	9.3			25.0		57.0	50.4		55.9	50.5	29.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.4	0.0			0.9		0.8	0.5		5.6	3.9	0.1
Delay (s)	64.6	9.4			25.9		57.8	51.0		61.6	54.4	29.4
Level of Service	E	A			C		E	D		E	D	C
Approach Delay (s)		27.2			25.9			52.4			40.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	103	105	20	56	21	62	482	29	15	725	65
Future Volume (vph)	168	103	105	20	56	21	62	482	29	15	725	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.97	1.00			0.99		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1720	1660			1757		1770	3457		1770	3466	
Flt Permitted	0.69	1.00			0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1244	1660			1627		1770	3457		1770	3466	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	168	103	105	20	56	21	62	482	29	15	725	65
RTOR Reduction (vph)	0	44	0	0	12	0	0	3	0	0	5	0
Lane Group Flow (vph)	168	164	0	0	85	0	62	508	0	15	785	0
Confl. Peds. (#/hr)	28		49	49		28	27		82	82		27
Confl. Bikes (#/hr)									8			8
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	20.7	20.7			20.7		6.8	59.2		2.6	55.0	
Effective Green, g (s)	20.7	20.7			20.7		6.8	59.2		2.6	55.0	
Actuated g/C Ratio	0.22	0.22			0.22		0.07	0.62		0.03	0.58	
Clearance Time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	271	361			354		126	2154		48	2006	
v/s Ratio Prot		0.10					c0.04	0.15		0.01	c0.23	
v/s Ratio Perm	c0.13				0.05							
v/c Ratio	0.62	0.45			0.24		0.49	0.24		0.31	0.39	
Uniform Delay, d1	33.6	32.3			30.7		42.4	7.9		45.3	10.9	
Progression Factor	1.00	1.00			1.00		1.05	0.69		1.00	1.00	
Incremental Delay, d2	3.0	0.3			0.1		1.1	0.2		1.4	0.6	
Delay (s)	36.6	32.6			30.8		45.4	5.7		46.7	11.5	
Level of Service	D	C			C		D	A		D	B	
Approach Delay (s)		34.4			30.8			10.0			12.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	45	23	3	70	16	507	9	30	852	20
Future Volume (Veh/h)	9	1	45	23	3	70	16	507	9	30	852	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	1	45	23	3	70	16	507	9	30	852	20
Pedestrians		96			123			22				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		9			12			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.91	0.91	0.89	0.91	0.91	0.96	0.89			0.96		
vC, conflicting volume	1375	1689	554	1220	1694	381	968			639		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1032	1376	265	863	1382	277	728			545		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	92	84	97	89	98			97		
cM capacity (veh/h)	109	99	584	146	99	612	708			866		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	55	96	270	262	456	446
Volume Left	9	23	16	0	30	0
Volume Right	45	70	0	9	0	20
cSH	324	318	708	1700	866	1700
Volume to Capacity	0.17	0.30	0.02	0.15	0.03	0.26
Queue Length 95th (ft)	15	31	2	0	3	0
Control Delay (s)	18.4	21.2	0.9	0.0	1.0	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.4	21.2	0.4		0.5	
Approach LOS	C	C				

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	59.7%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	157	69	694	113	28	769
Future Volume (vph)	157	69	694	113	28	769
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.91		0.98			1.00
Flpb, ped/bikes	0.79		1.00			0.99
Frt	0.96		0.98			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1227		3380			3515
Flt Permitted	0.97		1.00			0.91
Satd. Flow (perm)	1227		3380			3193
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	157	69	694	113	28	769
RTOR Reduction (vph)	17	0	12	0	0	0
Lane Group Flow (vph)	209	0	795	0	0	797
Confl. Peds. (#/hr)	255	221		203	203	
Confl. Bikes (#/hr)		7		14		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	23.2		63.8			63.8
Effective Green, g (s)	23.2		63.8			63.8
Actuated g/C Ratio	0.24		0.67			0.67
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	299		2269			2144
v/s Ratio Prot			0.24			
v/s Ratio Perm	c0.17					c0.25
v/c Ratio	0.70		0.35			0.37
Uniform Delay, d1	32.7		6.7			6.8
Progression Factor	1.00		2.18			1.32
Incremental Delay, d2	5.6		0.4			0.5
Delay (s)	38.3		15.0			9.5
Level of Service	D		B			A
Approach Delay (s)	38.3		15.0			9.5
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	300	33	53	264	99	35	665	118	57	779	89
Future Volume (vph)	35	300	33	53	264	99	35	665	118	57	779	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.85	1.00	0.95			0.97	
Flpb, ped/bikes		0.99			0.99	1.00	0.93	1.00			0.99	
Frt		0.99			1.00	0.85	1.00	0.98			0.99	
Flt Protected		1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		3404			3470	1338	1649	3285			3352	
Flt Permitted		0.89			0.80	1.00	0.28	1.00			0.85	
Satd. Flow (perm)		3041			2814	1338	477	3285			2842	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	35	300	33	53	264	99	35	665	118	57	779	89
RTOR Reduction (vph)	0	9	0	0	0	40	0	11	0	0	6	0
Lane Group Flow (vph)	0	359	0	0	317	59	35	772	0	0	919	0
Confl. Peds. (#/hr)	116		99	99		116	198		260	260		198
Confl. Bikes (#/hr)			7			3			10			9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.1			23.1	23.1	60.9	60.9			60.9	
Effective Green, g (s)		23.1			23.1	23.1	60.9	60.9			60.9	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64			0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)		739			684	325	305	2105			1821	
v/s Ratio Prot								0.23				
v/s Ratio Perm		c0.12			0.11	0.04	0.07				c0.32	
v/c Ratio		0.49			0.46	0.18	0.11	0.37			0.50	
Uniform Delay, d1		30.9			30.7	28.5	6.6	8.0			9.0	
Progression Factor		1.00			1.00	1.00	0.08	0.26			1.22	
Incremental Delay, d2		0.2			0.2	0.1	0.7	0.5			0.9	
Delay (s)		31.0			30.8	28.6	1.2	2.6			12.0	
Level of Service		C			C	C	A	A			B	
Approach Delay (s)		31.0			30.3			2.5			12.0	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	19	34	31	12	17	57	767	33	32	808	27
Future Volume (vph)	29	19	34	31	12	17	57	767	33	32	808	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			0.95		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1677			1664		1770	3443		1770	3461	
Flt Permitted		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1677			1664		1770	3443		1770	3461	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	19	34	31	12	17	57	767	33	32	808	27
RTOR Reduction (vph)	0	27	0	0	56	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	55	0	0	4	0	57	798	0	32	835	0
Confl. Peds. (#/hr)	31		52	52		31	174		136	136		174
Confl. Bikes (#/hr)			1						12			8
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		20.0			5.6		7.4	49.5		4.9	47.0	
Effective Green, g (s)		20.0			5.6		7.4	49.5		4.9	47.0	
Actuated g/C Ratio		0.21			0.06		0.08	0.52		0.05	0.49	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		353			98		137	1793		91	1712	
v/s Ratio Prot		c0.03			c0.00		c0.03	0.23		0.02	c0.24	
v/s Ratio Perm												
v/c Ratio		0.16			0.04		0.42	0.44		0.35	0.49	
Uniform Delay, d1		30.6			42.2		41.7	14.2		43.5	16.0	
Progression Factor		1.00			1.00		1.00	1.00		1.21	0.99	
Incremental Delay, d2		0.2			0.2		2.0	0.8		2.1	0.9	
Delay (s)		30.8			42.3		43.8	15.0		54.6	16.7	
Level of Service		C			D		D	B		D	B	
Approach Delay (s)		30.8			42.3			16.9			18.1	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Turn Type	Prot
Protected Phases	7
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	0.0
Approach LOS	A

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1	45	23	3	70	16	507	9	30	852	20
Future Volume (vph)	9	1	45	23	3	70	16	507	9	30	852	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			5.0			5.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.96			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			0.99			1.00			0.99	
Frt		0.89			0.90			1.00			1.00	
Flt Protected		0.99			0.99			1.00			1.00	
Satd. Flow (prot)		1582			1647			3497			3482	
Flt Permitted		0.89			0.94			0.92			0.92	
Satd. Flow (perm)		1414			1560			3226			3225	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	9	1	45	23	3	70	16	507	9	30	852	20
RTOR Reduction (vph)	0	42	0	0	65	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	13	0	0	31	0	0	531	0	0	901	0
Confl. Peds. (#/hr)			22	22			96		123	123		96
Confl. Bikes (#/hr)									7			12
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			6			2	
Permitted Phases	8			4			6			2		
Actuated Green, G (s)		6.7			6.7			78.8			78.8	
Effective Green, g (s)		6.7			6.7			78.8			78.8	
Actuated g/C Ratio		0.07			0.07			0.83			0.83	
Clearance Time (s)		4.5			4.5			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		99			110			2675			2675	
v/s Ratio Prot												
v/s Ratio Perm		0.01			c0.02			0.16			c0.28	
v/c Ratio		0.13			0.28			0.20			0.34	
Uniform Delay, d1		41.4			41.9			1.7			1.9	
Progression Factor		1.00			0.84			1.26			0.45	
Incremental Delay, d2		0.6			1.4			0.0			0.3	
Delay (s)		42.0			36.6			2.1			1.2	
Level of Service		D			D			A			A	
Approach Delay (s)		42.0			36.6			2.1			1.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM 2000 Control Delay	5.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Appendix C LEVEL OF SERVICE WORKSHEETS: EXISTING PLUS PROJECT CONDITIONS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	5	12	119	8	109	38
Future Volume (vph)	5	12	119	8	109	38
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	12	119	8	109	38

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	17	127	147
Volume Left (vph)	5	119	0
Volume Right (vph)	12	0	38
Hadj (s)	-0.33	0.22	-0.12
Departure Headway (s)	4.2	4.3	3.9
Degree Utilization, x	0.02	0.15	0.16
Capacity (veh/h)	810	821	901
Control Delay (s)	7.2	8.1	7.7
Approach Delay (s)	7.2	8.1	7.7
Approach LOS	A	A	A

Intersection Summary			
Delay	7.8		
Level of Service	A		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	470	20	6	461	75	8	4	7	95	3	85
Future Volume (vph)	24	470	20	6	461	75	8	4	7	95	3	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.93			0.96			0.95	
Flpb, ped/bikes		0.99			1.00			0.98			0.95	
Frt		0.99			0.98			0.95			0.94	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3418			1700			1638			1542	
Flt Permitted		0.92			1.00			0.91			0.83	
Satd. Flow (perm)		3151			1693			1518			1308	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	470	20	6	461	75	8	4	7	95	3	85
RTOR Reduction (vph)	0	2	0	0	5	0	0	6	0	0	36	0
Lane Group Flow (vph)	0	512	0	0	537	0	0	13	0	0	147	0
Confl. Peds. (#/hr)	128		122	122		128	25		41	41		25
Confl. Bikes (#/hr)			2			25						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		71.2			71.2			15.3			15.3	
Effective Green, g (s)		71.2			71.2			15.3			15.3	
Actuated g/C Ratio		0.75			0.75			0.16			0.16	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2361			1268			244			210	
v/s Ratio Prot												
v/s Ratio Perm		0.16			c0.32			0.01			c0.11	
v/c Ratio		0.22			0.42			0.05			0.70	
Uniform Delay, d1		3.6			4.4			33.7			37.7	
Progression Factor		0.75			1.00			1.00			1.00	
Incremental Delay, d2		0.2			1.0			0.1			9.0	
Delay (s)		2.9			5.4			33.8			46.7	
Level of Service		A			A			C			D	
Approach Delay (s)		2.9			5.4			33.8			46.7	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	347	43	86	362	87	128	895	116	61	448	30
Future Volume (vph)	68	347	43	86	362	87	128	895	116	61	448	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			0.98		1.00	0.97		1.00	0.99	
Flpb, ped/bikes		1.00			0.99		0.94	1.00		0.97	1.00	
Frt		0.99			0.98		1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3411			1763		1663	3377		1713	3475	
Flt Permitted		0.76			0.85		0.45	1.00		0.19	1.00	
Satd. Flow (perm)		2622			1514		781	3377		349	3475	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	68	347	43	86	362	87	128	895	116	61	448	30
RTOR Reduction (vph)	0	10	0	0	8	0	0	9	0	0	4	0
Lane Group Flow (vph)	0	448	0	0	527	0	128	1002	0	61	474	0
Confl. Peds. (#/hr)	65		91	91		65	77		138	138		77
Confl. Bikes (#/hr)			2			16			5			2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)		38.4			38.4		47.1	47.1		47.6	47.6	
Effective Green, g (s)		38.4			38.4		47.1	47.1		47.6	47.6	
Actuated g/C Ratio		0.40			0.40		0.50	0.50		0.50	0.50	
Clearance Time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		1059			611		387	1674		174	1741	
v/s Ratio Prot								c0.30			0.14	
v/s Ratio Perm		0.17			c0.35		0.16			0.17		
v/c Ratio		0.42			0.86		0.33	0.60		0.35	0.27	
Uniform Delay, d1		20.3			25.9		14.4	17.2		14.3	13.7	
Progression Factor		1.00			0.84		0.67	0.70		1.75	1.77	
Incremental Delay, d2		0.1			10.7		2.0	1.4		5.3	0.4	
Delay (s)		20.4			32.5		11.7	13.4		30.4	24.5	
Level of Service		C			C		B	B		C	C	
Approach Delay (s)		20.4			32.5			13.2			25.2	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	20.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	477	395	111	50	372	97	47	294	27	86	197	303
Future Volume (vph)	477	395	111	50	372	97	47	294	27	86	197	303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.99			0.95		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	0.99			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3190			3264		1770	3482		1770	1863	2683
Flt Permitted	0.95	0.63			0.82		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2032			2674		1770	3482		1770	1863	2683
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	477	395	111	50	372	97	47	294	27	86	197	303
RTOR Reduction (vph)	0	11	0	0	13	0	0	6	0	0	0	139
Lane Group Flow (vph)	324	648	0	0	506	0	47	315	0	86	197	164
Confl. Peds. (#/hr)	182		16	16		182	25		14	14		25
Confl. Bikes (#/hr)			4			13			7			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	30.6	86.0			51.4		7.4	21.3		9.7	23.6	54.2
Effective Green, g (s)	30.6	86.0			51.4		7.4	21.3		9.7	23.6	54.2
Actuated g/C Ratio	0.24	0.66			0.40		0.06	0.16		0.07	0.18	0.42
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	378	1616			1057		100	570		132	338	1118
v/s Ratio Prot	c0.20	0.09					0.03	c0.09		0.05	c0.11	0.03
v/s Ratio Perm		0.17			c0.19							0.03
v/c Ratio	0.86	0.40			0.48		0.47	0.55		0.65	0.58	0.15
Uniform Delay, d1	47.6	10.1			29.3		59.4	50.0		58.5	48.7	23.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.6	0.1			1.6		1.3	1.2		11.0	2.6	0.0
Delay (s)	64.2	10.2			30.9		60.7	51.1		69.5	51.2	23.6
Level of Service	E	B			C		E	D		E	D	C
Approach Delay (s)		28.0			30.9			52.4			39.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	62	70	82	40	122	19	135	726	37	11	491	86
Future Volume (vph)	62	70	82	40	122	19	135	726	37	11	491	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.94			0.99		1.00	0.98		1.00	0.96	
Flpb, ped/bikes	0.92	1.00			0.98		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.99		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1630	1602			1758		1770	3460		1770	3318	
Flt Permitted	0.55	1.00			0.91		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	943	1602			1610		1770	3460		1770	3318	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	62	70	82	40	122	19	135	726	37	11	491	86
RTOR Reduction (vph)	0	45	0	0	5	0	0	3	0	0	14	0
Lane Group Flow (vph)	62	107	0	0	176	0	135	760	0	11	563	0
Confl. Peds. (#/hr)	98		88	88		98	87		101	101		87
Confl. Bikes (#/hr)			1						4			4
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	23.0	23.0			23.0		11.5	58.2		1.3	48.0	
Effective Green, g (s)	23.0	23.0			23.0		11.5	58.2		1.3	48.0	
Actuated g/C Ratio	0.24	0.24			0.24		0.12	0.61		0.01	0.51	
Clearance Time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	228	387			389		214	2119		24	1676	
v/s Ratio Prot		0.07					c0.08	c0.22		0.01	0.17	
v/s Ratio Perm	0.07				c0.11							
v/c Ratio	0.27	0.28			0.45		0.63	0.36		0.46	0.34	
Uniform Delay, d1	29.2	29.2			30.7		39.7	9.1		46.5	14.0	
Progression Factor	1.00	1.00			1.00		1.36	0.37		1.00	1.00	
Incremental Delay, d2	0.2	0.1			0.3		3.7	0.4		5.0	0.5	
Delay (s)	29.4	29.4			31.0		57.9	3.8		51.5	14.5	
Level of Service	C	C			C		E	A		D	B	
Approach Delay (s)		29.4			31.0			11.9			15.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	16	25	3	68	42	876	99	59	578	10
Future Volume (Veh/h)	4	1	16	25	3	68	42	876	99	59	578	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	1	16	25	3	68	42	876	99	59	578	10
Pedestrians		64			134			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		6			13			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.84	0.84	0.94	0.84	0.84	0.81	0.94			0.81		
vC, conflicting volume	1356	1958	366	1575	1914	622	652			1109		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	696	1415	188	957	1361	47	493			652		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	98	78	97	90	96			91		
cM capacity (veh/h)	177	81	718	116	88	711	938			654		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	21	96	480	537	348	299
Volume Left	4	25	42	0	59	0
Volume Right	16	68	0	99	0	10
cSH	367	278	938	1700	654	1700
Volume to Capacity	0.06	0.35	0.04	0.32	0.09	0.18
Queue Length 95th (ft)	5	37	4	0	7	0
Control Delay (s)	15.4	24.7	1.3	0.0	2.9	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.4	24.7	0.6		1.5	
Approach LOS	C	C				

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	66.0%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	108	99	1119	93	18	594
Future Volume (vph)	108	99	1119	93	18	594
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.92		0.99			1.00
Flpb, ped/bikes	0.90		1.00			1.00
Frt	0.94		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1411		3464			3528
Flt Permitted	0.97		1.00			0.90
Satd. Flow (perm)	1411		3464			3190
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	108	99	1119	93	18	594
RTOR Reduction (vph)	37	0	6	0	0	0
Lane Group Flow (vph)	170	0	1206	0	0	612
Confl. Peds. (#/hr)	137	114		147	147	
Confl. Bikes (#/hr)		4		7		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.5		65.5			65.5
Effective Green, g (s)	21.5		65.5			65.5
Actuated g/C Ratio	0.23		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	319		2388			2199
v/s Ratio Prot			c0.35			
v/s Ratio Perm	c0.12					0.19
v/c Ratio	0.53		0.51			0.28
Uniform Delay, d1	32.3		7.0			5.7
Progression Factor	1.00		0.43			1.22
Incremental Delay, d2	0.9		0.7			0.3
Delay (s)	33.2		3.7			7.2
Level of Service	C		A			A
Approach Delay (s)	33.2		3.7			7.2
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	7.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	184	25	63	362	167	47	1016	71	39	586	70
Future Volume (vph)	18	184	25	63	362	167	47	1016	71	39	586	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.84	1.00	0.98			0.99	
Flpb, ped/bikes		0.99			0.99	1.00	0.96	1.00			1.00	
Frt		0.98			1.00	0.85	1.00	0.99			0.98	
Flt Protected		1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		3410			3479	1337	1704	3432			3426	
Flt Permitted		0.90			0.86	1.00	0.37	1.00			0.84	
Satd. Flow (perm)		3090			3010	1337	662	3432			2871	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	18	184	25	63	362	167	47	1016	71	39	586	70
RTOR Reduction (vph)	0	12	0	0	0	26	0	4	0	0	7	0
Lane Group Flow (vph)	0	215	0	0	425	141	47	1083	0	0	688	0
Confl. Peds. (#/hr)	113		72	72		113	63		204	204		63
Confl. Bikes (#/hr)			2			9			7			3
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.7			23.7	23.7	60.3	60.3			60.3	
Effective Green, g (s)		23.7			23.7	23.7	60.3	60.3			60.3	
Actuated g/C Ratio		0.25			0.25	0.25	0.63	0.63			0.63	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)		770			750	333	420	2178			1822	
v/s Ratio Prot								c0.32				
v/s Ratio Perm		0.07			c0.14	0.11	0.07				0.24	
v/c Ratio		0.28			0.57	0.42	0.11	0.50			0.38	
Uniform Delay, d1		28.8			31.2	29.9	6.8	9.3			8.3	
Progression Factor		1.00			1.00	1.00	0.50	1.09			1.15	
Incremental Delay, d2		0.1			0.6	0.3	0.5	0.7			0.6	
Delay (s)		28.8			31.7	30.2	3.9	10.8			10.1	
Level of Service		C			C	C	A	B			B	
Approach Delay (s)		28.8			31.3			10.5			10.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	98.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	14	28	34	38	46	64	1057	15	22	625	27
Future Volume (vph)	26	14	28	34	38	46	64	1057	15	22	625	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.98			0.97		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.95		1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1700			1683		1770	3516		1770	3487	
Flt Permitted		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1700			1683		1770	3516		1770	3487	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	14	28	34	38	46	64	1057	15	22	625	27
RTOR Reduction (vph)	0	23	0	0	109	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	45	0	0	9	0	64	1072	0	22	652	0
Confl. Peds. (#/hr)	19		22	22		19	51		85	85		51
Confl. Bikes (#/hr)						1			6			3
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		16.4			7.6		7.7	52.8		3.2	48.3	
Effective Green, g (s)		16.4			7.6		7.7	52.8		3.2	48.3	
Actuated g/C Ratio		0.17			0.08		0.08	0.56		0.03	0.51	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		293			134		143	1954		59	1772	
v/s Ratio Prot		c0.03			c0.01		c0.04	c0.30		0.01	0.19	
v/s Ratio Perm												
v/c Ratio		0.15			0.07		0.45	0.55		0.37	0.37	
Uniform Delay, d1		33.4			40.4		41.6	13.5		44.9	14.1	
Progression Factor		1.00			1.00		1.00	1.00		1.12	0.70	
Incremental Delay, d2		0.2			0.2		2.2	1.1		3.7	0.6	
Delay (s)		33.6			40.7		43.8	14.6		54.2	10.4	
Level of Service		C			D		D	B		D	B	
Approach Delay (s)		33.6			40.7			16.2			11.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Turn Type	Prot
Protected Phases	7
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	0.0
Approach LOS	A

Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	3	22	103	13	98	33
Future Volume (vph)	3	22	103	13	98	33
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	22	103	13	98	33

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	25	116	131
Volume Left (vph)	3	103	0
Volume Right (vph)	22	0	33
Hadj (s)	-0.47	0.21	-0.12
Departure Headway (s)	4.0	4.3	4.0
Degree Utilization, x	0.03	0.14	0.14
Capacity (veh/h)	853	821	897
Control Delay (s)	7.1	8.0	7.6
Approach Delay (s)	7.1	8.0	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	653	12	10	391	59	7	3	20	127	4	79
Future Volume (vph)	33	653	12	10	391	59	7	3	20	127	4	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.93			0.90			0.90	
Flpb, ped/bikes		0.99			1.00			0.98			0.92	
Frt		1.00			0.98			0.91			0.95	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		3451			1694			1478			1431	
Flt Permitted		0.92			0.99			0.94			0.80	
Satd. Flow (perm)		3176			1671			1405			1176	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	33	653	12	10	391	59	7	3	20	127	4	79
RTOR Reduction (vph)	0	1	0	0	5	0	0	16	0	0	24	0
Lane Group Flow (vph)	0	697	0	0	455	0	0	14	0	0	186	0
Confl. Peds. (#/hr)	181		158	158		181	65		61	61		65
Confl. Bikes (#/hr)			22			15						2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		67.6			67.6			18.9			18.9	
Effective Green, g (s)		67.6			67.6			18.9			18.9	
Actuated g/C Ratio		0.71			0.71			0.20			0.20	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2259			1189			279			233	
v/s Ratio Prot												
v/s Ratio Perm		0.22			c0.27			0.01			c0.16	
v/c Ratio		0.31			0.38			0.05			0.80	
Uniform Delay, d1		5.1			5.4			30.8			36.2	
Progression Factor		1.18			1.00			1.00			1.00	
Incremental Delay, d2		0.3			0.9			0.1			16.6	
Delay (s)		6.3			6.4			30.8			52.9	
Level of Service		A			A			C			D	
Approach Delay (s)		6.3			6.4			30.8			52.9	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	469	111	43	320	86	83	520	138	123	614	82
Future Volume (vph)	30	469	111	43	320	86	83	520	138	123	614	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.96			0.97		1.00	0.94		1.00	0.97	
Flpb, ped/bikes		1.00			0.99		0.92	1.00		0.91	1.00	
Frt		0.97			0.97		1.00	0.97		1.00	0.98	
Flt Protected		1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3298			1737		1627	3236		1618	3365	
Flt Permitted		0.92			0.90		0.34	1.00		0.36	1.00	
Satd. Flow (perm)		3032			1570		576	3236		611	3365	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	30	469	111	43	320	86	83	520	138	123	614	82
RTOR Reduction (vph)	0	25	0	0	12	0	0	19	0	0	8	0
Lane Group Flow (vph)	0	585	0	0	437	0	83	639	0	123	688	0
Confl. Peds. (#/hr)	126		153	153		126	157		145	145		157
Confl. Bikes (#/hr)			13			8			9			7
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4			6			2		
Actuated Green, G (s)		34.6			34.6		50.9	50.9		51.4	51.4	
Effective Green, g (s)		34.6			34.6		50.9	50.9		51.4	51.4	
Actuated g/C Ratio		0.36			0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		4.5			4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		1104			571		308	1733		330	1820	
v/s Ratio Prot								0.20			c0.20	
v/s Ratio Perm		0.19			c0.28		0.14			0.20		
v/c Ratio		0.53			0.77		0.27	0.37		0.37	0.38	
Uniform Delay, d1		23.8			26.6		12.0	12.8		12.5	12.6	
Progression Factor		1.00			1.03		1.30	1.33		1.45	1.44	
Incremental Delay, d2		0.2			5.0		2.0	0.6		3.1	0.6	
Delay (s)		24.0			32.3		17.6	17.6		21.3	18.7	
Level of Service		C			C		B	B		C	B	
Approach Delay (s)		24.0			32.3			17.6			19.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	22.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	284	443	94	62	350	48	60	156	69	107	192	460
Future Volume (vph)	284	443	94	62	350	48	60	156	69	107	192	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.98			0.99		1.00	0.98		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			0.99		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98			0.98		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3213			3394		1770	3304		1770	1863	2695
Flt Permitted	0.95	0.92			0.79		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2978			2698		1770	3304		1770	1863	2695
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	284	443	94	62	350	48	60	156	69	107	192	460
RTOR Reduction (vph)	0	11	0	0	5	0	0	42	0	0	0	199
Lane Group Flow (vph)	256	554	0	0	455	0	60	183	0	107	192	261
Confl. Peds. (#/hr)	83		41	41		83	19		33	33		19
Confl. Bikes (#/hr)			17			7			2			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	25.3	85.7			56.4		9.9	19.2		12.1	21.4	46.7
Effective Green, g (s)	25.3	85.7			56.4		9.9	19.2		12.1	21.4	46.7
Actuated g/C Ratio	0.19	0.66			0.43		0.08	0.15		0.09	0.16	0.36
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	313	2008			1170		134	487		164	306	968
v/s Ratio Prot	c0.16	0.05					0.03	c0.06		0.06	c0.10	0.05
v/s Ratio Perm		0.13			c0.17							0.04
v/c Ratio	0.82	0.28			0.39		0.45	0.38		0.65	0.63	0.27
Uniform Delay, d1	50.1	9.2			25.1		57.4	50.0		56.9	50.6	29.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.4	0.0			1.0		0.9	0.5		9.0	4.0	0.1
Delay (s)	64.6	9.3			26.0		58.3	50.5		65.9	54.6	29.6
Level of Service	E	A			C		E	D		E	D	C
Approach Delay (s)		26.5			26.0			52.1			41.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	103	105	20	56	21	62	504	29	15	745	65
Future Volume (vph)	168	103	105	20	56	21	62	504	29	15	745	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96			0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.97	1.00			0.99		1.00	1.00		1.00	1.00	
Frt	1.00	0.92			0.97		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1720	1660			1757		1770	3460		1770	3468	
Flt Permitted	0.69	1.00			0.92		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1244	1660			1627		1770	3460		1770	3468	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	168	103	105	20	56	21	62	504	29	15	745	65
RTOR Reduction (vph)	0	44	0	0	12	0	0	3	0	0	5	0
Lane Group Flow (vph)	168	164	0	0	85	0	62	530	0	15	805	0
Confl. Peds. (#/hr)	28		49	49		28	27		82	82		27
Confl. Bikes (#/hr)									8			8
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								
Actuated Green, G (s)	20.7	20.7			20.7		6.8	59.2		2.6	55.0	
Effective Green, g (s)	20.7	20.7			20.7		6.8	59.2		2.6	55.0	
Actuated g/C Ratio	0.22	0.22			0.22		0.07	0.62		0.03	0.58	
Clearance Time (s)	4.5	4.5			4.5		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	2.0	2.0			2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	271	361			354		126	2156		48	2007	
v/s Ratio Prot		0.10					c0.04	0.15		0.01	c0.23	
v/s Ratio Perm	c0.13				0.05							
v/c Ratio	0.62	0.45			0.24		0.49	0.25		0.31	0.40	
Uniform Delay, d1	33.6	32.3			30.7		42.4	8.0		45.3	11.0	
Progression Factor	1.00	1.00			1.00		1.16	0.59		1.00	1.00	
Incremental Delay, d2	3.0	0.3			0.1		1.1	0.3		1.4	0.6	
Delay (s)	36.6	32.6			30.8		50.4	4.9		46.7	11.6	
Level of Service	D	C			C		D	A		D	B	
Approach Delay (s)		34.4			30.8			9.7			12.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	45	34	3	85	16	514	59	50	852	20
Future Volume (Veh/h)	9	1	45	34	3	85	16	514	59	50	852	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	9	1	45	34	3	85	16	514	59	50	852	20
Pedestrians		96			123			22				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		9			12			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.92	0.92	0.89	0.92	0.92	0.94	0.89			0.94		
vC, conflicting volume	1434	1786	554	1292	1766	410	968			696		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1004	1388	249	850	1367	246	715			550		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	92	77	97	86	98			94		
cM capacity (veh/h)	110	96	594	147	99	626	712			843		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	55	122	273	316	476	446
Volume Left	9	34	16	0	50	0
Volume Right	45	85	0	59	0	20
cSH	328	308	712	1700	843	1700
Volume to Capacity	0.17	0.40	0.02	0.19	0.06	0.26
Queue Length 95th (ft)	15	46	2	0	5	0
Control Delay (s)	18.2	24.2	0.8	0.0	1.7	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.2	24.2	0.4		0.9	
Approach LOS	C	C				

Intersection Summary				
Average Delay	3.0			
Intersection Capacity Utilization	65.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	157	69	714	113	28	791
Future Volume (vph)	157	69	714	113	28	791
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		0.95			0.95
Frpb, ped/bikes	0.91		0.98			1.00
Flpb, ped/bikes	0.79		1.00			1.00
Frt	0.96		0.98			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	1227		3384			3516
Flt Permitted	0.97		1.00			0.91
Satd. Flow (perm)	1227		3384			3193
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	157	69	714	113	28	791
RTOR Reduction (vph)	17	0	12	0	0	0
Lane Group Flow (vph)	209	0	815	0	0	819
Confl. Peds. (#/hr)	255	221		203	203	
Confl. Bikes (#/hr)		7		14		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	23.2		63.8			63.8
Effective Green, g (s)	23.2		63.8			63.8
Actuated g/C Ratio	0.24		0.67			0.67
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	299		2272			2144
v/s Ratio Prot			0.24			
v/s Ratio Perm	c0.17					c0.26
v/c Ratio	0.70		0.36			0.38
Uniform Delay, d1	32.7		6.7			6.9
Progression Factor	1.00		2.20			0.94
Incremental Delay, d2	5.6		0.4			0.5
Delay (s)	38.3		15.3			6.9
Level of Service	D		B			A
Approach Delay (s)	38.3		15.3			6.9
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	300	33	53	264	99	35	685	118	57	801	89
Future Volume (vph)	35	300	33	53	264	99	35	685	118	57	801	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.85	1.00	0.95			0.97	
Flpb, ped/bikes		0.99			0.99	1.00	0.93	1.00			0.99	
Frt		0.99			1.00	0.85	1.00	0.98			0.99	
Flt Protected		1.00			0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)		3404			3470	1338	1654	3291			3357	
Flt Permitted		0.89			0.80	1.00	0.27	1.00			0.84	
Satd. Flow (perm)		3041			2814	1338	465	3291			2843	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	35	300	33	53	264	99	35	685	118	57	801	89
RTOR Reduction (vph)	0	9	0	0	0	39	0	11	0	0	6	0
Lane Group Flow (vph)	0	359	0	0	317	60	35	792	0	0	941	0
Confl. Peds. (#/hr)	116		99	99		116	198		260	260		198
Confl. Bikes (#/hr)			7			3			10			9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.1			23.1	23.1	60.9	60.9			60.9	
Effective Green, g (s)		23.1			23.1	23.1	60.9	60.9			60.9	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64			0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0			6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0			2.0	
Lane Grp Cap (vph)		739			684	325	298	2109			1822	
v/s Ratio Prot								0.24				
v/s Ratio Perm		c0.12			0.11	0.05	0.08				c0.33	
v/c Ratio		0.49			0.46	0.19	0.12	0.38			0.52	
Uniform Delay, d1		30.9			30.7	28.5	6.6	8.1			9.1	
Progression Factor		1.00			1.00	1.00	0.07	0.25			1.26	
Incremental Delay, d2		0.2			0.2	0.1	0.7	0.5			1.0	
Delay (s)		31.0			30.8	28.6	1.2	2.5			12.5	
Level of Service		C			C	C	A	A			B	
Approach Delay (s)		31.0			30.3			2.5			12.5	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	19	34	31	12	17	57	787	33	32	830	27
Future Volume (vph)	29	19	34	31	12	17	57	787	33	32	830	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.97			0.95		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			0.96		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1677			1664		1770	3445		1770	3463	
Flt Permitted		0.98			0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1677			1664		1770	3445		1770	3463	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	29	19	34	31	12	17	57	787	33	32	830	27
RTOR Reduction (vph)	0	27	0	0	56	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	55	0	0	4	0	57	818	0	32	857	0
Confl. Peds. (#/hr)	31		52	52		31	174		136	136		174
Confl. Bikes (#/hr)			1						12			8
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	
Protected Phases	4	4		3	3		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)		20.0			5.6		7.4	49.5		4.9	47.0	
Effective Green, g (s)		20.0			5.6		7.4	49.5		4.9	47.0	
Actuated g/C Ratio		0.21			0.06		0.08	0.52		0.05	0.49	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		353			98		137	1795		91	1713	
v/s Ratio Prot		c0.03			c0.00		c0.03	0.24		0.02	c0.25	
v/s Ratio Perm												
v/c Ratio		0.16			0.04		0.42	0.46		0.35	0.50	
Uniform Delay, d1		30.6			42.2		41.7	14.3		43.5	16.1	
Progression Factor		1.00			1.00		1.00	1.00		1.21	0.97	
Incremental Delay, d2		0.2			0.2		2.0	0.8		2.1	0.9	
Delay (s)		30.8			42.3		43.8	15.1		54.8	16.6	
Level of Service		C			D		D	B		D	B	
Approach Delay (s)		30.8			42.3			17.0			18.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL
Lane Configurations	
Traffic Volume (vph)	0
Future Volume (vph)	0
Ideal Flow (vphpl)	1900
Total Lost time (s)	
Lane Util. Factor	
Frpb, ped/bikes	
Flpb, ped/bikes	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	0
RTOR Reduction (vph)	0
Lane Group Flow (vph)	0
Confl. Peds. (#/hr)	
Confl. Bikes (#/hr)	
Turn Type	Prot
Protected Phases	7
Permitted Phases	
Actuated Green, G (s)	
Effective Green, g (s)	
Actuated g/C Ratio	
Clearance Time (s)	
Vehicle Extension (s)	
Lane Grp Cap (vph)	
v/s Ratio Prot	
v/s Ratio Perm	
v/c Ratio	
Uniform Delay, d1	
Progression Factor	
Incremental Delay, d2	
Delay (s)	
Level of Service	
Approach Delay (s)	0.0
Approach LOS	A

Intersection Summary

Appendix D LEVEL OF SERVICE WORKSHEETS: 2040 NO PROJECT CONDITIONS

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	18	98	44	7	3
Future Volume (Veh/h)	5	18	98	44	7	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	18	98	44	7	3
Pedestrians	15			6	8	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				509		
pX, platoon unblocked						
vC, conflicting volume	272	30	25			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272	30	25			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	98	94			
cM capacity (veh/h)	658	1024	1567			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	142	10
Volume Left	5	98	0
Volume Right	18	0	3
cSH	914	1567	1700
Volume to Capacity	0.03	0.06	0.01
Queue Length 95th (ft)	2	5	0
Control Delay (s)	9.0	5.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	5.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	485	32	9	415	86	17	16	14	83	7	33
Future Volume (vph)	20	485	32	9	415	86	17	16	14	83	7	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.92			0.97			0.98	
Flpb, ped/bikes		0.99			1.00			0.99			0.95	
Frt		0.99			0.98			0.96			0.96	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3380			1664			1682			1613	
Flt Permitted		0.93			0.99			0.90			0.82	
Satd. Flow (perm)		3150			1651			1548			1365	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	485	32	9	415	86	17	16	14	83	7	33
RTOR Reduction (vph)	0	3	0	0	5	0	0	12	0	0	16	0
Lane Group Flow (vph)	0	534	0	0	505	0	0	35	0	0	107	0
Confl. Peds. (#/hr)	128		122	122		128	25		41	41		25
Confl. Bikes (#/hr)			2			25						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		73.3			73.3			13.2			13.2	
Effective Green, g (s)		73.3			73.3			13.2			13.2	
Actuated g/C Ratio		0.77			0.77			0.14			0.14	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2430			1273			215			189	
v/s Ratio Prot												
v/s Ratio Perm		0.17			c0.31			0.02			c0.08	
v/c Ratio		0.22			0.40			0.16			0.56	
Uniform Delay, d1		3.0			3.6			36.0			38.2	
Progression Factor		0.57			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.9			0.3			3.1	
Delay (s)		1.8			4.5			36.3			41.3	
Level of Service		A			A			D			D	
Approach Delay (s)		1.8			4.5			36.3			41.3	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	8.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	329	45	29	408	31	486	1441	156	76	566	109
Future Volume (vph)	40	329	45	29	408	31	486	1441	156	76	566	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.79		0.99		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		0.99	1.00		0.99		0.97	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.99		1.00	0.98	
Flt Protected		0.99	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3497	1256		3431		1719	1790		1770	1777	
Flt Permitted		0.82	1.00		0.91		0.31	1.00		0.06	1.00	
Satd. Flow (perm)		2877	1256		3131		565	1790		118	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	329	45	29	408	31	486	1441	156	76	566	109
RTOR Reduction (vph)	0	0	34	0	5	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	369	11	0	463	0	486	1593	0	76	668	0
Confl. Peds. (#/hr)	65		91	91		65	77		138	138		77
Confl. Bikes (#/hr)			2			16			5			2
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)		23.0	23.0		23.0		62.5	62.5		63.0	63.0	
Effective Green, g (s)		23.0	23.0		23.0		62.5	62.5		63.0	63.0	
Actuated g/C Ratio		0.24	0.24		0.24		0.66	0.66		0.66	0.66	
Clearance Time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		696	304		758		371	1177		78	1178	
v/s Ratio Prot								c0.89			0.38	
v/s Ratio Perm		0.13	0.01		c0.15		0.86			0.64		
v/c Ratio		0.53	0.04		0.61		1.31	1.35		0.97	0.57	
Uniform Delay, d1		31.3	27.5		32.0		16.2	16.2		15.2	8.6	
Progression Factor		1.00	1.00		0.87		0.80	0.79		0.53	0.29	
Incremental Delay, d2		0.4	0.0		1.0		141.3	159.5		75.9	1.3	
Delay (s)		31.7	27.5		29.0		154.3	172.3		84.1	3.8	
Level of Service		C	C		C		F	F		F	A	
Approach Delay (s)		31.2			29.0			168.1			11.9	
Approach LOS		C			C			F			B	

Intersection Summary			
HCM 2000 Control Delay	103.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	142.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	641	387	122	77	772	176	64	285	22	72	160	425
Future Volume (vph)	641	387	122	77	772	176	64	285	22	72	160	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.99			0.96		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98			0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.98			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3220			3289		1770	3490		1770	1863	2696
Flt Permitted	0.95	0.51			0.79		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	1675			2618		1770	3490		1770	1863	2696
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	641	387	122	77	772	176	64	285	22	72	160	425
RTOR Reduction (vph)	0	5	0	0	13	0	0	4	0	0	0	32
Lane Group Flow (vph)	385	760	0	0	1012	0	64	303	0	72	160	393
Confl. Peds. (#/hr)	182		16	16		182	25		14	14		25
Confl. Bikes (#/hr)			4			13			7			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	33.3	89.8			52.5		6.7	20.2		7.0	20.5	53.8
Effective Green, g (s)	33.3	89.8			52.5		6.7	20.2		7.0	20.5	53.8
Actuated g/C Ratio	0.26	0.69			0.40		0.05	0.16		0.05	0.16	0.41
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	412	1552			1057		91	542		95	293	1115
v/s Ratio Prot	c0.24	0.13					0.04	c0.09		c0.04	c0.09	0.09
v/s Ratio Perm		0.21			c0.39							0.06
v/c Ratio	0.93	0.49			0.96		0.70	0.56		0.76	0.55	0.35
Uniform Delay, d1	47.3	9.4			37.7		60.7	50.8		60.7	50.5	26.2
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.0	0.1			19.1		18.2	1.3		28.6	2.1	0.1
Delay (s)	75.2	9.5			56.8		78.8	52.0		89.3	52.5	26.2
Level of Service	E	A			E		E	D		F	D	C
Approach Delay (s)		31.5			56.8			56.7			39.5	
Approach LOS		C			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	122	37	136	11	344	1011	53	9	626	137
Future Volume (vph)	59	64	122	37	136	11	344	1011	53	9	626	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.90			0.99		1.00	0.98			1.00	0.72
Flpb, ped/bikes		0.97			0.98		1.00	1.00			1.00	1.00
Frt		0.93			0.99		1.00	0.99			1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1498			1769		1770	1820			1861	1147
Flt Permitted		0.86			0.88		0.95	1.00			0.98	1.00
Satd. Flow (perm)		1309			1578		1770	1820			1833	1147
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	59	64	122	37	136	11	344	1011	53	9	626	137
RTOR Reduction (vph)	0	38	0	0	2	0	0	2	0	0	0	41
Lane Group Flow (vph)	0	207	0	0	182	0	344	1062	0	0	635	96
Confl. Peds. (#/hr)	98		88	88		98	87		101	101		87
Confl. Bikes (#/hr)			1						4			4
Turn Type	Perm	NA		Perm	NA		Prot	NA		Perm	NA	Perm
Protected Phases		4			4		1	6			2	
Permitted Phases	4			4						2		2
Actuated Green, G (s)		23.0			23.0		20.3	63.5			39.2	39.2
Effective Green, g (s)		23.0			23.0		20.3	63.5			39.2	39.2
Actuated g/C Ratio		0.24			0.24		0.21	0.67			0.41	0.41
Clearance Time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		316			382		378	1216			756	473
v/s Ratio Prot							0.19	c0.58				
v/s Ratio Perm		c0.16			0.12						0.35	0.08
v/c Ratio		0.66			0.48		0.91	0.87			0.84	0.20
Uniform Delay, d1		32.4			30.8		36.5	12.5			25.1	17.9
Progression Factor		1.00			1.00		0.93	1.01			1.00	1.00
Incremental Delay, d2		3.7			0.3		3.4	0.9			10.9	1.0
Delay (s)		36.1			31.2		37.4	13.6			35.9	18.8
Level of Service		D			C		D	B			D	B
Approach Delay (s)		36.1			31.2			19.4			32.9	
Approach LOS		D			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	25.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	123.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1	17	0	0	62	64	1413	13	0	808	14
Future Volume (Veh/h)	5	1	17	0	0	62	64	1413	13	0	808	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	1	17	0	0	62	64	1413	13	0	808	14
Pedestrians		64			134			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		6			13			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.51	0.51	0.68	0.51	0.51	0.35	0.68			0.35		
vC, conflicting volume	2488	2567	887	2522	2568	1554	886			1560		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2012	2165	595	2077	2166	1652	593			1671		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	94	95	100	100	0	90			100		
cM capacity (veh/h)	0	18	318	13	18	37	625			118		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	62	1490	822
Volume Left	5	0	64	0
Volume Right	17	62	13	14
cSH	0	37	625	1700
Volume to Capacity	Err	1.66	0.10	0.48
Queue Length 95th (ft)	Err	165	9	0
Control Delay (s)	Err	558.7	7.4	0.0
Lane LOS	F	F	A	
Approach Delay (s)	Err	558.7	7.4	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	137.9%	ICU Level of Service	H	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	95	115	2048	98	14	658
Future Volume (vph)	95	115	2048	98	14	658
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.85		0.99			1.00
Flpb, ped/bikes	0.86		1.00			1.00
Frt	0.93		0.99			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1230		1840			1861
Flt Permitted	0.98		1.00			0.56
Satd. Flow (perm)	1230		1840			1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	115	2048	98	14	658
RTOR Reduction (vph)	8	0	2	0	0	0
Lane Group Flow (vph)	202	0	2144	0	0	672
Confl. Peds. (#/hr)	137	114		147	147	
Confl. Bikes (#/hr)		4		7		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.4		65.6			65.6
Effective Green, g (s)	21.4		65.6			65.6
Actuated g/C Ratio	0.23		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	277		1270			714
v/s Ratio Prot			c1.16			
v/s Ratio Perm	c0.16					0.65
v/c Ratio	0.73		1.69			0.94
Uniform Delay, d1	34.1		14.7			13.0
Progression Factor	1.00		1.09			0.53
Incremental Delay, d2	8.2		310.0			20.0
Delay (s)	42.4		326.1			26.9
Level of Service	D		F			C
Approach Delay (s)	42.4		326.1			26.9
Approach LOS	D		F			C

Intersection Summary			
HCM 2000 Control Delay	240.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.45		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	139.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	244	40	64	361	263	58	1815	73	36	626	77
Future Volume (vph)	43	244	40	64	361	263	58	1815	73	36	626	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00	0.74	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.98			0.99	1.00	0.98	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3330			3466	1173	1732	1829		1770	1809	
Flt Permitted		0.82			0.81	1.00	0.29	1.00		0.07	1.00	
Satd. Flow (perm)		2740			2834	1173	538	1829		122	1809	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	43	244	40	64	361	263	58	1815	73	36	626	77
RTOR Reduction (vph)	0	11	0	0	0	26	0	1	0	0	5	0
Lane Group Flow (vph)	0	316	0	0	425	237	58	1887	0	36	698	0
Confl. Peds. (#/hr)	113		72	72		113	63		204	204		63
Confl. Bikes (#/hr)			2			9			7			3
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Effective Green, g (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		663			686	283	345	1174		78	1161	
v/s Ratio Prot								c1.03			0.39	
v/s Ratio Perm		0.12			0.15	c0.20	0.11			0.29		
v/c Ratio		0.48			0.62	0.84	0.17	1.61		0.46	0.60	
Uniform Delay, d1		30.8			32.1	34.2	6.8	17.0		8.6	9.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.26	1.38	
Incremental Delay, d2		0.2			1.2	18.3	1.1	277.1		7.5	0.9	
Delay (s)		31.0			33.3	52.5	7.9	294.1		18.4	14.6	
Level of Service		C			C	D	A	F		B	B	
Approach Delay (s)		31.0			40.6			285.6			14.8	
Approach LOS		C			D			F			B	

Intersection Summary			
HCM 2000 Control Delay	163.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	154.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	98	0	0	129	0	1825	22	0	689	25
Future Volume (Veh/h)	0	0	98	0	0	129	0	1825	22	0	689	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	98	0	0	129	0	1825	22	0	689	25
Pedestrians		51			85			22			19	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		5			8			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											265	
pX, platoon unblocked	0.77	0.77	0.77	0.77	0.77		0.77					
vC, conflicting volume	2736	2684	774	2742	2686	1940	765			1932		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3096	3029	564	3103	3031	1940	551			1932		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	74	100	100	0	100			100		
cM capacity (veh/h)	0	9	379	3	9	74	751			280		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	129	1847	714
Volume Left	0	0	0	0
Volume Right	98	129	22	25
cSH	379	74	1700	1700
Volume to Capacity	0.26	1.75	1.09	0.42
Queue Length 95th (ft)	25	281	0	0
Control Delay (s)	17.8	482.4	0.0	0.0
Lane LOS	C	F		
Approach Delay (s)	17.8	482.4	0.0	0.0
Approach LOS	C	F		

Intersection Summary				
Average Delay	22.9			
Intersection Capacity Utilization	115.6%	ICU Level of Service	H	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	37	111	53	89	7
Future Volume (Veh/h)	3	37	111	53	89	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	37	111	53	89	7
Pedestrians	2			3	10	
Lane Width (ft)	12.0			12.0	12.0	
Walking Speed (ft/s)	3.5			3.5	3.5	
Percent Blockage	0			0	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)				509		
pX, platoon unblocked						
vC, conflicting volume	380	98	98			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	380	98	98			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	96	93			
cM capacity (veh/h)	570	954	1492			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	164	96
Volume Left	3	111	0
Volume Right	37	0	7
cSH	908	1492	1700
Volume to Capacity	0.04	0.07	0.06
Queue Length 95th (ft)	3	6	0
Control Delay (s)	9.1	5.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.1	5.3	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	26.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	850	50	28	331	79	16	13	40	324	33	111
Future Volume (vph)	76	850	50	28	331	79	16	13	40	324	33	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.90			0.92			0.96	
Flpb, ped/bikes		0.99			1.00			1.00			0.92	
Frt		0.99			0.98			0.92			0.97	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		3359			1633			1557			1541	
Flt Permitted		0.87			0.91			0.89			0.76	
Satd. Flow (perm)		2933			1486			1402			1219	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	76	850	50	28	331	79	16	13	40	324	33	111
RTOR Reduction (vph)	0	4	0	0	8	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	972	0	0	430	0	0	50	0	0	455	0
Confl. Peds. (#/hr)	181		158	158		181	65		61	61		65
Confl. Bikes (#/hr)			22			15						2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		46.9			46.9			39.6			39.6	
Effective Green, g (s)		46.9			46.9			39.6			39.6	
Actuated g/C Ratio		0.49			0.49			0.42			0.42	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		1447			733			584			508	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.29			0.04			c0.37	
v/c Ratio		0.67			0.59			0.09			0.90	
Uniform Delay, d1		18.2			17.1			16.8			25.8	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			3.4			0.0			18.1	
Delay (s)		18.5			20.6			16.8			43.9	
Level of Service		B			C			B			D	
Approach Delay (s)		18.5			20.6			16.8			43.9	
Approach LOS		B			C			B			D	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	739	377	87	190	126	78	1090	204	152	1587	65
Future Volume (vph)	21	739	377	87	190	126	78	1090	204	152	1587	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.66		0.91		1.00	0.96		1.00	0.99	
Flpb, ped/bikes		1.00	1.00		0.98		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	0.98		1.00	0.99	
Flt Protected		1.00	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3521	1043		2994		1770	1742		1770	1832	
Flt Permitted		0.94	1.00		0.55		0.07	1.00		0.07	1.00	
Satd. Flow (perm)		3299	1043		1658		126	1742		125	1832	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	21	739	377	87	190	126	78	1090	204	152	1587	65
RTOR Reduction (vph)	0	0	17	0	40	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	760	360	0	363	0	78	1292	0	152	1651	0
Confl. Peds. (#/hr)	126		153	153		126	157		145	145		157
Confl. Bikes (#/hr)			13			8			9			7
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)		26.5	26.5		26.5		59.0	59.0		59.5	59.5	
Effective Green, g (s)		26.5	26.5		26.5		59.0	59.0		59.5	59.5	
Actuated g/C Ratio		0.28	0.28		0.28		0.62	0.62		0.63	0.63	
Clearance Time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		920	290		462		78	1081		78	1147	
v/s Ratio Prot								0.74			0.90	
v/s Ratio Perm		0.23	c0.35		0.22		0.62			c1.21		
v/c Ratio		0.83	1.24		0.78		1.00	1.19		1.95	1.44	
Uniform Delay, d1		32.1	34.2		31.6		18.0	18.0		17.8	17.8	
Progression Factor		1.00	1.00		1.31		0.99	1.01		1.04	1.01	
Incremental Delay, d2		5.8	135.0		6.2		30.6	88.6		468.0	202.3	
Delay (s)		37.9	169.2		47.8		48.4	106.7		486.5	220.3	
Level of Service		D	F		D		D	F		F	F	
Approach Delay (s)		81.5			47.8			103.4			242.7	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM 2000 Control Delay	146.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.74		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	148.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	731	929	141	37	207	60	39	182	69	164	173	463
Future Volume (vph)	731	929	141	37	207	60	39	182	69	164	173	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.98			0.98		1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	0.99			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98			0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3241			3324		1770	3328		1770	1863	2728
Flt Permitted	0.95	0.76			0.71		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2464			2388		1770	3328		1770	1863	2728
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	731	929	141	37	207	60	39	182	69	164	173	463
RTOR Reduction (vph)	0	7	0	0	16	0	0	32	0	0	0	153
Lane Group Flow (vph)	592	1202	0	0	288	0	39	219	0	164	173	310
Confl. Peds. (#/hr)	83		41	41		83	19		33	33		19
Confl. Bikes (#/hr)			17			7			2			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	49.9	87.0			33.1		8.2	19.0		11.0	21.8	71.7
Effective Green, g (s)	49.9	87.0			33.1		8.2	19.0		11.0	21.8	71.7
Actuated g/C Ratio	0.38	0.67			0.25		0.06	0.15		0.08	0.17	0.55
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	617	1947			608		111	486		149	312	1504
v/s Ratio Prot	c0.37	0.24					0.02	c0.07		c0.09	c0.09	0.08
v/s Ratio Perm		c0.18			0.12							0.03
v/c Ratio	0.96	0.62			0.47		0.35	0.45		1.10	0.55	0.21
Uniform Delay, d1	39.1	12.1			41.1		58.4	50.7		59.5	49.6	14.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	25.9	0.4			2.6		0.7	0.7		103.3	2.1	0.0
Delay (s)	65.0	12.5			43.7		59.1	51.4		162.8	51.8	14.8
Level of Service	E	B			D		E	D		F	D	B
Approach Delay (s)		29.8			43.7			52.4			53.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	99.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	138	525	23	71	5	371	760	45	6	1214	114
Future Volume (vph)	226	138	525	23	71	5	371	760	45	6	1214	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.93			1.00		1.00	0.99			1.00	0.89
Flpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	1.00
Frt		0.92			0.99		1.00	0.99			1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1554			1822		1770	1820			1862	1405
Flt Permitted		0.89			0.82		0.95	1.00			0.81	1.00
Satd. Flow (perm)		1396			1504		1770	1820			1512	1405
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	226	138	525	23	71	5	371	760	45	6	1214	114
RTOR Reduction (vph)	0	55	0	0	2	0	0	2	0	0	0	88
Lane Group Flow (vph)	0	834	0	0	97	0	371	803	0	0	1220	26
Confl. Peds. (#/hr)	28		49	49		28	27		82	82		27
Confl. Bikes (#/hr)									8			8
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		43.5			43.5		20.8	43.0			18.2	18.2
Effective Green, g (s)		43.5			43.5		20.8	43.0			18.2	18.2
Actuated g/C Ratio		0.46			0.46		0.22	0.45			0.19	0.19
Clearance Time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		639			688		387	823			289	269
v/s Ratio Prot							0.21	c0.44				
v/s Ratio Perm		c0.60			0.06						c0.81	0.02
v/c Ratio		1.31			0.14		0.96	0.98			4.22	0.10
Uniform Delay, d1		25.8			14.9		36.7	25.5			38.4	31.6
Progression Factor		1.00			1.00		0.70	1.02			1.00	1.00
Incremental Delay, d2		148.6			0.0		6.5	5.4			1457.8	0.7
Delay (s)		174.4			15.0		32.2	31.4			1496.2	32.3
Level of Service		F			B		C	C			F	C
Approach Delay (s)		174.4			15.0			31.7			1371.1	
Approach LOS		F			B			C			F	

Intersection Summary			
HCM 2000 Control Delay	578.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.88		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	178.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	1	65	0	0	100	13	1135	12	0	1789	16
Future Volume (Veh/h)	13	1	65	0	0	100	13	1135	12	0	1789	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	1	65	0	0	100	13	1135	12	0	1789	16
Pedestrians		96			123			22				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		9			12			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.49	0.49	0.82	0.49	0.49	0.40	0.82			0.40		
vC, conflicting volume	3160	3189	1915	3174	3191	1264	1901			1270		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4059	4118	2008	4089	4122	903	1991			919		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	100	15	94			100		
cM capacity (veh/h)	0	1	54	0	1	117	214			259		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	79	100	1160	1805
Volume Left	13	0	13	0
Volume Right	65	100	12	16
cSH	0	117	214	1700
Volume to Capacity	185.11	0.85	0.06	1.06
Queue Length 95th (ft)	Err	129	5	0
Control Delay (s)	Err	116.2	4.5	0.0
Lane LOS	F	F	A	
Approach Delay (s)	Err	116.2	4.5	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	256.6			
Intersection Capacity Utilization	111.9%	ICU Level of Service	H	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	166	63	1379	107	36	2113
Future Volume (vph)	166	63	1379	107	36	2113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.86		0.99			1.00
Flpb, ped/bikes	0.63		1.00			1.00
Frt	0.96		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	930		1822			1861
Flt Permitted	0.97		1.00			0.36
Satd. Flow (perm)	930		1822			669
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	63	1379	107	36	2113
RTOR Reduction (vph)	14	0	3	0	0	0
Lane Group Flow (vph)	215	0	1483	0	0	2149
Confl. Peds. (#/hr)	255	221		203	203	
Confl. Bikes (#/hr)		7		14		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.0		66.0			66.0
Effective Green, g (s)	21.0		66.0			66.0
Actuated g/C Ratio	0.22		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	205		1265			464
v/s Ratio Prot			0.81			
v/s Ratio Perm	c0.23					c3.21
v/c Ratio	1.05		1.17			4.63
Uniform Delay, d1	37.0		14.5			14.5
Progression Factor	1.00		0.88			1.29
Incremental Delay, d2	76.2		78.4			1634.6
Delay (s)	113.2		91.2			1653.3
Level of Service	F		F			F
Approach Delay (s)	113.2		91.2			1653.3
Approach LOS	F		F			F

Intersection Summary			
HCM 2000 Control Delay	961.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.76		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	165.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	320	25	50	271	176	38	1215	167	196	1796	236
Future Volume (vph)	50	320	25	50	271	176	38	1215	167	196	1796	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.74	1.00	0.96		1.00	0.96	
Flpb, ped/bikes		0.98			0.98	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3370			3453	1174	1770	1755		1770	1764	
Flt Permitted		0.86			0.80	1.00	0.07	1.00		0.07	1.00	
Satd. Flow (perm)		2913			2786	1174	122	1755		122	1764	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	320	25	50	271	176	38	1215	167	196	1796	236
RTOR Reduction (vph)	0	5	0	0	0	26	0	5	0	0	5	0
Lane Group Flow (vph)	0	390	0	0	321	150	38	1377	0	196	2027	0
Confl. Peds. (#/hr)	116		99	99		116	198		260	260		198
Confl. Bikes (#/hr)			7			3			10			9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Effective Green, g (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		705			674	284	78	1126		78	1132	
v/s Ratio Prot								0.78			1.15	
v/s Ratio Perm		c0.13			0.12	0.13	0.31			c1.60		
v/c Ratio		0.55			0.48	0.53	0.49	1.22		2.51	1.79	
Uniform Delay, d1		31.5			30.8	31.3	8.9	17.0		17.0	17.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		0.67	0.67	
Incremental Delay, d2		0.5			0.2	0.8	20.2	108.3		684.2	356.1	
Delay (s)		32.0			31.0	32.1	29.0	125.3		695.6	367.5	
Level of Service		C			C	C	C	F		F	F	
Approach Delay (s)		32.0			31.4			122.7			396.4	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	239.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	170.1%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	85	0	0	81	0	1310	44	0	1789	46
Future Volume (Veh/h)	0	0	85	0	0	81	0	1310	44	0	1789	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	85	0	0	81	0	1310	44	0	1789	46
Pedestrians		174			136			52			31	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		17			13			5			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											265	
pX, platoon unblocked	0.36	0.36	0.36	0.36	0.36		0.36					
vC, conflicting volume	3430	3476	2038	3417	3477	1499	2009			1490		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6801	6928	2978	6766	6930	1499	2898			1490		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	0	0	100	36	100			100		
cM capacity (veh/h)	0	0	5	0	0	127	38			392		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	85	81	1354	1835
Volume Left	0	0	0	0
Volume Right	85	81	44	46
cSH	5	127	1700	1700
Volume to Capacity	15.87	0.64	0.80	1.08
Queue Length 95th (ft)	Err	84	0	0
Control Delay (s)	Err	73.6	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	Err	73.6	0.0	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	255.1			
Intersection Capacity Utilization	116.4%	ICU Level of Service	H	
Analysis Period (min)	15			

Appendix E LEVEL OF SERVICE WORKSHEETS: 2040 PLUS PROJECT CONDITIONS



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	5	18	171	44	130	23
Future Volume (vph)	5	18	171	44	130	23
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	18	171	44	130	23

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	23	215	153
Volume Left (vph)	5	171	0
Volume Right (vph)	18	0	23
Hadj (s)	-0.39	0.19	-0.06
Departure Headway (s)	4.3	4.3	4.1
Degree Utilization, x	0.03	0.26	0.17
Capacity (veh/h)	760	822	861
Control Delay (s)	7.4	8.8	8.0
Approach Delay (s)	7.4	8.8	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay	8.4		
Level of Service	A		
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	485	32	9	431	122	17	16	14	126	7	113
Future Volume (vph)	57	485	32	9	431	122	17	16	14	126	7	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.89			0.97			0.97	
Flpb, ped/bikes		0.98			1.00			0.99			0.96	
Frt		0.99			0.97			0.96			0.94	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3347			1611			1691			1583	
Flt Permitted		0.85			0.99			0.87			0.84	
Satd. Flow (perm)		2862			1599			1502			1357	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	57	485	32	9	431	122	17	16	14	126	7	113
RTOR Reduction (vph)	0	4	0	0	9	0	0	11	0	0	35	0
Lane Group Flow (vph)	0	570	0	0	553	0	0	36	0	0	211	0
Confl. Peds. (#/hr)	128		122	122		128	25		41	41		25
Confl. Bikes (#/hr)			2			25						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		67.8			67.8			18.7			18.7	
Effective Green, g (s)		67.8			67.8			18.7			18.7	
Actuated g/C Ratio		0.71			0.71			0.20			0.20	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		2042			1141			295			267	
v/s Ratio Prot												
v/s Ratio Perm		0.20			c0.35			0.02			c0.16	
v/c Ratio		0.28			0.48			0.12			0.79	
Uniform Delay, d1		4.9			6.0			31.4			36.3	
Progression Factor		0.59			1.00			1.00			1.00	
Incremental Delay, d2		0.0			1.5			0.1			14.3	
Delay (s)		2.9			7.4			31.5			50.6	
Level of Service		A			A			C			D	
Approach Delay (s)		2.9			7.4			31.5			50.6	
Approach LOS		A			A			C			D	

Intersection Summary			
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	345	45	58	451	55	486	1476	156	111	566	109
Future Volume (vph)	77	345	45	58	451	55	486	1476	156	111	566	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.79		0.98		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		0.99	1.00		0.99		0.97	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	0.99		1.00	0.98	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3476	1256		3379		1719	1791		1770	1777	
Flt Permitted		0.62	1.00		0.80		0.31	1.00		0.06	1.00	
Satd. Flow (perm)		2192	1256		2705		565	1791		118	1777	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	77	345	45	58	451	55	486	1476	156	111	566	109
RTOR Reduction (vph)	0	0	34	0	8	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	422	11	0	556	0	486	1628	0	111	668	0
Confl. Peds. (#/hr)	65		91	91		65	77		138	138		77
Confl. Bikes (#/hr)			2			16			5			2
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)		23.0	23.0		23.0		62.5	62.5		63.0	63.0	
Effective Green, g (s)		23.0	23.0		23.0		62.5	62.5		63.0	63.0	
Actuated g/C Ratio		0.24	0.24		0.24		0.66	0.66		0.66	0.66	
Clearance Time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		530	304		654		371	1178		78	1178	
v/s Ratio Prot								0.91			0.38	
v/s Ratio Perm		0.19	0.01		c0.21		0.86			c0.94		
v/c Ratio		0.80	0.04		0.85		1.31	1.38		1.42	0.57	
Uniform Delay, d1		33.8	27.5		34.4		16.2	16.2		16.0	8.6	
Progression Factor		1.00	1.00		0.87		0.80	0.79		0.59	0.23	
Incremental Delay, d2		7.6	0.0		8.6		141.3	172.4		229.5	1.2	
Delay (s)		41.4	27.5		38.3		154.3	185.1		239.0	3.2	
Level of Service		D	C		D		F	F		F	A	
Approach Delay (s)		40.1			38.3			178.0			36.5	
Approach LOS		D			D			F			D	

Intersection Summary			
HCM 2000 Control Delay	113.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.27		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	147.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	641	440	122	77	815	176	64	285	22	72	160	425
Future Volume (vph)	641	440	122	77	815	176	64	285	22	72	160	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.99			0.96		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98			0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	0.99			1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3231			3299		1770	3490		1770	1863	2697
Flt Permitted	0.95	0.51			0.79		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	1676			2611		1770	3490		1770	1863	2697
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	641	440	122	77	815	176	64	285	22	72	160	425
RTOR Reduction (vph)	0	4	0	0	13	0	0	4	0	0	0	29
Lane Group Flow (vph)	397	802	0	0	1055	0	64	303	0	72	160	396
Confl. Peds. (#/hr)	182		16	16		182	25		14	14		25
Confl. Bikes (#/hr)			4			13			7			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	33.8	89.8			52.0		6.7	20.2		7.0	20.5	54.3
Effective Green, g (s)	33.8	89.8			52.0		6.7	20.2		7.0	20.5	54.3
Actuated g/C Ratio	0.26	0.69			0.40		0.05	0.16		0.05	0.16	0.42
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	418	1562			1044		91	542		95	293	1126
v/s Ratio Prot	c0.25	0.13					0.04	c0.09		c0.04	c0.09	0.09
v/s Ratio Perm		0.22			c0.40							0.06
v/c Ratio	0.95	0.51			1.01		0.70	0.56		0.76	0.55	0.35
Uniform Delay, d1	47.3	9.6			39.0		60.7	50.8		60.7	50.5	25.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	30.8	0.1			30.6		18.2	1.3		28.6	2.1	0.1
Delay (s)	78.0	9.7			69.6		78.8	52.0		89.3	52.5	25.9
Level of Service	E	A			E		E	D		F	D	C
Approach Delay (s)		32.3			69.6			56.7			39.3	
Approach LOS		C			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	48.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	64	122	37	136	11	344	1039	53	9	661	137
Future Volume (vph)	59	64	122	37	136	11	344	1039	53	9	661	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.90			0.99		1.00	0.98			1.00	0.72
Flpb, ped/bikes		0.97			0.98		1.00	1.00			1.00	1.00
Frt		0.93			0.99		1.00	0.99			1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1498			1769		1770	1821			1861	1147
Flt Permitted		0.86			0.88		0.95	1.00			0.98	1.00
Satd. Flow (perm)		1309			1578		1770	1821			1834	1147
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	59	64	122	37	136	11	344	1039	53	9	661	137
RTOR Reduction (vph)	0	38	0	0	2	0	0	2	0	0	0	39
Lane Group Flow (vph)	0	207	0	0	182	0	344	1090	0	0	670	98
Confl. Peds. (#/hr)	98		88	88		98	87		101	101		87
Confl. Bikes (#/hr)			1						4			4
Turn Type	Perm	NA		Perm	NA		Prot	NA		Perm	NA	Perm
Protected Phases		4			4		1	6			2	
Permitted Phases	4			4						2		2
Actuated Green, G (s)		23.0			23.0		20.1	63.5			39.4	39.4
Effective Green, g (s)		23.0			23.0		20.1	63.5			39.4	39.4
Actuated g/C Ratio		0.24			0.24		0.21	0.67			0.41	0.41
Clearance Time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		316			382		374	1217			760	475
v/s Ratio Prot							0.19	c0.60				
v/s Ratio Perm		c0.16			0.12						0.37	0.09
v/c Ratio		0.66			0.48		0.92	0.90			0.88	0.21
Uniform Delay, d1		32.4			30.8		36.7	13.0			25.6	17.8
Progression Factor		1.00			1.00		0.93	1.06			1.00	1.00
Incremental Delay, d2		3.7			0.3		3.8	1.1			14.0	1.0
Delay (s)		36.1			31.2		37.9	14.9			39.6	18.8
Level of Service		D			C		D	B			D	B
Approach Delay (s)		36.1			31.2			20.4			36.1	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	126.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1	17	0	0	82	64	1421	115	0	843	14
Future Volume (Veh/h)	5	1	17	0	0	82	64	1421	115	0	843	14
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	1	17	0	0	82	64	1421	115	0	843	14
Pedestrians		64			134			8				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		6			13			1				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.53	0.53	0.65	0.53	0.53	0.35	0.65			0.35		
vC, conflicting volume	2602	2712	922	2616	2662	1612	921			1670		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2093	2301	609	2119	2205	1821	608			1984		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	93	94	100	100	0	89			100		
cM capacity (veh/h)	0	15	299	12	17	30	591			89		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	82	1600	857
Volume Left	5	0	64	0
Volume Right	17	82	115	14
cSH	0	30	591	1700
Volume to Capacity	Err	2.78	0.11	0.50
Queue Length 95th (ft)	Err	243	9	0
Control Delay (s)	Err	1086.6	11.8	0.0
Lane LOS	F	F	B	
Approach Delay (s)	Err	1086.6	11.8	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	146.8%	ICU Level of Service	H	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	95	115	2083	98	14	687
Future Volume (vph)	95	115	2083	98	14	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.85		0.99			1.00
Flpb, ped/bikes	0.86		1.00			1.00
Frt	0.93		0.99			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	1230		1841			1861
Flt Permitted	0.98		1.00			0.56
Satd. Flow (perm)	1230		1841			1034
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	95	115	2083	98	14	687
RTOR Reduction (vph)	7	0	2	0	0	0
Lane Group Flow (vph)	203	0	2179	0	0	701
Confl. Peds. (#/hr)	137	114		147	147	
Confl. Bikes (#/hr)		4		7		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.4		65.6			65.6
Effective Green, g (s)	21.4		65.6			65.6
Actuated g/C Ratio	0.23		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	277		1271			714
v/s Ratio Prot			c1.18			
v/s Ratio Perm	c0.17					0.68
v/c Ratio	0.73		1.71			0.98
Uniform Delay, d1	34.1		14.7			14.1
Progression Factor	1.00		1.10			0.53
Incremental Delay, d2	8.3		321.8			27.0
Delay (s)	42.5		338.0			34.5
Level of Service	D		F			C
Approach Delay (s)	42.5		338.0			34.5
Approach LOS	D		F			C

Intersection Summary			
HCM 2000 Control Delay	249.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.47		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	140.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	244	40	64	361	263	58	1850	73	36	655	77
Future Volume (vph)	43	244	40	64	361	263	58	1850	73	36	655	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98			1.00	0.74	1.00	0.99		1.00	0.99	
Flpb, ped/bikes		0.98			0.99	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3330			3466	1173	1770	1830		1770	1811	
Flt Permitted		0.82			0.81	1.00	0.28	1.00		0.07	1.00	
Satd. Flow (perm)		2740			2834	1173	517	1830		122	1811	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	43	244	40	64	361	263	58	1850	73	36	655	77
RTOR Reduction (vph)	0	11	0	0	0	26	0	1	0	0	4	0
Lane Group Flow (vph)	0	316	0	0	425	237	58	1922	0	36	728	0
Confl. Peds. (#/hr)	113		72	72		113	63		204	204		63
Confl. Bikes (#/hr)			2			9			7			3
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Effective Green, g (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		663			686	283	331	1175		78	1162	
v/s Ratio Prot								c1.05			0.40	
v/s Ratio Perm		0.12			0.15	c0.20	0.11			0.29		
v/c Ratio		0.48			0.62	0.84	0.18	1.64		0.46	0.63	
Uniform Delay, d1		30.8			32.1	34.2	6.9	17.0		8.6	10.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.23	1.34	
Incremental Delay, d2		0.2			1.2	18.3	1.2	289.8		6.2	0.8	
Delay (s)		31.0			33.3	52.5	8.0	306.8		16.9	14.4	
Level of Service		C			C	D	A	F		B	B	
Approach Delay (s)		31.0			40.6			298.1			14.6	
Approach LOS		C			D			F			B	

Intersection Summary			
HCM 2000 Control Delay	170.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	156.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	98	0	0	129	0	1860	22	0	718	25
Future Volume (Veh/h)	0	0	98	0	0	129	0	1860	22	0	718	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	98	0	0	129	0	1860	22	0	718	25
Pedestrians		51			85			22			19	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		5			8			2			2	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											265	
pX, platoon unblocked	0.76	0.76	0.76	0.76	0.76		0.76					
vC, conflicting volume	2800	2748	804	2806	2750	1975	794			1967		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3216	3148	581	3224	3149	1975	568			1967		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	100	73	100	100	0	100			100		
cM capacity (veh/h)	0	7	363	3	7	70	724			271		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	98	129	1882	743
Volume Left	0	0	0	0
Volume Right	98	129	22	25
cSH	363	70	1700	1700
Volume to Capacity	0.27	1.84	1.11	0.44
Queue Length 95th (ft)	27	289	0	0
Control Delay (s)	18.6	525.1	0.0	0.0
Lane LOS	C	F		
Approach Delay (s)	18.6	525.1	0.0	0.0
Approach LOS	C	F		

Intersection Summary				
Average Delay	24.4			
Intersection Capacity Utilization	117.4%	ICU Level of Service	H	
Analysis Period (min)	15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	3	37	153	53	186	22
Future Volume (vph)	3	37	153	53	186	22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	37	153	53	186	22

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	40	206	208
Volume Left (vph)	3	153	0
Volume Right (vph)	37	0	22
Hadj (s)	-0.51	0.18	-0.03
Departure Headway (s)	4.3	4.4	4.2
Degree Utilization, x	0.05	0.25	0.24
Capacity (veh/h)	757	803	847
Control Delay (s)	7.5	8.8	8.5
Approach Delay (s)	7.5	8.8	8.5
Approach LOS	A	A	A

Intersection Summary			
Delay	8.6		
Level of Service	A		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	850	50	28	340	100	16	13	40	358	33	174
Future Volume (vph)	97	850	50	28	340	100	16	13	40	358	33	174
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.0			4.0	
Lane Util. Factor		0.95			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.88			0.92			0.95	
Flpb, ped/bikes		1.00			1.00			1.00			0.92	
Frt		0.99			0.97			0.92			0.96	
Flt Protected		1.00			1.00			0.99			0.97	
Satd. Flow (prot)		3402			1593			1557			1522	
Flt Permitted		0.80			0.89			0.88			0.77	
Satd. Flow (perm)		2734			1428			1383			1206	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	850	50	28	340	100	16	13	40	358	33	174
RTOR Reduction (vph)	0	4	0	0	11	0	0	17	0	0	17	0
Lane Group Flow (vph)	0	993	0	0	458	0	0	52	0	0	548	0
Confl. Peds. (#/hr)	181		158	158		181	65		61	61		65
Confl. Bikes (#/hr)			22			15						2
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		42.5			42.5			44.0			44.0	
Effective Green, g (s)		42.5			42.5			44.0			44.0	
Actuated g/C Ratio		0.45			0.45			0.46			0.46	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		2.5			2.5			2.5			2.5	
Lane Grp Cap (vph)		1223			638			640			558	
v/s Ratio Prot												
v/s Ratio Perm		c0.36			0.32			0.04			c0.45	
v/c Ratio		0.81			0.72			0.08			0.98	
Uniform Delay, d1		22.8			21.4			14.2			25.1	
Progression Factor		1.02			1.00			1.00			1.00	
Incremental Delay, d2		0.6			6.8			0.0			33.5	
Delay (s)		23.8			28.1			14.3			58.6	
Level of Service		C			C			B			E	
Approach Delay (s)		23.8			28.1			14.3			58.6	
Approach LOS		C			C			B			E	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	748	377	109	224	142	78	1110	204	172	1587	65
Future Volume (vph)	42	748	377	109	224	142	78	1110	204	172	1587	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Lane Util. Factor		0.95	1.00		0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.66		0.92		1.00	0.96		1.00	0.99	
Flpb, ped/bikes		0.99	1.00		0.98		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.96		1.00	0.98		1.00	0.99	
Flt Protected		1.00	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3508	1043		3011		1770	1744		1770	1832	
Flt Permitted		0.89	1.00		0.53		0.07	1.00		0.07	1.00	
Satd. Flow (perm)		3117	1043		1620		126	1744		125	1832	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	42	748	377	109	224	142	78	1110	204	172	1587	65
RTOR Reduction (vph)	0	0	17	0	38	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	790	360	0	437	0	78	1312	0	172	1651	0
Confl. Peds. (#/hr)	126		153	153		126	157		145	145		157
Confl. Bikes (#/hr)			13			8			9			7
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4		4	4			6			2		
Actuated Green, G (s)		26.5	26.5		26.5		59.0	59.0		59.5	59.5	
Effective Green, g (s)		26.5	26.5		26.5		59.0	59.0		59.5	59.5	
Actuated g/C Ratio		0.28	0.28		0.28		0.62	0.62		0.63	0.63	
Clearance Time (s)		4.5	4.5		4.5		5.0	5.0		4.5	4.5	
Vehicle Extension (s)		2.0	2.0		2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		869	290		451		78	1083		78	1147	
v/s Ratio Prot								0.75			0.90	
v/s Ratio Perm		0.25	c0.35		0.27		0.62			c1.37		
v/c Ratio		0.91	1.24		1.01dl		1.00	1.21		2.21	1.44	
Uniform Delay, d1		33.1	34.2		33.8		18.0	18.0		17.8	17.8	
Progression Factor		1.00	1.00		1.19		1.31	1.27		1.03	1.01	
Incremental Delay, d2		12.9	135.0		24.6		30.6	95.9		579.9	202.3	
Delay (s)		46.0	169.2		64.9		54.1	118.8		598.2	220.3	
Level of Service		D	F		E		D	F		F	F	
Approach Delay (s)		85.8			64.9			115.1			255.9	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM 2000 Control Delay	156.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.91		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	148.6%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	731	959	141	37	241	60	39	182	69	164	173	463
Future Volume (vph)	731	959	141	37	241	60	39	182	69	164	173	463
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Lane Util. Factor	0.91	0.91			0.95		1.00	0.95		1.00	1.00	0.88
Frpb, ped/bikes	1.00	0.98			0.98		1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98			0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	0.99			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1610	3246			3346		1770	3328		1770	1863	2728
Flt Permitted	0.95	0.75			0.72		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1610	2448			2425		1770	3328		1770	1863	2728
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	731	959	141	37	241	60	39	182	69	164	173	463
RTOR Reduction (vph)	0	7	0	0	14	0	0	32	0	0	0	135
Lane Group Flow (vph)	599	1225	0	0	324	0	39	219	0	164	173	328
Confl. Peds. (#/hr)	83		41	41		83	19		33	33		19
Confl. Bikes (#/hr)			17			7			2			5
Turn Type	Prot	NA		Perm	NA		Prot	NA		Prot	NA	pm+ov
Protected Phases	1	6			2		7	4		3	8	1
Permitted Phases				2								8
Actuated Green, G (s)	49.9	87.0			33.1		8.2	19.0		11.0	21.8	71.7
Effective Green, g (s)	49.9	87.0			33.1		8.2	19.0		11.0	21.8	71.7
Actuated g/C Ratio	0.38	0.67			0.25		0.06	0.15		0.08	0.17	0.55
Clearance Time (s)	4.0	4.5			4.5		4.0	4.5		4.0	4.5	4.0
Vehicle Extension (s)	2.0	2.0			2.0		2.0	3.0		3.0	3.0	2.0
Lane Grp Cap (vph)	617	1944			617		111	486		149	312	1504
v/s Ratio Prot	c0.37	0.24					0.02	c0.07		c0.09	c0.09	0.08
v/s Ratio Perm		c0.18			0.13							0.04
v/c Ratio	0.97	0.63			0.52		0.35	0.45		1.10	0.55	0.22
Uniform Delay, d1	39.3	12.3			41.7		58.4	50.7		59.5	49.6	14.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.8	0.5			3.2		0.7	0.7		103.3	2.1	0.0
Delay (s)	68.1	12.8			44.9		59.1	51.4		162.8	51.8	14.9
Level of Service	E	B			D		E	D		F	D	B
Approach Delay (s)		30.9			44.9			52.4			53.2	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	100.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	138	525	23	71	5	371	782	45	6	1234	114
Future Volume (vph)	226	138	525	23	71	5	371	782	45	6	1234	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00			1.00	1.00
Frpb, ped/bikes		0.93			1.00		1.00	0.99			1.00	0.89
Flpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	1.00
Frt		0.92			0.99		1.00	0.99			1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1554			1822		1770	1821			1862	1405
Flt Permitted		0.89			0.82		0.95	1.00			0.70	1.00
Satd. Flow (perm)		1396			1504		1770	1821			1297	1405
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	226	138	525	23	71	5	371	782	45	6	1234	114
RTOR Reduction (vph)	0	55	0	0	2	0	0	2	0	0	0	88
Lane Group Flow (vph)	0	834	0	0	97	0	371	825	0	0	1240	26
Confl. Peds. (#/hr)	28		49	49		28	27		82	82		27
Confl. Bikes (#/hr)									8			8
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			4		1	6		5	2	
Permitted Phases	4			4								2
Actuated Green, G (s)		43.5			43.5		20.8	43.0			18.2	18.2
Effective Green, g (s)		43.5			43.5		20.8	43.0			18.2	18.2
Actuated g/C Ratio		0.46			0.46		0.22	0.45			0.19	0.19
Clearance Time (s)		4.5			4.5		4.0	4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0		2.0	2.0			2.0	2.0
Lane Grp Cap (vph)		639			688		387	824			248	269
v/s Ratio Prot							0.21	c0.45				
v/s Ratio Perm		c0.60			0.06						c0.96	0.02
v/c Ratio		1.31			0.14		0.96	1.00			5.00	0.10
Uniform Delay, d1		25.8			14.9		36.7	26.0			38.4	31.6
Progression Factor		1.00			1.00		0.73	1.02			1.00	1.00
Incremental Delay, d2		148.6			0.0		6.5	9.8			1809.0	0.7
Delay (s)		174.4			15.0		33.5	36.4			1847.4	32.3
Level of Service		F			B		C	D			F	C
Approach Delay (s)		174.4			15.0			35.5			1694.6	
Approach LOS		F			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	704.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.06		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	180.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	1	65	0	0	115	13	1142	70	0	1809	16
Future Volume (Veh/h)	13	1	65	0	0	115	13	1142	70	0	1809	16
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	1	65	0	0	115	13	1142	70	0	1809	16
Pedestrians		96			123			22				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		3.5			3.5			3.5				
Percent Blockage		9			12			2				
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)								485			635	
pX, platoon unblocked	0.48	0.48	0.82	0.48	0.48	0.39	0.82			0.39		
vC, conflicting volume	3231	3274	1935	3230	3247	1300	1921			1335		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	4219	4308	2033	4218	4252	991	2016			1080		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	0	0	100	0	94			100		
cM capacity (veh/h)	0	1	52	0	1	104	209			224		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	79	115	1225	1825
Volume Left	13	0	13	0
Volume Right	65	115	70	16
cSH	0	104	209	1700
Volume to Capacity	Err	1.11	0.06	1.07
Queue Length 95th (ft)	Err	183	5	0
Control Delay (s)	Err	198.5	5.2	0.0
Lane LOS	F	F	A	
Approach Delay (s)	Err	198.5	5.2	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	113.0%	ICU Level of Service	H	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	166	63	1399	107	36	2135
Future Volume (vph)	166	63	1399	107	36	2135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		5.0			5.0
Lane Util. Factor	1.00		1.00			1.00
Frpb, ped/bikes	0.86		0.99			1.00
Flpb, ped/bikes	0.63		1.00			1.00
Frt	0.96		0.99			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	930		1823			1861
Flt Permitted	0.97		1.00			0.36
Satd. Flow (perm)	930		1823			669
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	166	63	1399	107	36	2135
RTOR Reduction (vph)	14	0	3	0	0	0
Lane Group Flow (vph)	215	0	1503	0	0	2171
Confl. Peds. (#/hr)	255	221		203	203	
Confl. Bikes (#/hr)		7		14		
Turn Type	Perm		NA		Perm	NA
Protected Phases			2			6
Permitted Phases	8				6	
Actuated Green, G (s)	21.0		66.0			66.0
Effective Green, g (s)	21.0		66.0			66.0
Actuated g/C Ratio	0.22		0.69			0.69
Clearance Time (s)	3.0		5.0			5.0
Vehicle Extension (s)	2.0		2.0			2.0
Lane Grp Cap (vph)	205		1266			464
v/s Ratio Prot			0.82			
v/s Ratio Perm	c0.23					c3.25
v/c Ratio	1.05		1.19			4.68
Uniform Delay, d1	37.0		14.5			14.5
Progression Factor	1.00		1.70			0.91
Incremental Delay, d2	76.2		85.1			1655.9
Delay (s)	113.2		109.8			1669.1
Level of Service	F		F			F
Approach Delay (s)	113.2		109.8			1669.1
Approach LOS	F		F			F

Intersection Summary			
HCM 2000 Control Delay	976.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	3.80		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	166.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	320	25	50	271	176	38	1235	167	196	1818	236
Future Volume (vph)	50	320	25	50	271	176	38	1235	167	196	1818	236
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Lane Util. Factor		0.95			0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99			1.00	0.74	1.00	0.96		1.00	0.96	
Flpb, ped/bikes		0.98			0.98	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3370			3453	1174	1770	1757		1770	1765	
Flt Permitted		0.86			0.80	1.00	0.07	1.00		0.07	1.00	
Satd. Flow (perm)		2913			2786	1174	122	1757		122	1765	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	50	320	25	50	271	176	38	1235	167	196	1818	236
RTOR Reduction (vph)	0	5	0	0	0	26	0	5	0	0	5	0
Lane Group Flow (vph)	0	390	0	0	321	150	38	1397	0	196	2049	0
Confl. Peds. (#/hr)	116		99	99		116	198		260	260		198
Confl. Bikes (#/hr)			7			3			10			9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			4			6			2	
Permitted Phases	4			4		4	6			2		
Actuated Green, G (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Effective Green, g (s)		23.0			23.0	23.0	61.0	61.0		61.0	61.0	
Actuated g/C Ratio		0.24			0.24	0.24	0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0	5.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		705			674	284	78	1128		78	1133	
v/s Ratio Prot								0.80			1.16	
v/s Ratio Perm		c0.13			0.12	0.13	0.31			c1.60		
v/c Ratio		0.55			0.48	0.53	0.49	1.24		2.51	1.81	
Uniform Delay, d1		31.5			30.8	31.3	8.9	17.0		17.0	17.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.44	1.43	
Incremental Delay, d2		0.5			0.2	0.8	20.2	115.0		684.2	364.1	
Delay (s)		32.0			31.0	32.1	29.0	132.0		708.6	388.4	
Level of Service		C			C	C	C	F		F	F	
Approach Delay (s)		32.0			31.4			129.3			416.3	
Approach LOS		C			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	251.2	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.97		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	171.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	85	0	0	81	0	1330	44	0	1811	46
Future Volume (Veh/h)	0	0	85	0	0	81	0	1330	44	0	1811	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	0	85	0	0	81	0	1330	44	0	1811	46
Pedestrians		174			136			52			31	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		17			13			5			3	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											265	
pX, platoon unblocked	0.36	0.36	0.36	0.36	0.36		0.36					
vC, conflicting volume	3472	3518	2060	3459	3519	1519	2031			1510		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	6917	7043	3038	6881	7046	1519	2959			1510		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	0	0	100	34	100			100		
cM capacity (veh/h)	0	0	5	0	0	123	36			386		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	85	81	1374	1857
Volume Left	0	0	0	0
Volume Right	85	81	44	46
cSH	5	123	1700	1700
Volume to Capacity	17.34	0.66	0.81	1.09
Queue Length 95th (ft)	Err	87	0	0
Control Delay (s)	Err	77.6	0.0	0.0
Lane LOS	F	F		
Approach Delay (s)	Err	77.6	0.0	0.0
Approach LOS	F	F		

Intersection Summary				
Average Delay	252.0			
Intersection Capacity Utilization	117.6%	ICU Level of Service	H	
Analysis Period (min)	15			

Appendix F PEAK HOUR TRAFFIC SIGNAL WARRANT ANALYSIS

Existing Plus Project Conditions: AM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **E. 15th Street** Critical Approach Speed 25 m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)…… ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population …….. ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH	LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches	Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches	Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH	LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches	Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches	Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

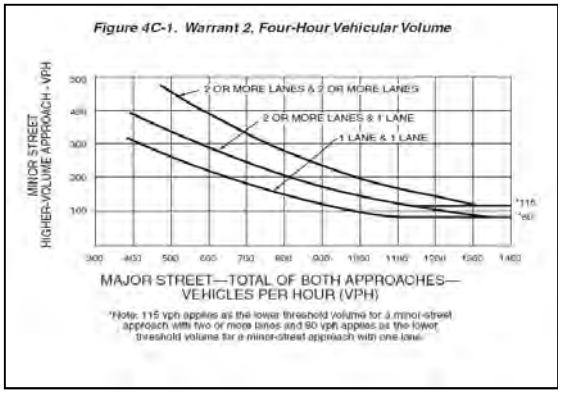


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A

SATISFIED **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B

SATISFIED **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	7:00 a.m.				Hour
Both Approaches - Major Street	X		274				
Highest Approaches - Minor Street	X		17				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

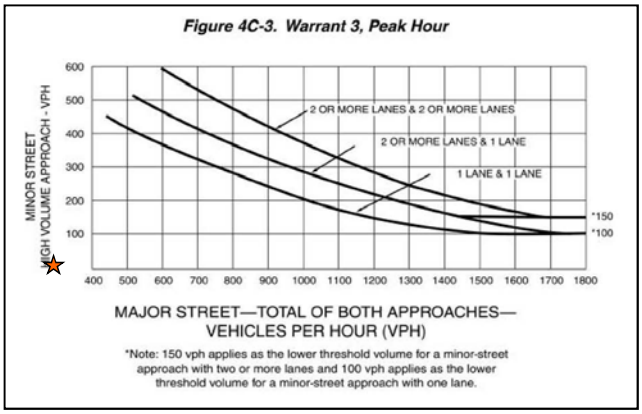


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: AM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **E. 15th Street** Critical Approach Speed 25 m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)…… ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population …….. ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

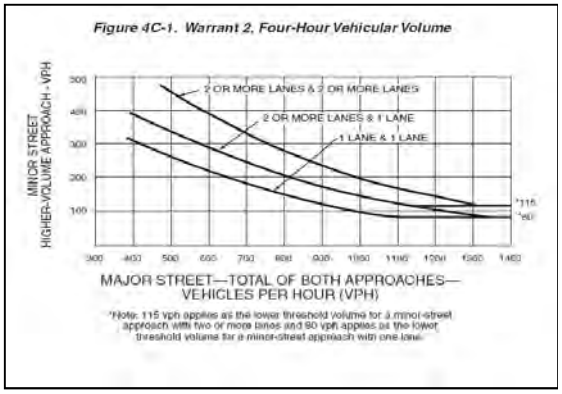


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A **SATISFIED** **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	7:00 a.m.				Hour
Both Approaches - Major Street	X		368				
Highest Approaches - Minor Street	X		23				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

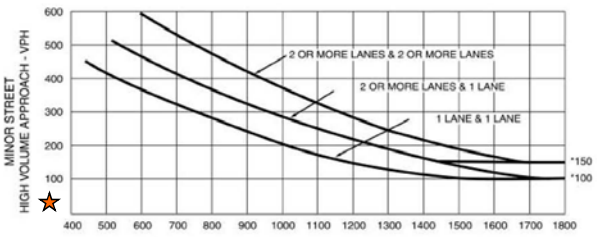


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: PM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **E. 15th Street** Critical Approach Speed 25 m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population ..... ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

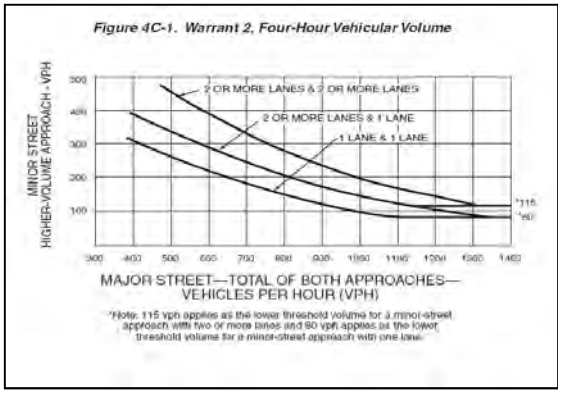


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or **PART B SATISFIED** **YES** ☐ **NO** ☑

PART A

SATISFIED **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B

SATISFIED **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	6:00 p.m.				Hour
Both Approaches - Major Street	X		414				
Highest Approaches - Minor Street	X		40				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

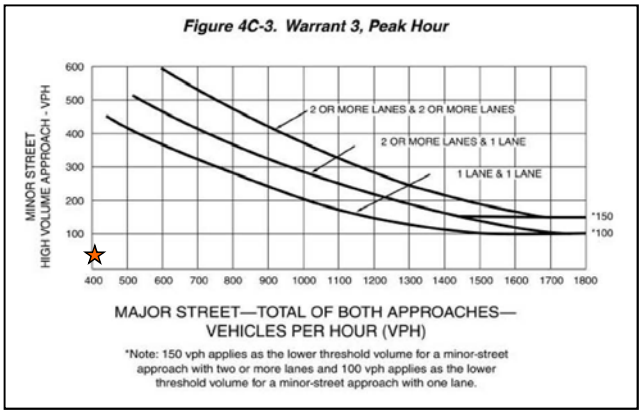


Figure 4C-3. Warrant 3, Peak Hour

Existing Plus Project Conditions: PM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **E. 15th Street** Critical Approach Speed 25 m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)…… ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population …….. ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

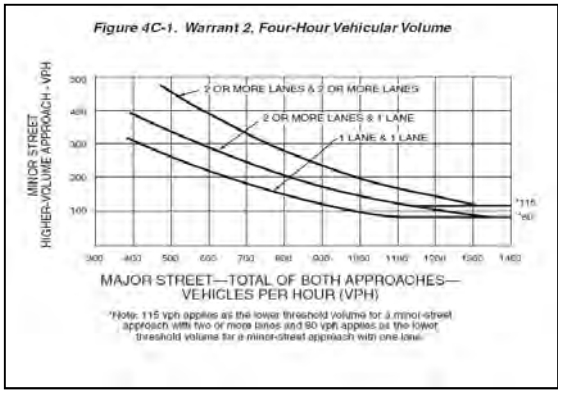


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A **SATISFIED** **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	6:00 p.m.				Hour
Both Approaches - Major Street	X		247				
Highest Approaches - Minor Street	X		25				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

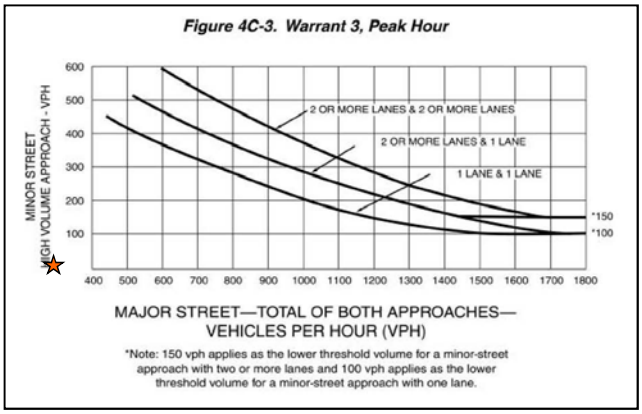


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: AM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM			
	Alameda			CALC JL	DATE 3/4/2016	
				CHK	DATE	

Major St: **International Boulevard** Critical Approach Speed _____ m/h

Minor St: **Derby Avenue** Critical Approach Speed _____ m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐

In built up area of isolated community of < 10,000 population ..... ☐ or ☐ RURAL (R)

☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

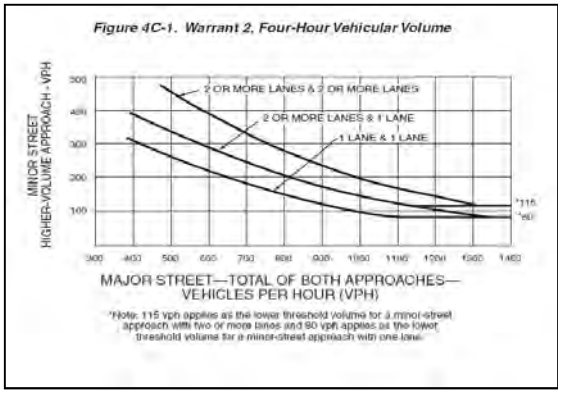


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A

SATISFIED **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B

SATISFIED **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	7:00 a.m.				Hour
Both Approaches - Major Street	X		2457				
Highest Approaches - Minor Street	X		23				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

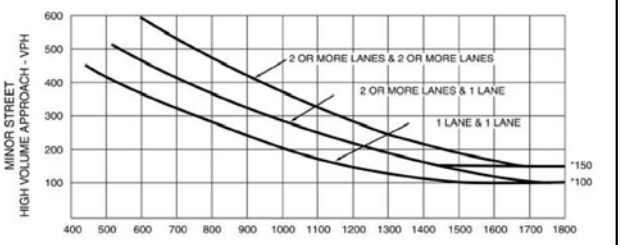


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: PM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **International Boulevard** Critical Approach Speed _____ m/h

Minor St: **Derby Avenue** Critical Approach Speed _____ m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population ..... ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

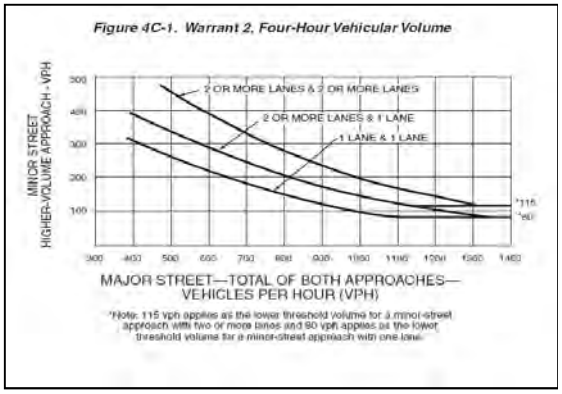


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☑ **NO** ☐

PART A

SATISFIED **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B

SATISFIED **YES** ☑ **NO** ☐

APPROACH LANES	One	2 or More	6:00 p.m.				Hour
Both Approaches - Major Street	X		3050				
Highest Approaches - Minor Street	X		115				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

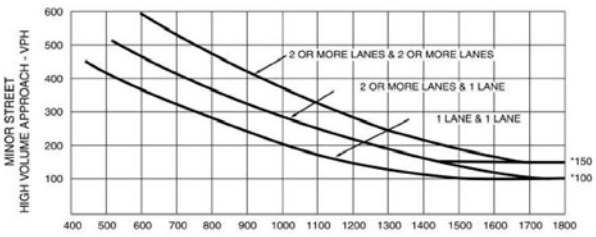


Figure 4C-3. Warrant 3, Peak Hour

Existing Plus Project Conditions: AM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **International Boulevard** Critical Approach Speed ____ m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐

In built up area of isolated community of < 10,000 population ..... ☐ or ☐ RURAL (R)

☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

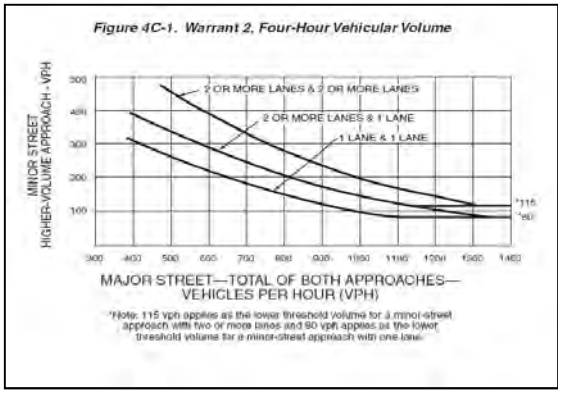


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A **SATISFIED** **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	7:00 a.m.				Hour
Both Approaches - Major Street	X		1664				
Highest Approaches - Minor Street	X		96				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

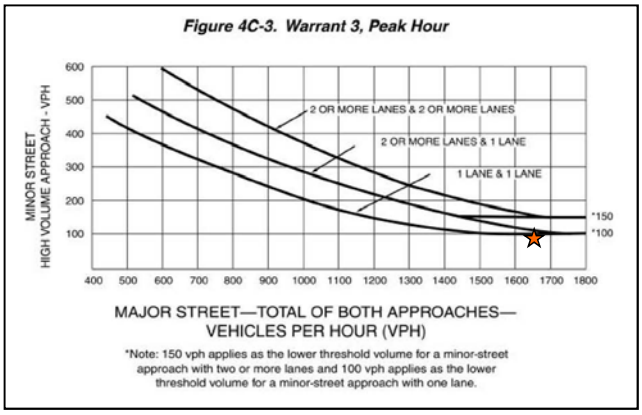


Figure 4C-3. Warrant 3, Peak Hour

Existing Plus Project Conditions: PM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM			
	Alameda			CALC	JL	DATE 3/4/2016
				CHK		DATE

Major St: **International Boulevard** Critical Approach Speed ____ m/h

Minor St: **Derby Avenue** Critical Approach Speed 25 m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐

In built up area of isolated community of < 10,000 population ..... ☐ or ☐ RURAL (R)

☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

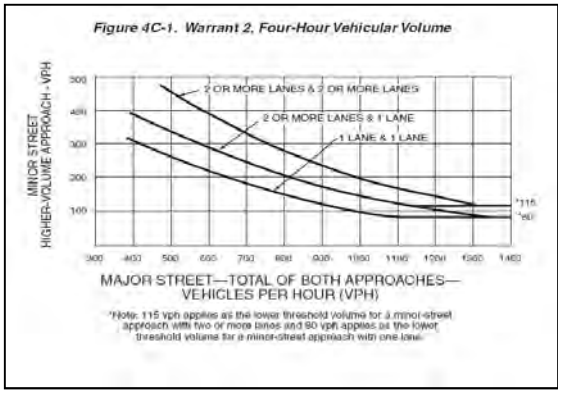


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☑

PART A **SATISFIED** **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	6:00 p.m.				Hour
Both Approaches - Major Street	X		1511				
Highest Approaches - Minor Street	X		79 *				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.
Note:
* 50% Right-Turn teduction is applied

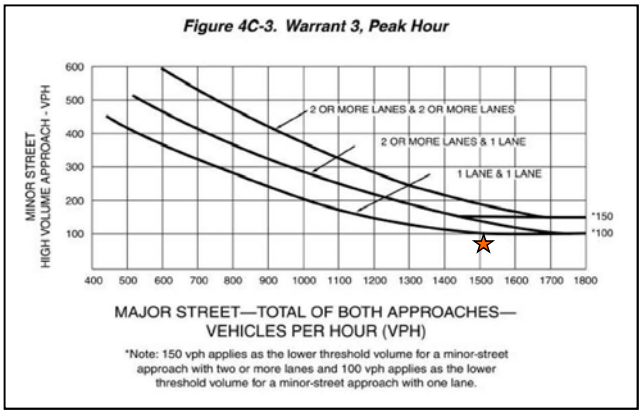


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: AM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **International Boulevard** Critical Approach Speed _____ m/h

Minor St: **36th Avenue** Critical Approach Speed _____ m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐

In built up area of isolated community of < 10,000 population ..... ☐ or ☐ RURAL (R)

☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) U	R	U	R	1	2	3	4	5	6	7	8	Hour
	1		2 or More										
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

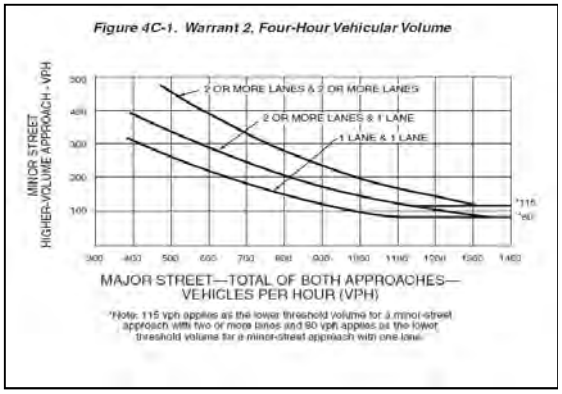


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☑ **NO** ☐

PART A **SATISFIED** **YES** ☐ **NO** ☐

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☑ **NO** ☐

APPROACH LANES	One	2 or More	7:00 a.m.				Hour
Both Approaches - Major Street	X		2625				
Highest Approaches - Minor Street	X		129				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

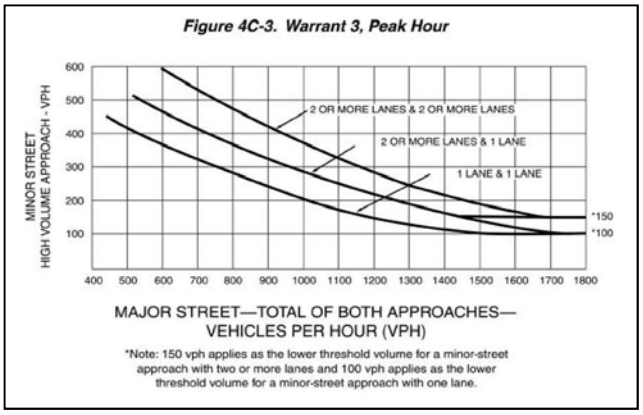


Figure 4C-3. Warrant 3, Peak Hour

2040 Plus Project Conditions: PM Peak Hour

Signal Warrant Analysis

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 1 of 2)

DIST	CO	RTE	KPM				
	Alameda			CALC	JL	DATE	3/4/2016
				CHK		DATE	

Major St: **International Boulevard** Critical Approach Speed _____ m/h

Minor St: **36th Avenue** Critical Approach Speed _____ m/h

Critical speed of major street traffic > 64 km/h (40 mph)..... ☐ or ☐ RURAL (R)

In built up area of isolated community of < 10,000 population ..... ☑ URBAN (U)

WARRANT 1 - Eight Hour Vehicular Volume

Condition A - Minimum Vehicle Volume **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	500 (400)	350 (280)	600 (480)	420 (336)									
Highest Approaches Minor Street	150 (120)	105 (84)	200 (160)	140 (112)									

Condition B - Interruption of Continuous Traffic **100% SATISFIED** YES ☐ NO ☐

80 % SATISFIED YES ☐ NO ☐

APPROACH LANES	MINIMUM REQUIREMENTS (80% SHOWN IN BRACKETS) 1 U	1 R	2 or More U	2 or More R	1	2	3	4	5	6	7	8	Hour
Both Approaches Major Street	750 (600)	525 (420)	900 (720)	630 (504)									
Highest Approaches Minor Street	75 (60)	53 (42)	100 (80)	70 (56)									

Combination of Conditions A & B **SATISFIED** YES ☐ NO ☐

REQUIREMENT	WARRANT		FULFILLED
TWO WARRANTS SATISFIED 80%	1. MINIMUM VEHICULAR VOLUME		Yes ☐ No ☐
	2. INTERRUPTION OF CONTINUOUS TRAFFIC		

Figure 4C-101. Traffic Signal Warrants Worksheet (Sheet 2 of 2)

WARRANT 2 - Four Hour Vehicular Volume

SATISFIED **YES** ☐ **NO** ☐

Record hourly vehicular volumes for four hours

APPROACH LANES	One	2 or More	9:00 a.m.	10:00 a.m.	11:00 a.m.	7:00 p.m.	Hour
Both Approaches - Major Street							
Highest Approaches - Minor Street							

*All plotted points fall above the curves in MUTCD Figure 4C-1 or 4C-2. Yes ☐ No ☐

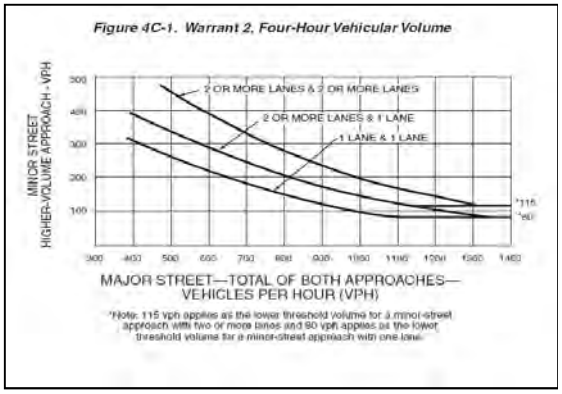


Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume

WARRANT 3 - Peak Hours

PART A or PART B SATISFIED **YES** ☐ **NO** ☐

PART A **SATISFIED** **YES** ☐ **NO** ☑

(All parts, 1, 2 and 3 below must be satisfied)

1. The total delay experienced for traffic on one minor street approach controlled by a STOP sign equals or exceeds four vehicle-hours for a one-lane approach and five vehicle-hours for a two-lane approach; AND — Yes ☐ No ☐
2. The volume on the same minor street approach equals or exceeds 100 vph for one moving lane of traffic or 150 vph for two moving lanes: AND — Yes ☐ No ☐
3. The total entering volume services during the hour equals or exceeds 800 vph for intersections with four or more approaches or 650 vph for intersections with three approaches. — Yes ☐ No ☐

PART B **SATISFIED** **YES** ☐ **NO** ☑

APPROACH LANES	One	2 or More	6:00 p.m.				Hour
Both Approaches - Major Street	X		3231				
Highest Approaches - Minor Street	X		85				

The plotted points for vehicles per hour on major streets (both approaches) and the corresponding per hour higher volume vehicle minor street approach (one direction only) for one hour (any consecutive 15 minute
fall above the applicable curves in MUTCD Figure 4C-3 or 4C-4.

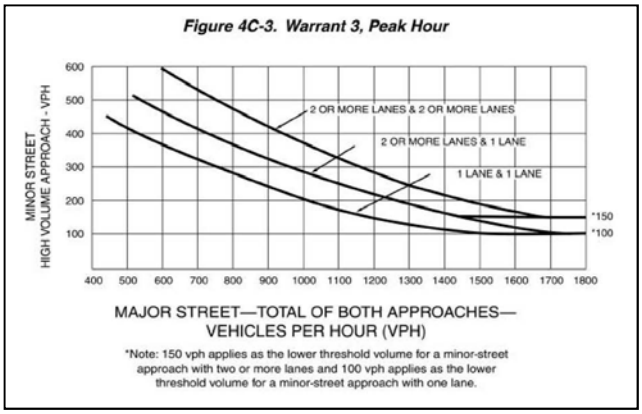


Figure 4C-3. Warrant 3, Peak Hour

ATTACHMENT F

Transportation Demand Management Plan
Aspire Public School - Oakland, Ca.

Prepared for:
The City of Oakland

Prepared by:
Stantec Consulting



March 07, 2018

March 7, 2018

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1.0 INTRODUCTION

1.1 GOALS AND APPROACH

The proposed Aspire Public School (herein referred to as "School") is located on E. 15th Street in Oakland, CA. As currently programmed, the maximum enrollment for the School is expected to be 620 students, from kindergarten to eighth grade (i.e. ages 4 years, 8 months to 14 years), and would include approximately 51 faculty/staff members. As shown in **Table 2**, it is expected that the School would generate, at full enrollment and using the City's Mode Split Adjustment, approximately 318 vehicle trips on a typical weekday during the a.m. peak hour, and 212 p.m. peak hour trips. It should be noted that calculated trip generation is based upon maximum enrollment and actual enrollment may vary.

This Transportation Demand Management (TDM) Plan is a set of strategies that reduce the number of single occupancy vehicle (SOV) trips that travel to and from a site. The Aspire Public School and staffing faculty will implement this TDM Plan that seeks to annually reduce the number of SOV and improve and maintain traffic circulation in the vicinity of the School. Based on direction provided by City of Oakland Staff, this plan is required to reduce the proposed project VMT impact to less-than significant (20% reduction of total project VMT) and achieve a 20% reduction in SOV trips, as shown in **Table 6**.

1.2 SIGNIFICANCE CRITERIA

Based on the City of Oakland's Traffic Impact Review Guidelines (TIRG), a proposed project would have a significant effect on the environment if it would:

1. Conflict with a plan, ordinance, or policy addressing the safety or performance of the circulation system, including transit, roadways, bicycle lanes, and pedestrian paths (except for automobile level of service or other measures of vehicle delay); or
2. Cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure; or
3. Substantially induce additional automobile travel by increasing physical roadway capacity in congested areas (i.e., by adding new mixed-flow lanes) or by adding new roadways to the network.

1.3 SIGNIFICANT IMPACT CRITERIA / VEHICLE MILES TRAVELED (VMT) STANDARDS

According to Bureau of Planning's *Update to CEQA Thresholds of significance and Transportation Impact Study guidelines*[1], on September 21, 2016, the City of Oakland's Planning Commission directed staff to update the City of Oakland's California Environmental Quality Act (CEQA) Thresholds of Significance Guidelines related to transportation impacts in order to

[1] Update to CEQA Thresholds of Significance and Transportation Impact Study Guidelines, Darin Fanelletti, Interim Director of Planning and Building Department Environmental Review Officer, October 17, 2016.

implement the directive from Senate Bill 743 (Steinberg 2013) to modify local environmental review processes by removing automobile delay, as described solely by level of service (LOS) or similar measures of vehicular capacity or traffic congestion, as a significant impact on the environment pursuant to CEQA. The new Thresholds replace LOS with vehicle miles traveled (VMT) criteria to determine whether a project causes a significant impact on the environment related to transportation. According to Bureau of Planning's City of Oakland Transportation Impact Review Guidelines[2], the project would have a significant effect on the environment if it would cause substantial additional VMT per capita, per service population, or other appropriate efficiency measure. The following are thresholds of significance related to substantial additional VMT:

- For residential projects, a project would cause substantial additional VMT if it exceeds existing regional household VMT per capita minus 15 percent.
- For office projects, a project would cause substantial additional VMT if it exceeds the existing regional VMT per employee minus 15 percent.
- For retail projects, a project would cause substantial additional VMT if it exceeds the existing regional VMT per employee minus 15 percent.

There are three key screening criteria for land use development projects: small size, project location in a low-VMT area, and project location near transit stations.

1. Presumption of Less Than Significant Impact for Small Projects – Absence of substantial evidence indicating that a project would generate a potentially significant level of VMT, projects that generate fewer than 100 vehicle trips per day generally may be assumed to cause a less-than-significant transportation impact.

2. Presumption of Less Than Significant Impact for Residential, Retail, and/or Office Projects in Low-VMT Areas – Residential, retail, and office projects that are located in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility) will tend to exhibit similarly low VMT.

3. Presumption of Less Than Significant Impact Near Transit Stations – Presume that residential, retail, and office projects, as well as mixed use projects, proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor3 will have a less than significant impact on VMT. The presumption would not apply, however, if project-specific or location-specific information indicates that the project will still generate significant levels of VMT.

1.4 VEHICLE MILES TRAVELED (VMT)

This section summarizes vehicle miles traveled (VMT) analysis for the Existing plus Project conditions. The analysis is based on the information provided in the Bureau of Planning – Strategic Planning Division's maps.[4]

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[2] City of Oakland Transportation Impact Review Guidelines, April 14, 2017

[3] Major transit stop is defined in CEQA Section 21064.3 as a rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

[4] Data for these maps can be obtained via the Bureau of Planning – Strategic Planning Division's Dropbox using this link: https://www.dropbox.com/s/tev0hbvezo5dukl/VMT_Layers.gdb.zip?dl=0.

For the purpose of this VMT screening and analysis, schools are treated as office use. The regional average daily VMT per worker is 20.7. Refer to **Table 1**, the traffic analysis zone (TAZ) in which the project site is located is TAZ 927.

Table 1 – Year 2020 Vehicle Miles Traveled

Land Use	TAZ 927	Bay Area	
		Regional Average	Regional Average minus 15% (Threshold)
Office (workers)	20.7	23.2	19.7
TAZ Percent Difference	-	-(10.8%)	4.8%

As shown in **Table 1**, the daily VMT per worker within TAZ 927 is 10.8% below the regional average but 4.8% above the regional threshold.

A project would have a significant effect on the environment if it would cause substantial additional VMT. The Bureau of Planning's Transportation Impact Study Guidelines recommends screening criteria to identify types, characteristics, or locations of projects that would not result in significant impacts to VMT. If a project meets any of the below screening criteria, then it is presumed that VMT impacts would be less than significant for the project and a detailed VMT analysis is not required.

Presumption of Less Than Significant Impact for Small Projects
The proposed Project would generate more than 100 vehicle trips per day, and therefore, does not meet this screening criteria.

Presumption of Less Than Significant Impact or Residential, Retail, and/or Office Projects in Low-VMT Areas
As shown in **Table 1** above, in 2020, the average daily VMT per worker in TAZ 927 is 20.7 miles. This is 10.8 percent below the regional average daily VMT per capita of 23.2 in 2020. Given the project site is located in an area where the VMT is less than 15 percent below the regional average, the proposed project does not meet this screening criteria.

Presumption of Less Than Significant Impact Near Transit Stations
The proposed Project site is located within 0.5 mile of Fruitvale BART Station, which is an existing major transit stop11. However, the proposed Project will still generate significant levels of VMT since students typically come by vehicles. Therefore, the proposed Project does not meet this screening criteria.

Therefore, the proposed Project does not meet any of the screen criteria. However, the application of required TDM measures would reduce VMT impacts to less-than-significant levels. Therefore, a detailed VMT analysis is not required. This TDM program has been be prepared to reduce auto trips by 20%.

It is assumed that vehicle trip reductions would apply to overall mode split and that vehicle trip length and average vehicle occupancy would remain constant. Thus, vehicle trip reductions would be equal to VMT reductions. employing this methodology, reducing the peak hour project trips by 20% would also reduce the project VMT by 20%, resulting in an estimated per employee VMT of 16.56, well below the regional threshold of 19.7 and resulting in less-than-significant impact. As shown in **Table 6**, the estimated trip and VMT reduction has been calculated to be 22.3%, exceeding the 20% requirement.

The project trip generation and 20% TDM trip reduction is shown in **Table 2**.

Table 2 - Project Trip Generation

Land Use (ITE Code)	Size	A.M. Peak Hour				P.M. Peak Hour				Daily Trips	
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	Total
Private School (K-8) (534)	620 Students	0.9	307	251	558	0.6	175	197	372	2.48	1538
Transit/Bike/Walk Trips Reduction	43.0%		132	108	240		75	85	160		661
Totals			**175**	**143**	**318**		**100**	**112**	**212**		**877**

Source: ITE Trip Generation, 9th Edition, 2012. Additional trip reductions based on transit proximity were not shown for project trip generation in the TDM.
Note: * The proposed Project would include program from Kindergarten to eighth grade. ITE land use category "Private School (K-8)" would provide closest trip generation estimates compared to other public-school land use categories

In addition to the 20% reduction, the secondary goals of this TDM are:

1. Reduce total SOV trips by students, guardians, faculty, and staff during peak periods.
2. Reduce School related congestion on surrounding roadways by managing parking, drop-off and pick-up conditions
3. Promote safe and neighborhood-friendly driving behavior
4. Facilitate the student drop-off and pick-up process to ease traffic congestion and enhance student and driver safety
5. Ensure that special events held at the Aspire School do not interfere with the livability of the surrounding neighborhood

In addition to this TDM plan, the Aspire School will prepare and release additional traffic site operation documents and handbooks that will provide detailed information in regard to student pick up and drop off, special events procedures, and updates to programs, information, and incentives. These documents will be updated and released each year, prior to the start of School, and will contain information that is specific to student groups based on age and grade.

1.5 ROADWAY NETWORK

International Boulevard/ SR 185 is a four-lane urban arterial roadway that runs approximately north-south parallel to Interstate 880 (I-880), beginning at the Lake Merritt area, passing through

east Oakland and City of San Leandro, and ending in the City of Hayward where it becomes Mission Street.

Derby Avenue is a two-lane local street running approximately east-west between E. 10th Street and E. 15th Street.

E. 15th Street is a two-lane local street that runs approximately north-south between Fruitvale Avenue and the cul-de-sec north of Derby Avenue in the Project vicinity.

29th Avenue is a collector street with two to four lanes that runs approximately east-west between E. 17th Street and I-880. 29th Avenue provides access to and from Northbound I-880.

Fruitvale Avenue is an urban arterial roadway with two to four lanes that runs approximately east-west providing access between Interstate 580 (I-580) and City of Alameda. East of I-580, Fruitvale Avenue becomes Lyman Road, and it becomes Tilden Way west of Tidal Canal between Oakland and Alameda.

34th Avenue is a two-lane collector street that runs discontinuously between E. 9th Street and Henrietta Street. In the Project vicinity, 34th Avenue intersects with International Boulevard as a T-intersection.

35th Avenue is a collector street with two to four lanes that runs discontinuously between E. 9th Street and I-580. East of I-580, 35th Avenue runs as an urban arterial roadway and becomes Redwood Road before the interchange with Highway 13.

36th Avenue is a two-lane collector street that runs discontinuously between E. 9th Street and Harper Street.

E. 12th Street is an urban arterial roadway with two to four lanes that runs approximately north-south between 14th Avenue and 42nd Avenue. North of 14th Avenue, E. 12th Street becomes E. 8th Street; and south of 42nd Avenue, it becomes a collector street until the cul-de-sac south of 54th Avenue.

1.6 TRANSIT SERVICE

The proposed School is well served by transit, with six (6) AC Transit lines operating within the study area. Due to the close proximity of transit services, it is anticipated that 10-15% of the student population will arrive via transit.

AC Transit provides bus transit service to the greater San Francisco East Bay Area, including Oakland and several other cities in Alameda and Contra Costa Counties, and Transbay service to downtown San Francisco. Access to transit will reduce the number of SOV trips by providing a viable alternate mode of transportation to the School site. Detailed information on AC Transit services can be found at http://www.actransit.org.

The Fruitvale BART Station is located approximately .5 miles from the School site and is accessible via defined bicycle and pedestrian networks. Bart provides access throughout the Bay Area region. Detailed information regarding BART can be found at www.BART.gov

1.7 BICYCLE FACILITIES

Stantec assessed existing bicycle conditions through field surveys on March 3, 2016 and review of the *2007 Bicycle Master Plan*[5].

Currently, a Class III bike route runs on Fruitvale Avenue east of E. 12th Street. The shared lane marking is placed on the outer lane of Fruitvale Avenue for both directions. West of E. 12th Street, Fruitvale Avenue becomes a Class II bike route with one striped bike lane on each direction. Additionally, students may use the sidewalks along streets with Class III bike lanes while traveling to the Class II bike lanes, which provide a higher level of safety for bicyclists. The City of Oakland allows minors to ride their bicycles along sidewalks.

Additional information on existing and planned bicycle facilities can be found in the City of Oakland's Bicycle Master Plan.

Providing information to students on safe and efficient routes to School supports the use of bicycles as a mode of student transportation. Using student residence location information provided by Aspire, **Figure 3** was created to identify primary bicycle routes for the student population.

1.8 PEDESTRIAN FACILITIES

Generally, the Aspire School is well served by existing pedestrian facilities. Pedestrian sidewalks are present on all streets in the School vicinity area. Six-foot wide and seven-foot wide sidewalks are currently in place along E. 15th Street north of Derby Avenue on the west side and east side of the street, respectively. A 10-foot wide sidewalk exists along the School frontage on Derby Avenue.

A high percentage of the intersections along International Blvd., Fruitvale Ave, and Foothill Blvd contain well marked crosswalks and pedestrian curb ramps. These existing pedestrian facilities provide numerous routes and networks for students to utilize. Through informational flyers and education, Aspire will encourage students and families that live in the School's vicinity to walk to School.

[5] *City of Oakland Bicycle Master Plan, part of the Land Use & Transportation Element of the Oakland General Plan,* City of Oakland, December 2007

March 7, 2018

Figure 1 - Vicinity Map

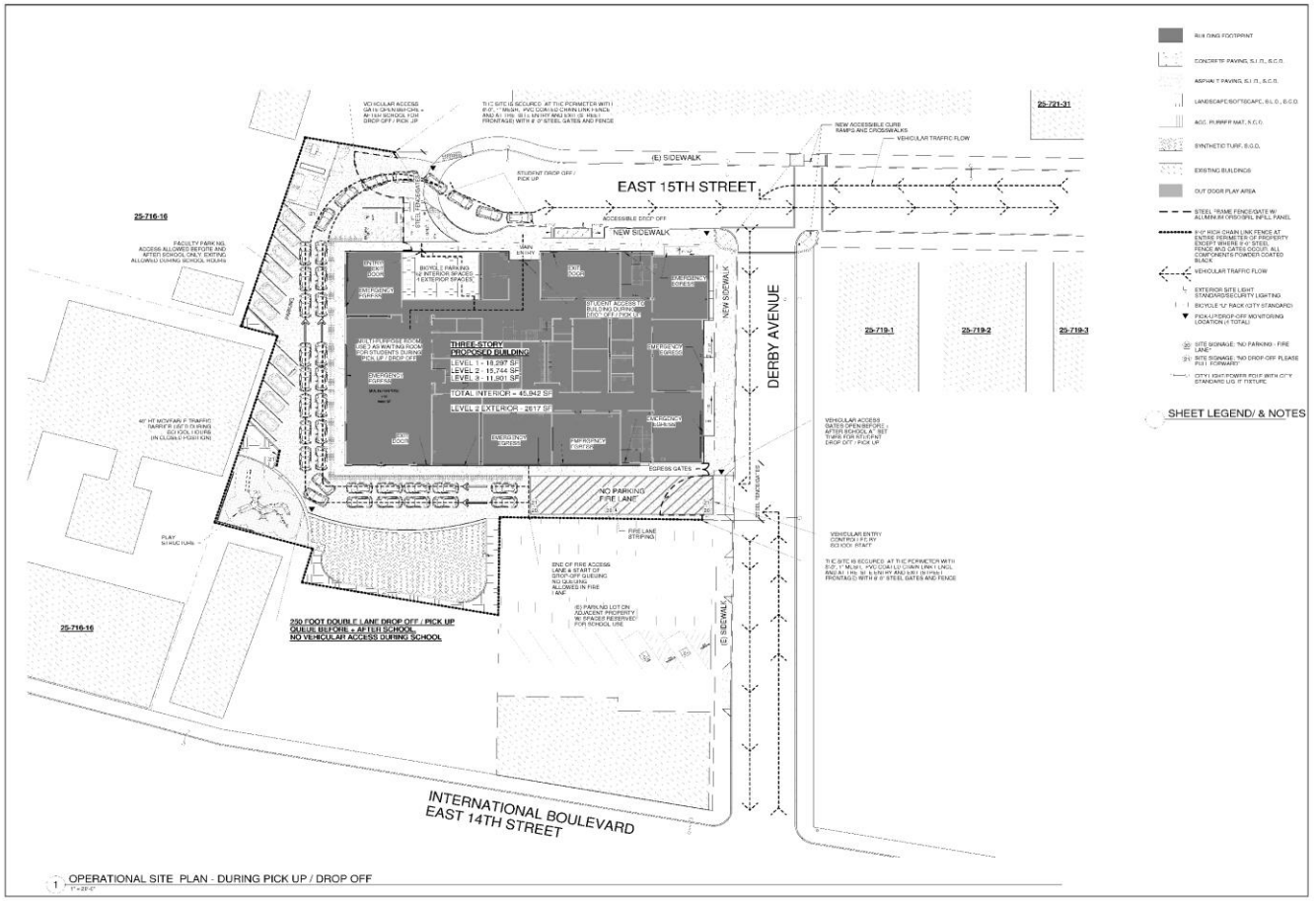


City of Oakland
Transportation Demand Managment Plan for Aspire Public School
Vicinity Map

Figure
1

Stantec

Figure 2 - School Site Plan

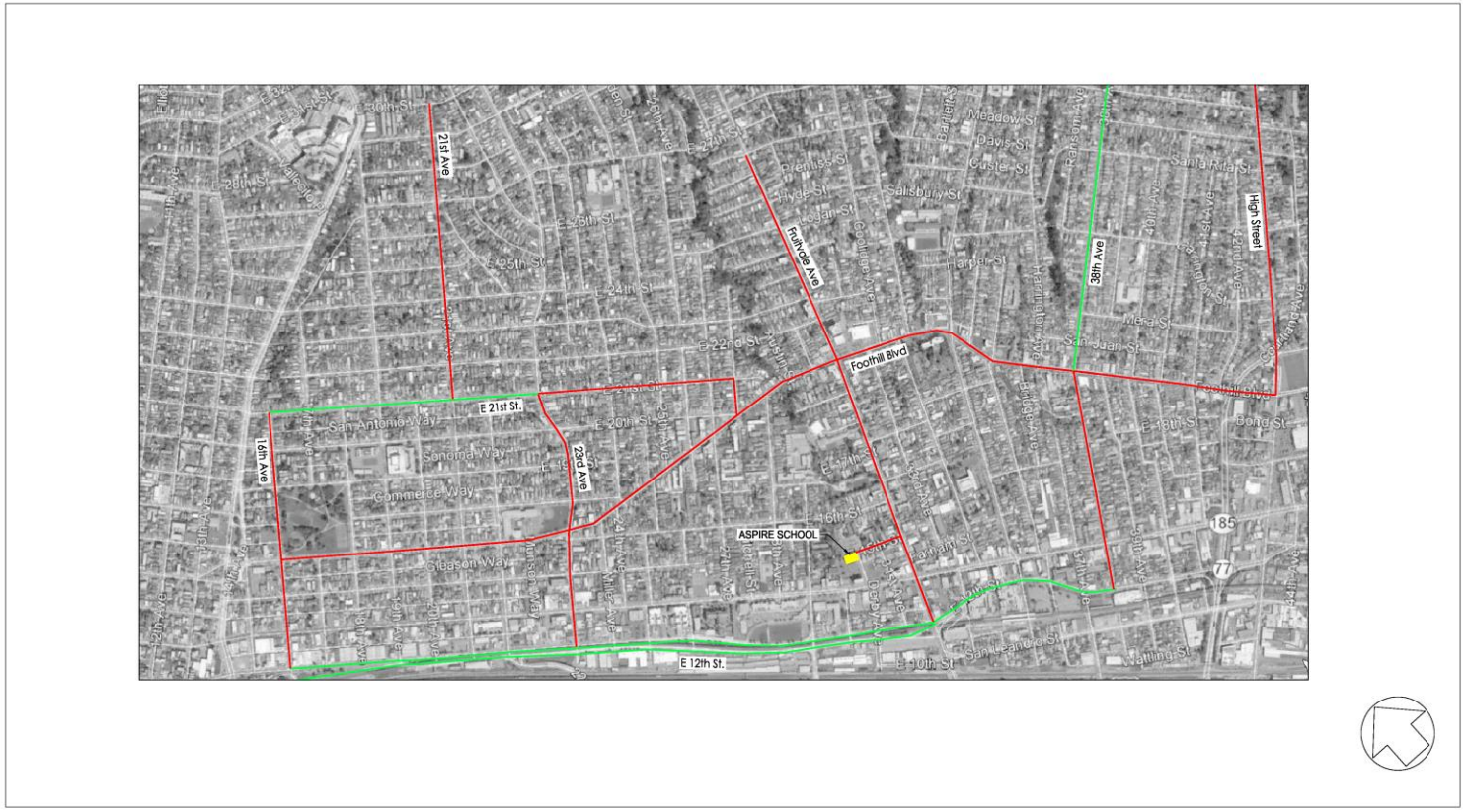


City of Oakland
TDM Plan for The Aspire Public School
Proposed Site Plan

Figure
2

Stantec

Figure 3 -Primary Bicycle Routes to the Aspire School



2.0 TRAFFIC AND CIRCULATION MANAGEMENT

Although the purpose of this TDM is to reduce the number of SOV trips, it is crucial that vehicles arriving and departing from the School site create the least amount of impact to the surrounding roadways as possible. To achieve the TDM's requirements, efficient management of vehicles and parking is necessary.

2.1 STUDENT PICK UP AND DROP OFF

The School will manage vehicle circulation related to the School by a clearly defined and regulated pick up/drop off location, and managing their operations via School staff. The loading and unloading zone will be on the south side of E 15th St, in front of the school's main entrance. Further detail can be found in **Figure 2**.

The start time and end time for grades K-5 and 6-8 will be staggered. Grades 6-8 breakfast will start around 7:15 a.m. with classes starting at 7:45 a.m. The K-5 breakfast will start at 7:45 a.m. with classes starting at 8:15 a.m. Aspire will provide student drop-off windows between 7:15 a.m. and 8:15 a.m., and assign specific 15-minute drop-off periods for students by grade, accounting for breakfast attendees and divided into equal groups based last name as shown in **Table 3**.

Table 3 - Drop-off Window Assignments

Grades 6 - 8	Drop-off Window
Breakfast Attendees	7:15 – 7:30
A-N*	7:15 – 7:30
N-Z*	7:30 – 7:45

Grades K - 5	Drop-off Window
Breakfast Attendees	7:45 – 8:00
A-N*	7:45 – 8:00
N-Z*	8:00– 8:15

*Actual grouping may differ based on enrollment. Assignments will form two groups with an equal number of students.

Current analysis assumed that 10% of the students from each school would attend breakfast programs and Grades K-5 would comprise of 65% of the student population with 35% coming from Grades 6-8. Using the calculated number of a.m. arrival trips of 175, the estimated number drop-off vehicle arrivals are summarized in **Table 4**. It is assumed that the highest rate of arrivals would occur during the 15-minute period prior to the start classes and that most students will would arrive in their identified drop-off window.

Table 4 - Estimated Student Vehicle Arrivals

Arrival Period	Proposed Project	
Time Period	Vehicle Trips	Percent
7:15 - 7:30 AM	35	20%
7:30 – 7:45 AM	44	25%
7:45 – 8:00 AM	44	25%
8:00 – 8:15 AM	52	30%
Total	**175**	**100%**

During the highest arrival time (8:00 – 8:15), the average arrival rate is three (3) vehicles per minute and a drop-off can be completed in approximately 15 seconds, resulting in the expected queuing at the drop-off area of 7 cars. The drop-off area will be designed to accommodate 32 cars within the school boundaries, without spilling over to Derby Avenue.

For student drop-off (passenger unloading), eight faculty/staff member (e.g. teacher) will be stationed at the front of and along the school's driveway and at the intersection of Derby and E15th during the drop-off periods to help usher students into the School and to avoid double parking on the drop-off/pick-up driveway. Aspire staff will notify Parents/guardian that students shall always exit on the curbside of the vehicle. Aspire will be responsible for producing an annual detailed drop-off/pick-up operations plan, and its distribution to faculty members and student families before the start of the School year.

The School driveway on the west side of Derby Avenue between International Boulevard and E. 15th Street will be used as entry for pick-up and drop-off activities. The South side of E. 15th Street, along the School frontage, would be used for exiting during picking up and drop off.

3.0 PARKING MANAGEMENT

Parking at the School is intended for Staff members and special guests. The School will be responsible for monitoring the use of its on and off-site parking to ensure unnecessary impacts to the surrounding community do not occur. Facility will direct school associated vehicles not to double park or block driveways. Vehicles observed in violation of this will be directed to move.

3.1 SCHOOL PARKING

Per the School site plan, the School would provide a total of fifteen (15) parking stalls; eleven spaces will be available on site and four will be available at the Fruitvale Medical Building (located across the street on E 15th) through an executed shared agreement.

Additional off-site parking will be provided for special events and as required to deter Aspire users from parking on the local neighborhood roadways. Aspire will be responsible for securing agreements with neighboring commercial establishments such as Goodwill, A Better Way, and the commercial complex to the South for temporary access to 80-120 spaces for special events that are within walking distance of the school (< .25 Miles). Aspire will not hold special events if sufficient temporary offsite parking cannot be secured.

3.2 SPECIAL EVENT PLANS AND OPERATIONS

Currently, the Aspire School is scheduled to host multiple after School special events that will result in non-standard parking demand and traffic operations at the School site. The Aspire School will provide instructions to the School community regarding traffic and parking related to special events and notify neighbors in advance of any special events. This information will be reviewed and prepared annually as part of the School's operating handbook, which will be distributed before each School year. Aspire will also provide this information on their website under a specific section dedicated to Special Events.

At events that require off-site parking spaces, the Aspire School will provide a minimum of four staff members to assist with traffic operations to ensure that visiting vehicles are aware of available parking locations. Standard drop off and pick up procedures will be utilized for school dances.

A summary list of the special events is provided below:

Table 5 - Aspire Special Events Summary

Event	Frequency / Timing	Estimated Attendance	Estimated Parking Demand[2]	Parking Accommodation[2]
Elementary Town Hall	Every other Friday morning	Up to 40 families	35	**11 On-site spaces** **24 Off-site spaces**
Middle School Town Hall	Every other Friday morning (alternating w/ Elementary Town Hall)	Up to 20 families	20	**11 On-site spaces** **9 Off-site spaces**
Elementary School Back to School Night	Once a year in August, weeknight, 5:30-7:30 pm	Up to 135 families	110	**11 On-site spaces** **99 Off-site spaces**
Middle School Back to School Night	Once a year in August, weeknight, 5:30-7:30 pm	Up to 65 families	55	**11 On-site spaces** **44 Off-site spaces**
Elementary School Literacy Night	Twice a year, weeknight, 5:30-7:30 pm	Up to 135 families	110	**11 On-site spaces** **99 Off-site spaces**
Middle School Literacy Night	Twice a year, weeknight, 5:30-7:30 pm	Up to 65 families	55	**11 On-site spaces** **44 Off-site spaces**
Middle School Dance	Twice a year, weeknight, 6-9 pm	200 attendees, including students, staff, and up to 20 family chaperones	30	**11 Onsite spaces** **19 Off-Site spaces**
Musical Performance	Once a year in May/June, weeknight, 5:30-6:30 pm	200 attendees, including students, staff, and up to 100 families in the audience	100	**11 On-site spaces** **89 Off-site spaces**

[1] It is assumed that 80% of the attending families and staff members will arrive in SOV
[2]Off-site parking locations are within walking distance to the School.

4.0 AUTO TRIP REDUCTION PROGRAMS AND TDM MEASURES

The purpose of this TDM Plan is to reduce the number of SOV trips, project VMT, and maintain adequate traffic circulation in the vicinity of the School.

4.1 TDM PROGRAM MEASURES

School sponsored programs and measures will reduce SOV trips by utilizing and supplementing facilities and services that are in the School's vicinity or provided by the School.

As shown the **Table 6**, the estimated trip and VMT reduction resulting from the provided measures is 22.3%

The School sponsor has committed to implementing numerous TDM programs and measures, which include the following:

Table 6 - TDM Measures

TDM Strategy[1]	Target User Group	SOV Trip and VMT Reduction Rate Range	Estimated SOV Trip and VMT Reduction Rate[2]	Estimated Vehicle Trip Reduction[3]	
				AM Peak Hour	PM Peak Hour
School Pool and Bike/Walk Program	All Students	7.2 – 15.8%	14%	**42**	**27**
Transit Subsidies and Pre-Tax Commuter Benefits	Grades 6-8 and Staff	.3% to 20%	15%	**19**	**13**
Bike Parking	All	0.625%	.625%	**2**	**2**
TDM Coordinator	All	-	2.5%	**8**	**6**
Total				**71**	**48**
Total Project Trips (Estimated Trips Minus TDM Reductions)				**241**	**164**
Total TDM Strategy Reductions			**22.3%**		

Source: STANTEC. 2018

Notes:
1 The TDM strategies and estimated vehicle trip reduction rate were obtained from CAPCOA and the BAAQMD TDM Tool.
2 Vehicle trip reduction rate estimated based on the estimated level of adoption and aggressiveness of implementation of a given strategy.
3 Vehicle trip reduction estimated by applying the estimated vehicle trip reduction rate to the vehicle trips generated by the target user group.

School Pool and Walk/Bike Program

Description: Aspire will develop and implement a ridesharing program for students. The ridesharing "School Pool" program will help to match parents to transport students to/from the school. Aspire will also develop and implement walk/bike groups for students that live in the same vicinity to promote groups of student walking or bicycling to the school.
Target Users: All students
Range of Effectiveness: 7.2% to 15.8% VMT reduction
Estimated Reduction: 14% VTR and VMT (42 weekday AM peak hour, 27 weekday PM peak hour)

Transit Subsidies and Pre-Tax Commuter Benefits

Description: Aspire will subsidized/discounted monthly public transit passes. The school will provide the equivalent of up to a $1.50 per trip subsidy. A Pre-Tax Commuter benefits system already exists through Aspire and will be available to all interested staff members.
Target Users: Grade 6 – 8 students and staff
Range of Effectiveness: 0.3% to 20% VMT reduction
Estimated Reduction: 15% of VTR and VMT (19 weekday AM peak hour, 13 weekday PM peak hour)

Bike Parking

Description: The School shall include 67 covered bicycle lockers/racks for student and faculty use.
Target Users: All staff and students
Range of Effectiveness: 0.625% VMT reduction
Estimated Reduction: 0.625% VTR and VMT (2 weekday AM peak hour, 2 weekday PM peak hour)

TDM Coordinator

Description: Aspire will assign a designated person to act as a facilitator and coordinator for all TDM related measures and programs. The Coordinator will also be responsible for updating TDM and event information on the School's website and disseminating information to all students and families.
Target Users: All
Estimated Reduction: 2.5% VTR and VMT (8 weekday AM peak hour, 6 weekday PM peak hour)

In addition to the above measures, Aspire will also implement the following measures:

1. The School shall provide a "Suggested Routes to School" map to parents and encourage students to walk or bike to School. The School shall also monitor bicycle facilities and promote bicycling to School by scheduling "bike to School days", and bicycle education. (Figure 3)

2. The School shall provide vehicle loading/unloading management:

    a. 8 faculty members will be assigned to assist and oversee vehicle drop-off/pick-up (see section 2.1 for more information).
    b. An annual Standard Operating Procedure (SOP) will be prepared by Aspire

5.0 COMMUNICATION AND REPORTING

The purpose of this TDM is to establish a relationship between the School and the students/parents. Communication and clear understanding of the measures and services available to students are necessary for the successful implementation of this TDM.

The TDM coordinator will act as the point of contact between the School, and the students and their parents. The role of the coordinator will be to promote the available programs and incentives to encourage the largest reduction of SOV trips possible. This may entail working on an individual level with students that are interested in riding their bicycles or taking transit to the School.

5.1 TRAFFIC SAFETY AND GOOD DRIVING

The Aspire Public School will encourage and remind students/parents of safe and good driving practices. This information includes the following and will be further identified in the Aspire Handbook:

- Respect traffic monitors/enforcers
- Remain in your vehicle during drop off/pick up
- Do not double park
- Limit loading and unloading vehicle trunks during peak times
- Observe all traffic laws in the School zone

This information is to be disseminated to students/parents by the following:

- Included as part of a condition of employment and enrollment contract
- Presented during Back to School Night and in the Aspire Handbook
- Mailed to parents at the start of each School year
- Posted along drop off/pick up locations

5.2 TDM REPORTING

The Aspire Public School is invested in ensuring that this TDM's goals are met. In order to ensure compliance, the School will conduct annual driveway vehicle counts, as indicated in the City of Oakland's "Transportation Impact Review Guidelines", to determine the School's compliance

with the TDM's overall requirement of a 20% reduction of SOV trips, based on the maximum attendance of 620 students (total trips not to exceed 242 in the a.m. peak and 161 in the p.m. peak, see **Table 6**).

If it is determined that the site is not meeting the TDM requirements, the City and the Aspire School will identify and evaluate additional TDM measures that the School will implement to achieve the TDM requirements. Measures may include increases in transit subsidies, based on their effectiveness and utilization. Another measure that will be evaluated will be the implementation of a school bus for the students; the exact route and magnitude of the school bus service will be dependent on the trip reduction needed to meet compliance and identified once its need is determined.

The annual report and implementation of additional measures will be at the School's expense.

ATTACHMENT G

CORNERSTONE EARTH GROUP

Type of Services	**Removal Action Work Plan**
Location	**Planned Aspire ERES Academy** **2956 International Boulevard** **Oakland, California**
Client	**Aspire Public Schools**
Client Address	**1001 22nd Avenue, Suite 300** **Oakland, California 94606**
Project Number	**729-4-5**
Date	**June 19, 2017**



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CORNERSTONE EARTH GROUP

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CORNERSTONE EARTH GROUP

Type of Services	**Removal Action Work Plan**
Location	**Planned Aspire ERES Academy** **2956 International Boulevard** **Oakland, California 94606**

SECTION 1: INTRODUCTION

On behalf of Aspire Public School (Aspire), Cornerstone Earth Group (Cornerstone) has prepared this Removal Action Work Plan (RAW) to address soil, soil vapor, and ground water impacted with the chemicals of concern at 2956 International Boulevard in Oakland, California (Site) as shown on Figures 1 and 2. This RAW was prepared at the request of the Department of Toxic Substances Control (DTSC) and in accordance with our Agreement with Aspire Public Schools dated July 25, 2016.

1.1 SITE DESCRIPTION

This project Site is approximately 0.8 acres and is located at 2956 International Boulevard in Oakland, California. The Site is comprised of three parcels (Assessor Parcel Numbers 25-720-7-2, 25-270-1, and 25-720-2-1) and is occupied by a two-story apartment building, paved parking areas, and landscaping (Figure 2). Sausal Creek bisects the western portion of the Site, draining from north to south in a closed culvert. The Site is bounded by East 15th Street to the north, Derby Avenue to the east, mixed-use developments to the west and beyond International Boulevard to the south.

1.2 PLANNED DEVELOPMENT

A new elementary school is currently planned for the Site that will consist of 24 classrooms and 600 students. The planned building will be three stories, at-grade, and of steel-frame construction with a footprint of approximately 17,950 square feet. Appurtenant parking, a drop-off and pick-up queue, a play area, utilities, landscaping and other improvements necessary for Site development are anticipated. Excavation cuts for planned utilities may be on the order of approximately 15 feet.

1.3 REGULATORY INVOLVEMENT

In 2015, Stantec prepared a Phase I Environmental Site Assessment (ESA) for the Site that also included off-Site properties to the south occupied by a vacant restaurant and a medical building (Stantec, 2015). The Phase I ESA was submitted to DTSC for review and approval. In their letter dated January 5, 2016, DTSC required a Preliminary Environmental Assessment

(PEA) for the Site. On January 20, 2016 Aspire Public Schools executed a voluntary cleanup agreement with DTSC to initiate the PEA process. Cornerstone prepared a PEA Work Plan dated April 21, 2016 that was submitted to DTSC. The PEA Work Plan was approved by DTSC in their letter dated May 3, 2016. Cornerstone implemented the PEA Work Plan in May, 2016 and presented the results in a draft PEA Report dated July 1, 2016. On September 6, 2016, Aspire Public Schools executed a School Cleanup Agreement with DTSC for review and approval of this RAW.

1.4 ELEMENTS OF THE RAW

To implement the recommendations contained in the PEA Report and to satisfy regulatory requirements, this RAW includes the following elements:

- A description of the nature and extent of the chemicals of concern (COC) at the Site;
- The goals to be achieved by the remedial action; and
- The general steps that will be taken to implement the selected remedial alternative: *Soil Excavation and Disposal of COC-Impacted Soil, Capping of Fill Containing Naturally Occurring Asbestos (NOA), and Installation and Operation of a Vapor Mitigation System.*

This report is organized as follows:

- Section 2 – Prior PEA Investigation
- Section 3 – Supplemental Site Investigation
- Section 4 – Environmental Setting
- Section 5 – Engineering Evaluation for the Removal Action
- Section 6 – Soil Removal Action Implementation
- Section 7 – NOA Mitigation Measures
- Section 8 – Vapor Intrusion Mitigation Plan

SECTION 2: PRIOR PEA INVESTIGATION

During the PEA investigation, soil and ground water sampling was performed to address the areas requiring further evaluation identified in the DTSC-approved PEA Work Plan. This section presents the soil and ground water sampling performed to evaluate these Areas of Concern (AOC). Please refer directly to the draft PEA report for a complete overview of the work performed.

2.1 SITE HISTORY

Based on the information obtained during the Phase I ESA by Stantec, the Site was developed as early as 1897 (Stantec, 2015). The 1903 Sanborn map shows at least four residential-type structures and/or related outbuildings on-Site. One structure in the northeast portion of the Site was labeled as a tank house; Stantec reported that a heating oil tank may have been associated with this structure. The southeast portion of the Site appears graded or paved in the 1948 aerial photograph. By 1950, a used car lot with two associated small office buildings were present on-Site in the southwest portion and associated paved parking in the southeast portion. Also

present by this time is the existing apartment building located in the northeast corner of the Site. By 1964, the offices for the used car lot are no longer present; the existing vacant restaurant building is shown off-Site. The 1967 Sanborn Map and 1968 aerial photograph show the Site similar to current conditions including the presence of the existing asphalt pavement surfaces.

According to information obtained from Aspires' project civil engineer, Underwood & Rosenblum, Inc., who conducted a records search at the Alameda County Public Works Records Department, a large concrete arch culvert was constructed over Sausal Creek in approximately 1860. This culvert traverses underneath the Site in a roughly north to south orientation. The details in the original plans from 1860 illustrated that the culvert's interior dimensions are approximately 16 feet wide and 9 feet tall. A catch basin illustrated in a later plan shows an invert depth at approximately 14½ feet.

2.2 AOCS EVALUATED DURING PEA

2.2.1 Lead Paint, Pest Control, and PCB Building Materials

Soil adjacent to former and existing structures that are painted with lead-containing paint and/or caulking around windows containing polychlorinated biphenyls (PCBs) can become impacted with lead and/or PCBs as a result of the weathering and/or peeling of painted and/or caulked surfaces. Soil near wood framed structures also can be impacted by organochlorine pesticides (OCPs) used to control termites. Due to the age of the existing and former structures, there is a potential that residual concentrations of lead, PCBs, and/or OCPs may be present in the shallow soil near these structures.

2.2.2 Naturally Occurring Asbestos

Asbestos occurs naturally in ultramafic rock. The six regulated asbestos-form minerals include: Chrysotile, Amosite, Crocidolite, Tremolite, Anthophyllite, and Actinolite. When this material or other Asbestos-form minerals are disturbed in connection with construction or grading, asbestos-containing dust can be generated. Exposure to asbestos can result in health ailments. The DTSC 2004 interim guidance document titled *Naturally Occurring Asbestos (NOA) at School Sites* recommends soil sampling when a proposed school site is located within a 10-mile radius of an NOA geologic formation. Based on our review of readily available geologic maps, the nearest geologic formation that may contain NOA is located approximately 2.7 miles east of the Site.

2.2.3 Regional PCE Ground Water Contamination

The former Walt's Transmission facility (1723 Fruitvale Avenue), located approximately 1,150 feet northeast and in the reported up-gradient ground water flow direction relative to the Site, is listed on the state Cleanup Program database. The last ground water sampling event was conducted in January 2003. At that time, perchloroethene (PCE) was detected in each of the three ground water monitoring wells at concentrations of 120 to 180 micrograms per liter (µg/L). Due to these conditions, Stantec identified this facility as a Recognized Environmental Condition.

To obtain additional readily available information pertaining to the former Walt's Transmission facility and other nearby documented contamination cases, Cornerstone reviewed the following documents obtained from the State of California's online Geotracker database. A summary of the relevant information reviewed is provided below and the location of the discussed facilities are shown on Figure 1. Copies of the documents were included in the PEA report.

- ACEHD, *Case Closure Summary for CalTrans South Oakland Maintenance Station at 1112 29th Avenue, Oakland*, dated August 30, 2010.
- ACEHD, *Case Closure Summary for Former Shell Station at 2001 Fruitvale Avenue, Oakland*, dated April 6, 2006.
- Broadbent, *Addendum Conceptual Site Model and Case Closure Request, Former Richfield Oil Company Station No. 402, 1450 Fruitvale Avenue, Oakland*, dated March 11, 2016.
- Papineau Environmental Service, *Specified Soil and Ground Water Sampling and Laboratory Analyses for 1723 Fruitvale Avenue, Oakland*, dated March 5, 2001.
- Soma Environmental Engineering, Inc., *Third Quarter 2009 Groundwater Monitoring and Remediation System Report with Evaluation of Effectiveness of Monthly MPE, Tony's Express Auto Service, 3609 International Boulevard, Oakland*, dated October 28, 2009.

In December 1999, soil sampling performed at the former Walt's Transmission facility identified PCE at 0.024 milligrams per kilogram (mg/kg) in soil samples collected from 5 and 10 feet at boring location SB-4; PCE also was detected in shallow soil samples collected from nearby location SS-1. A grab ground water sample also was collected near the southern property boundary and contained a PCE concentration of 42 ug/L. In November 2000, under Alameda County Environmental Health Department (ACEHD) oversight, two additional borings (SB-5 and SB-6) were advanced near the SB-4 and SS-1 locations. PCE was detected in the soil samples collected from boring SB-5 where concentrations reportedly increased with depth to a maximum concentration of 43 ug/kg at an approximate depth of 21 feet. The grab ground water sample collected from the SB-6 boring detected PCE at 290 ug/L. In January 2001 additional soil samples were collected from four "step-out" borings at approximate depths between 10 and 20 feet; PCE was not detected. Three ground water monitoring wells were installed near the borings and PCE was detected in the samples at 160 ug/L 140 ug/L, and 140 ug/L, respectively.

A former Shell Service Station (2001 Fruitvale Avenue) was located approximately 750 feet northeast of the former Walt's Transmission property, in the presumed up-gradient ground water flow direction. Three monitoring wells were installed at the property in 2003 and ground water sampling was performed between May 2003 and October 2005. The closure summary noted that the ground water flow at the time of closure was toward the southwest; however, a rose diagram depicted on an attached site plan also showed flow directions toward the northwest and northeast. Ground water samples collected from the monitoring wells in October 2005 detected PCE in the wells at concentrations of 58 µg/L 34 ug/L and 7.6 ug/L, respectively. The closure summary notes that the PCE appears to be from an off-property source.

Approximately 700 feet southwest of the Site is the former Caltrans South Oakland Maintenance Station located at 1112 29th Avenue. Four ground water monitoring wells were installed in June 2000 and were sampled until May 2005. The ground water flow direction reportedly was toward the southwest. In 1999 a grab ground water sample was collected from a boring near the southern property boundary and PCE was detected in the sample at 12 ug/L.

Ground water monitoring performed at 1450 Fruitvale Avenue (approximately 600 feet southeast of the Site) and 3609 International Boulevard (approximately 2,000 feet southeast of the Site) revealed a predominant ground water flow direction to the southwest to southeast.

Based on the documents reviewed, the predominant ground water flow direction beneath the general Site area is toward the southwest to southeast. These flow directions are consistent with the local topography and surface water flow in Sausal Creek and nearby Peralta Creek that drain from the Oakland Hills. PCE has been detected in ground water at properties located both up-gradient and down-gradient of the Site.

2.2.4 Possible Former Heating Oil and Diesel Fuel Tanks

As discussed, there is a potential that a former heating oil tank may have been present at the Site.

During Stantec's Phase I ESA Site visit, an area of patched asphalt was observed on the western portion of the Site; evidence of a trench was observed leading from this area to the off-Site six-story medical building. Based on Stantec's review and interpretation of aerial photographs, a structure may have been present on the patched area as recently as June 2014. The owners of the medical building did not respond to Stantec's requests for information regarding this structure. Stantec concluded this structure could have been an emergency generator for the medical building. Emergency generators are typically powered by diesel fuel that is stored in a nearby aboveground storage tank (AST) and/or underground storage tank (UST).

Based on a geophysical survey performed in 2015, these tanks, if formerly present, appear to have been removed; however, there is a potential for soil and/or ground water to be impacted if leaks occurred from these possible tanks.

2.3 SOIL AND GROUND WATER SAMPLING

During the PEA investigation, soil samples were collected near existing and former buildings to evaluate potential impacts from possible pest control spraying near building foundations, and potential impacts from building materials such as lead-based paint and/or PCB caulking compounds. Soil and ground water sampling was also performed where a diesel and/or heating oil tank may have been formerly present. The ground water samples were additionally analyzed for VOCs to help evaluate potential impacts to the Site associated with the VOC-impacted ground water identified in the regional area. Soil sampling and analyses for naturally occurring asbestos was also performed.

Laboratory analyses of the soil samples detected lead and organochlorine pesticide (OCP) compound chlordane at concentrations that exceed residential environmental screening levels. The occurrence of these contaminants is likely related to lead-based paint on former building

materials and pest control spraying. Naturally occurring asbestos was also detected in the fill soil observed near the eastern Site boundary. Additionally, the chlorinated solvent PCE was detected in the three grab ground water samples at concentrations that exceed its drinking water MCL. The PEA concluded that DTSC's RAW process will need to be completed prior to redevelopment of the Site.

SECTION 3: SUPPLEMENTAL SITE INVESTIGATION

To aid in preparing this RAW, in July 2016 Cornerstone performed a Supplemental Site Investigation (SSI) at the Site. The purpose of the SSI was to help delineate the lateral and vertical extent of lead and OCP-impacted soil, and evaluate general soil vapor quality within the footprint of the planned school building.

Prior to starting work, the Sampling and Analyses Plan was forwarded to DTSC for review and approval. In their email correspondence dated July 19, 2016, DTSC approved the plan with minor modifications that included one additional soil sampling location and three additional soil vapor sampling locations. A copy of the DTSC-approved plan is included in Appendix A.

3.1 PRE-FIELD ACTIVITIES

The following tasks were performed prior to starting field work:

- Drilling permits were obtained from the Alameda County Public Works Agency.
- Boring locations were marked at least two days prior to beginning our explorations as required by law.
- The regional utility notification center – Underground Service Alert (USA), and Aspire Public Schools, so that public and private utilities can be identified and marked at the ground surface. Borings were marked in white paint, as requested by USA. Utility operators/owners are required to mark their utilities at the ground surface prior to the start of work,
- A private utility locator was also contracted to locate unidentified underground utilities during drilling.

3.2 SOIL SAMPLING

Between July 27 and July 29, 2016, our field engineer directed a subsurface investigation and advanced 30 exploratory borings using Direct Push technology equipped with the Dual Wall Sampling System. The Dual Wall Sampling System helps prevent cross contamination between sampling intervals. The Dual Wall Sampler is comprised of two main components: an exterior steel casing and an inner sample barrel. The outer casing has a 2-inch outer diameter (OD) and a 1.5-inch inner diameter (ID). The sample barrel is 5 feet in length with a 1.375-inch outside diameter (OD) and a 1-inch inner diameter (ID). The Dual Wall sample barrel was loaded with a 5-foot acetate liner and installed inside the outer casing. The outer drive casing and inner sample barrel were then hydraulically pushed to a depth of approximately 5 feet. As these tools were advanced, the inner sampling barrel collected the soil core sample. This

sampler was then retrieved while the outer casing remained in place, protecting the integrity of the hole. All borings were sealed to the surface with cement grout upon completion of sampling activities.

The ends of the liners were covered in Teflon film, fitted with plastic end caps, and labeled with a unique identification number. The samples were then placed in an ice-chilled cooler and transported to a state-certified analytical laboratory with chain of custody documentation.

All sampling equipment was cleaned using distilled water and a Liquinox solution prior to use at each sample point. Additionally, separate exterior steel casing and inner sample barrel were used at each boring location.

Thirty-one soil samples were analyzed for lead and six samples were analyzed for OCPs. The approximate boring locations are shown on Figure 4. Analytical data sheets and chain of custody documentation are included in Appendix A. The analytical results are discussed below in Section 4.

3.3 SOIL VAPOR SAMPLING

3.3.1 Subsurface Soil Vapor Probe Installation

During the SSI investigation, subsurface soil vapor samples were collected at six locations (SV-1 through SV-6) located within the footprint of the proposed school building. On July 28, 2016 our C-57 licensed drilling contractor used drilling equipment to advance the soil vapor probes to depths of 5 and 15 feet below the asphalt pavement surface. To help limit potential soil consolidation caused by Direct Push drilling activities, hand auger equipment was used to extend the bottom section of each boring to its desired depth. Boring and well construction details are included in Appendix A.

The subsurface probes consisted of a stainless steel expendable vapor tip and screen installed at an approximate depth of 5 and 15 feet below the asphalt pavement surface; the vapor tip was affixed to stainless steel tubing. The vapor probes were constructed by first placing approximately 2 inches of coarse aquarium sand into the bottom of the borehole using a tremie pipe. The stainless steel tip and tubing was then lowered into the borehole via a tremie pipe. Additional sand was then placed in the borehole via tremie to create an approximately 1 foot sand pack interval around the vapor tip. Approximately 1 foot of granular bentonite (Benseal™) was placed on top of the sand pack via the tremie pipe. Bentonite "gel" will be placed via tremie pipe on top of the dry granular bentonite to the bottom depth of the upper-sand pack hosting the shallower vapor tip. Prior to installing the upper-sand pack, an approximately 1 foot layer of dry granular bentonite was placed on top of the hydrated bentonite (using a tremie pipe) to help prevent settling of the upper-sand pack. The upper vapor point screen interval was constructed similar to the lower and the remainder of the borehole sealed to surface utilizing the hydrated bentonite procedures. The stainless steel tubing was labeled with depth of placement and capped utilizing a vapor tight Swagelok valve set in the "off" position. A construction cone was placed over the probe until sampling was performed.

3.3.2 Soil Vapor Purging and Sampling Methods

Soil vapor sampling activities were performed on July 29, 2016 in general accordance with California/EPA's July 2015 guidance document titled *Advisory Active Soil Gas Investigation* (Cal/EPA, 2015). The tubing emanating from the vapor points was affixed to a sample shut off valve in the "off" position during the time needed to reach equilibrium (at least 2 hours). A 167 milliliters-per-minute flow regulator inclusive of particulate filter was fitted to the shut off valve and the other end to a "T" fitting. One end of the "T" was connected to the sampling summa canister. The other end of the "T" was affixed to a digital vacuum gauge and a 1-liter summa canister utilized for purging.

A minimum 10-minute vacuum tightness test was performed on the manifold and connections by opening and closing the 1-liter purge canister valve and applying and monitoring a vacuum on the vacuum gauge. The sample shut-off valve on the downhole side of the sampling manifold remained in the "off" position. When gauge vacuum was maintained for at least 10 minutes without any noticeable decrease (less than approximately 0.1 inches of mercury (Hg) for properly connected fittings), purging began. The downhole shut off valve was opened and three purge volumes of vapor was removed using the 1-liter summa for purging. The volume of vapor removed was verified by the calculated pressure drop in the summa canister.

Isopropyl alcohol was utilized as a leak detection compound during sampling by applying 5 drops to cotton gauze and placing the moistened gauze near the borehole. Sampling began by opening the summa canister valve. Immediately upon opening the sampling valve, a shroud was placed over and enclosed the atmosphere of the borehole and entire sampling train including all connections.

Sampling continued until the vacuum gauge indicates approximately 5 inches of Hg remaining, unless low permeability soils are encountered. A data logging photoionization detector (PID) was utilized during sampling to monitor the atmosphere inside the shroud through a bulk head fitting. The logged data (at minimum thirty [30] second intervals) was corrected to parts per million by volume isopropyl alcohol concentrations and utilized to evaluate the integrity of the sampling train.

To confirm the isopropyl alcohol atmosphere, one confirmation Tedlar bag sample was collected from the shroud atmosphere through the sampling port of the PID. All field data, including equilibrium time, purge volume calculations and leak check measurements was recorded.

The 11 soil vapor samples were analyzed for VOCs (EPA Test Method TO-15). The approximate probe locations are shown on Figure 5. Analytical data sheets and chain of custody documentation are included in Appendix A. The analytical results are discussed below in Section 4.

3.4 SSI SAMPLING PLAN DEVIATIONS

3.4.1 Soil Vapor Sampling

Due to low permeability soil surrounding the probe tip and/or field installation methods, a soil vapor sample could not be collected from the 5-foot vapor probe at location SV-6.

3.4.2 Additional NOA Analysis

To better evaluate NOA in native soil, four soil samples were selected from the retained soil samples obtained during Cornerstone's geotechnical investigation and were analyzed for asbestos using TEM methods. The selected native soil samples were collected from approximate depths of 1½ feet and 4½ feet from EB-1, and 2 feet and 6 feet from EB-2. The approximate geotechnical boring locations are shown on Figure 4. Analytical data sheets and chain of custody documentation are included in Appendix A. The analytical results are discussed below in Section 4.

SECTION 4: ENVIRONMENTAL SETTING

4.1 PHYSICAL SETTING

A 1997 USGS 7.5 minute topographic map was reviewed to evaluate the physical setting of the Site. The Site's elevation is approximately 10 feet above mean sea level; topography in the vicinity of the Site slopes downward gently to the northeast towards the San Francisco Bay.

4.2 GEOLOGY AND HYDROGEOLOGY

4.2.1 Local Geology

The Site is located on the eastern lowlands of the San Francisco Bay, where alluvial deposits from the Diablo Range provide a gently sloped surface for urban and suburban developments of Oakland to reside. In the San Francisco Bay Area, most of the Coast Ranges have developed on a basement of tectonically mixed rocks of the Franciscan Complex. The Hayward Faults system exists within the Diablo Range approximately 2.5 miles to the east producing the uplifted Oakland Hills and exposing the various rocks of the Franciscan Complex which includes serpentinite and other metamorphic ultramafic rocks. Alluvium shed primarily from the hills to the east create the gently south-west sloping Site topography. Alluvial fan sediment typically includes sand, gravel, silt, and clay materials that consist of a mixture of rocks from the adjacent hills.

4.2.2 Hydrogeology

During Cornerstone's PEA Investigation performed in May 2016, ground water was observed in the exploratory borings at approximate depths of 25 to 30 feet. As discussed in Section 2.2.3, the ground water flow direction in the regional area was reported to be southwest to southeast. These flow directions are consistent with the local topography and surface water flow in Sausal Creek and nearby Peralta Creek that drain from the Oakland Hills.

4.3 SUBSURFACE MATERIALS OBSERVED

The alluvial deposits encountered within our borings generally consist of medium stiff high plasticity clays; very stiff to hard lean clay, lean clay with sand, and sandy lean clay; medium dense to dense well-graded gravel with sand or clay. Sub-angular to sub-rounded gravels are common throughout. The upper approximate 1 to 4 feet commonly exhibits thin lenses of re-worked on-Site native soils. Fill material (imported soil) mixed with native soil was identified in

borings (SB-44 through SB-53) located on the eastern side of the Site along Derby Avenue. The fill was observed at approximate depths ranging from 1 to 6 feet below the existing ground surface. Figure 6 shows the approximate area where fill was observed.

4.4 NATURE AND EXTENT OF CONTAMINATION

This section includes: 1) a discussion of Environmental Screening Criteria selected for the Site; and 2) a summary of the COC and results of the soil, soil vapor, and ground water samples collected at the Site. Data summary tables presenting the results of the PEA and SSI investigations are included in the Tables Section of this RAW.

4.4.1 Environmental Screening Criteria

The soil sampling results were compared to the DTSC recommended Screening Levels (SLs) presented in DTSC Office of Human and Ecological Risk guidance document (HERO) *Human Health Risk Assessment (HHRA) Note 3* updated January 2016 (HERO, 2016). If an SL has not been established, the soil results were compared to Regional Screening Levels (RSLs) established by the USEPA Region 9 (USEPA, May 2016). For detected chemicals for which DTSC-SLs and RSLs have not been established, Environmental Screening Levels (ESLs) established by the San Francisco Bay Regional Water Quality Control Board (Water Board, 2016) were used for comparison.

HERO HHRA Note 3 does not include environmental screening levels for comparison to subsurface soil vapor data. To evaluate potential vapor intrusion concerns, HERO recommends using the DTSC guidance document Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air dated October 2011 (DTSC, 2011). The indoor air residential DTSC-SLs were adjusted using the attenuation factors provided in the DTSC guidance. For this study, the future residential building type attenuation factor of 0.001 was used to calculate subsurface screening criterion.

Detected contaminants in ground water were compared to Maximum Contaminant Levels (MCLs) established by State Water Resources Control Board (September 2015). For detected chemicals for which MCLs have not been established, ESLs were used for comparison. Asbestos results were compared DTSC's recommended screening criteria for school sites of 0.01 percent.

4.4.2 Contaminants of Concern (COC)

4.4.2.1 Lead and OCPs

As shown in Table 1, organochlorine pesticides (OCPs) including 4,4' –DDD, 4,4' –DDE, 4,4'–DDT, chlordane, and/or heptachlor epoxide were detected in 7 of 39 soil samples collected from approximate depths of 0 to ½ feet, 1 to 1½ feet and 2 to 2½ feet. None of the detected compounds exceeded their respective Environmental Screening Criteria except for chlordane and/or heptachlor epoxide detected in three soil samples. The elevated chlordane and heptachlor epoxide concentrations were detected in the near surface soil samples collected from the existing landscape strips near the apartment building. Laboratory analyses of the other soil samples collected from the Site indicate that the extent of the OCP-impacted soil is likely

limited to the upper few feet of soil within the landscape strips. The source of the OCPs appears associated with pest control activities performed near the apartment building.

As shown in Table 3, lead was detected in 132 of 132 soil samples analyzed. Concentrations in the 73 soil samples collected from the upper approximate ½ foot ranged from 4 mg/kg to 1,500 mg/kg with 22 samples exceeding its Environmental Screening Criteria of 80 mg/kg and one sample exceeding its Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg. Concentrations in the seven soil samples collected from an approximate depth of 1 to 1½ feet ranged from 8.9 mg/kg to 790 mg/kg; 1 of 7 samples exceeded 80 mg/kg. Concentrations in the 50 samples collected from an approximate depth of 2 to 2½ feet ranged from 6.2 mg/kg to 1,500 mg/kg with 6 samples containing concentrations that exceeded 80 mg/kg. One sample collected from an approximate depth of 3 to 3½ feet also contained a lead concentration that exceeded 80 mg/kg. The distribution of lead-impacted soil is shown on Figures 4, 4A, 4B, and 4C. The source of the lead is likely related to lead-based paint residue associated with former and existing structures.

The estimated in-place volume of OCP and lead-impacted soil is approximately 300 cubic yards.

4.4.2.2 PCE-Impacted Ground Water and Soil Vapor

PCE was detected in the three grab ground water samples collected at the Site at concentrations of 8.6 ug/L, 15 ug/L and 12 ug/L. The drinking water MCL for PCE is 5 ug/L. PCE-impacted ground water has migrated beneath most of the property from up-gradient off-Site sources; the probable source is the former Walt's Transmission facility located at 1723 Fruitvale Avenue.

To evaluate the movement of chemical vapors originating from the contaminated ground water, multi-depth vapor probes were installed and sampled. The deeper probes were installed at approximately 15 feet; ground water was observed in the grab ground water borings as shallow as approximately 25 feet. A shallower vapor probe was installed at 5 feet.

PCE concentrations in the soil vapor samples collected from the 5-foot probes ranged from 110 micrograms per cubic meter (ug/m^3) to 4,000 ug/m^3 with two samples exceeding its Environmental Screening Criteria of 480 ug/m^3. Concentrations in soil vapor samples collected from the 15-foot probes ranged from 91 ug/m^3 to 8,400 ug/m^3 with 5 of 6 samples exceeding its Environmental Screening Criteria. At 4 of 5 locations, PCE concentrations were greater in the 15-foot probe than in the 5-foot probe. This data indicates the source of the vapors is likely from the ground water zone and concentrations attenuate over the soil column in the direction of the ground surface. The PCE distribution in ground water and soil vapor is presented on Figure 5.

4.4.2.3 Soil Containing NOA

During the PEA and SSI investigations, 88 borings were advanced at the Site to depths ranging from ½ foot to 30 feet. Fill material (consisting of varying amounts of sand, gravel, and clay) mixed with native soil was identified in borings (SB-44 through SB-53) located on the eastern side of the Site along Derby Avenue. The fill was observed at approximate depths ranging from 1 to 6 feet below the existing ground surface. Figure 6 shows the approximate area where the fill was observed.

During the PEA and SSI investigations, 12 soil samples were analyzed for asbestos: 8 of 12 samples were collected from native soil; and the other four samples were collected from the observed fill. As shown on Figure 6, asbestos was detected in the soil samples collected from the fill samples at concentrations ranging from 0.07 percent to 0.14 percent. Asbestos was detected in the native soil samples at concentrations ranging from 0.0047 percent to 0.13 percent. DTSC's school screening criteria for asbestos is 0.01 percent. Based on these results, NOA mitigation measures will be implemented across the entire Site.

4.5 EXPOSURE PATHWAYS

Exposure pathways are the mechanisms by which a receptor (e.g. construction worker of future site user) may contact COC at the Site. Exposure pathways consist of three parts: (1) a source of contaminants, (2) an exposure point where the receptor may come into contact with contaminants (e.g. contaminated soil, drinking water, and/or indoor air), and (3) an exposure route (e.g. dermal, ingestions, and/or inhalation).

As discussed, COC in shallow soil consist of OCPs and lead. The physical characteristics of the OCPs and lead mainly make them relatively persistent and immobile. These COC typically do not readily dissolve in water and migrate to ground water, as they readily adsorb to the soil particles. Additionally, these COC will not readily volatilize or migrate as vapors. These COC are expected to persist in surface soil with the highest concentrations located near the surface. These chemicals may migrate if adsorbed to soil particles that become entrained into ambient air as a results of wind erosion of surface soil.

NOA is also a COC and appears limited to the fill material near Derby Avenue. Soil containing NOA may migrate if adsorbed to soil particles that become entrained into ambient air as a result of wind erosion of surface soil.

COC in soil vapor and ground water include the volatile organic compound PCE. Volatilization of PCE contaminants located in the subsurface soils and ground water and the subsequent mass transport of these vapors into indoor spaces constitute a potential inhalation exposure pathway. Although Site ground water is not currently used for drinking water purposes, the State Water Resources Control Board (Water Board) requires that all ground water beneath a given property be designated as a potential source of drinking water unless otherwise approved by the Water Board. The Site is not currently used for domestic, industrial, or agricultural purposes, nor is it expected to be used for these purposes in the future. Thus, ingestion of and dermal contact with impacted ground water is unlikely.

4.6 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) was developed to assist in understanding Site conditions and potential pathways by which humans may be exposed to contaminants of concern at the Site. The CSM is based on the known Site history and results of the data collected at the Site to date. An exposure pathway is considered complete if it presents a means of exposure to a receptor. A complete exposure pathway includes all of the following: a source of contamination, release mechanism, transport mechanism, exposure point, and a receptor. Figure 7 presents the CSM for the Site.

SECTION 5: ENGINEERING EVALUATION FOR THE REMOVAL ACTION

This Engineering Evaluation/Cost Analysis (EE/CA) was conducted for the proposed removal action at the Site in accordance with the USEPA guidance, titled "Guidance on Conducting Non-Time-Critical Removal Actions (NTCRA) under CERCLA (USEPA, 1993)". It was prepared, as part of the RAW developed for the Site, to aid in the evaluation of remediation alternatives for the mitigation of impacted soils at the Site.

The proposed removal action at the Site has been determined to be a non-time-critical removal, based on the risk evaluation and Site considerations. The proposed removal action will be conducted in accordance with protocols of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) codified in Part 300 of Code of Federal Regulations, Title 40 (40 CFR 300). Under 40 CFR 300.415 of the NCP, an EE/CA is required to address the implementability, effectiveness, and cost of NTCRA.

This EE/CA will be used as the basis for the planned non-time-critical RA. As the lead agency, DTSC has final authority of the selected alternative and of overall public participation activities.

5.1 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are goals developed for the protection of human health and the environment and are based on chemical concentrations and potential exposure routes. Protection of human health can be achieved by reducing chemical concentrations and/or by eliminating exposure pathways. The RAO for the Site is to mitigate the threat to human health and the environment from the identified COC-impacted soil, soil vapor, and ground water in a manner that will not constrain or limit school development of the property. Site specific RAOs include:

- Minimize or eliminate the potential for COC-impacted media to be encountered during Site development activities;
- Minimize or eliminate potential exposure of future school occupants (receptors) to COC-impacted media through direct contact, ingestion and inhalation;
- Minimize or eliminate the potential for uncontrolled migration of COC-impacted soil and soil vapor during construction activities;
- Reduce the concentration of COC in soil to levels that will allow maximum flexibility for school development and reuse of the Site as intended; and
- Achieve compliance with local, State and Federal regulations.

5.2 REMOVAL ACTION ALTERNATIVES

This section provides the analysis of three removal action alternatives for mitigating the threat to human health and the environment posed by the COC-impacted soil and soil vapor at the Site. These removal alternatives include the following:

- Alternative 1 – No action.
- Alternative 2 – Excavation and consolidation of soil exceeding Environmental Screening Criteria; capping of soil containing NOA; installation and operation of a vapor mitigation system; long-term operation and maintenance requirements; and institutional controls.
- Alternative 3 – Excavation and off-Site disposal of lead and OCP-impacted soil exceeding Environmental Screening Criteria; capping of soil containing NOA; installation and operation of a vapor mitigation system; and long-term operation and maintenance requirements.

Other potential alternatives or innovative technologies have not been included because they are unlikely to be timely, implementable, and/or cost-effective.

5.2.1 Alternative 1 – No Action

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and DTSC require the consideration of no action as a baseline alternative during the feasibility screening process. This remedial alternative would not involve the removal or capping of the impacted soil at the Site.

5.2.2 Alternative 2 – Excavation and on-Site Consolidation of Lead/OCP Impacted Soil; Capping of Soil Containing NOA; and Installation and Operation of a Vapor Mitigation System

Under this alternative, the lead and OCP-impacted soil will be excavated, consolidated on-Site and capped with hardscape surfaces (e.g. asphalt pavement or concrete). The soil containing NOA will be capped beneath the development. A vapor mitigation system will be installed beneath the planned school building.

Institutional controls including a deed restriction and long-term operation and maintenance plan will be implemented. The deed restriction will apply to the capped consolidation area where the lead and OCP-impacted soil is present. The long-term operation and maintenance plan will include an annual and 5-year review, inspection and reporting of: 1) the consolidation area; 2) the capping system over the soil containing NOA; and 3) the vapor mitigation system.

5.2.3 Alternative 3 –Excavation and Disposal Lead/OCP Impacted Soil; Capping of Soil Containing NOA; and Installation and Operation of a Vapor Mitigation System

Alternative 3 is similar to Alternative 2 except that the lead and OCP-impacted soil will be excavated and disposed at an off-Site permitted facility. The remedial excavations will be

backfilled with imported soil that meets the Environmental Screening Criteria. A deed restriction will not be required and on-going operation and maintenance requirements will only pertain to the capping system over the soil containing NOA and the vapor mitigation system.

5.3 EVALUATION OF REMOVAL ACTION ALTERNATIVES

The evaluation of removal action alternatives should consider the effectiveness, implementability, and cost of each remedial alternative. These evaluation criteria are discussed and compared below for each of the three proposed removal action alternatives.

5.3.1 Effectiveness

The evaluation of the effectiveness of each alternative is based on:

- Performance and reliability to eliminate or reduce the risk associated with the identified COC (in terms of toxicity, mobility, or volume) at the Site
- Overall protection of public health and the environment (threshold factor)
- Long- and short-term effectiveness (balancing factor)
- Reduction of toxicity, mobility, or volume through treatment (balancing factor)
- Ability to meet the RAOs presented in Section 1.3 (threshold factor)

Alternative 1 would not be protective of human health and the environment.

For Alternative 2, Site preparation for development will involve excavating and consolidating on-Site the upper approximate 1 to 3 feet of soil containing lead and OCP-impacted material. Consolidated material would be capped by hardscape surfaces such as a drive aisle or parking area. Due to the physical characteristics of the COC, this alternative would be protective of the environment. The COC are relatively persistent and immobile. These COC typically do not readily dissolve in water and migrate to ground water, as they readily adsorb to soil particles. The COC will not readily volatilize or migrate as vapors. Since the impacted soil would be capped by asphalt pavement or concrete surfaces, the impacted soil would not become entrained into ambient air as a result of wind erosion of surface soil. Alternative 2 is considered effective.

Alternative 3 is effective. It also is the most conservative of the alternatives because under this alternative the lead and OCP-impacted soil exceeding Environmental Screening Criteria would be removed from the Site; thus, the potential for on-going exposure to on-Site lead and OCP-impacted soil would be eliminated. However, there would be added risk of exposure during excavation and subsequent transportation of the impacted soil to a disposal facility. Additionally, this alternative likely has the largest "carbon footprint" due to anticipated natural resource consumption and vehicle emissions associated with hauling the impacted soil from the Site to off-Site landfills potentially more than 150 miles away. Similar to Alternative 2, the soil containing NOA will be capped beneath the planned development

In the case of Alternative 2 and 3, installation of a vapor mitigation system is also considered effective in helping to reduce potential inhalation exposure to the COC-impacted soil vapor.

5.3.2 Implementability

Implementability of a remedial alternative is based on the technical and institutional feasibility of implementing the alternative. Technical feasibility includes the availability of necessary materials, equipment and skilled workers to implement the alternative. Institutional feasibility includes the ability to obtain the necessary permits and regulatory concurrence.

Each of the three remedial alternatives is technically implementable. Alternatives 2 and 3 are also institutionally feasible. Alternative 1 is not considered to be institutionally feasible.

5.3.3 Cost

The cost of implementing an alternative includes capital and continuing costs. Continuing costs are defined as on-going costs associated with implementation and maintenance of the selected remedy. To compare the total cost of implementing each alternative, costs associated with implementing each alternative were estimated. The capital costs and continuing costs associated with implementing the three alternatives described above are summarized in Appendix B.

5.3.3.1 Capital Cost

Capital costs associated with implementing Alternatives 2 and 3 include construction, labor and disposal costs (e.g., constructing an asphalt/concrete cap, and excavation of impacted soil and capping or disposal off-site), engineering costs (e.g., preparing plans and specifications, and performing construction oversight), reporting costs, and regulatory agency oversight costs.

5.3.3.2 Continuing Cost

Since DTSC will require deed restrictions (Alternative 2), and operation and maintenance activities (Alternatives 2 and 3), continuing costs will be incurred as a result of these institutional controls. Such events will include periodic inspections, repair, and operation and maintenance costs. These events will pertain to the hardscape cap over the lead and OCP-impacted soil (Alternative 2), soil containing NOA (Alternatives 2 and 3), and/or the vapor mitigation system (Alternatives 2 and 3):

- Notifying overseeing regulatory agencies in advance of performing cap repair/maintenance;
- Using contractors with proper health and safety training to perform cap maintenance/repair if the capped soil will be disturbed;
- Conducting cap and vapor mitigation system inspections and maintenance/repair;
- Preparing reports summarizing inspections, maintenance/repair activities;

- Preparation of 5-year assessments.

5.3.3.3 Estimated Costs for Removal Action

Estimated remediation costs for implementing each alternative are calculated based on the sum of capital costs and continuing costs. Appendix B reflects the cost estimates with a 20 percent contingency for implementing the remedial alternatives.

Alternative 1: $0

Alternative 2: Estimated cost is approximately $ 465,000

Alternative 3: Estimated cost is approximately $ 500,000

5.4 REMOVAL ACTION ALTERNATIVE SELECTION

Alternative 1 is the least effective of the proposed alternatives in mitigating the threat to human health and the environment and is not considered effective or implementable.

Alternative 2 is considered effective and implementable but would require a deed restriction and may increase the project construction schedule. Alternative 2 is also more cost-effective than Alternative 3.

Alternative 3 is effective and implementable, and will not significantly impact the overall project schedule. This alternative, however, is the least cost-effective and has the greatest "carbon footprint". Additionally, excavation and off-haul costs of the OCP and lead-impacted soil could increase if a greater percentage of the excavated soil requires disposal at a Class I hazardous landfill. Our estimate of probable costs for Alternative 3 assumes 20 percent of the excavated soil may require disposal at a Class I landfill.

Based on consideration of the above factors, Alternative 3 is recommended as the removal action alternative for the Site.

SECTION 6: SOIL REMOVAL ACTION IMPLEMENTATION

This Section presents the protocols that will be followed for excavation and off-Site disposal of the lead and OCP-impacted soil at the Site. The preliminary remedial excavation areas are shown on Figures 8, 8A, 8B, and 8C.

6.1 FIELD PREPARATION FOR REMEDIAL ACTION

6.1.1 Contractor's Licensing and Training

Work activities will be performed by a licensed hazardous materials contractor (hereinafter "Contractor") with a hazardous substance removal and remedial action certificate ("A-haz" contractor) and personnel with training in hazardous waste operations (40-hour OSHA Training).

The Contractor will be required to perform several pre-field activities prior to the initiation of soil remediation activities as discussed in this section.

6.1.2 Utility Clearance

To locate public underground utilities, the Contractor will contact Underground Service Alert (USA) at least 48 hours prior to the initiation of excavation activities to clear utilities in the general area of the Site. In addition, a private utility locator also will be used to help locate utilities, if any, in the exploration areas.

6.1.3 Health and Safety Plan

All contractors will be responsible for operating in accordance with the most current requirements of Title 8, California Code of Regulations, section 5192 (8 CCR 5192) and Title 29, Code of Federal Regulations, section 1910.120 (29 CFR 1910.120), Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER). On-Site personnel are responsible for operating in accordance with all applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in 8 CCR General Industry and Construction Safety Orders and 29 CFR 1910 and 29 CFR 1926, Construction Industry Standards, as well as other applicable federal, state and local laws and regulations. All personnel will operate in compliance with all California OSHA requirements. A Site Specific Health and Safety Plan (HSP) is attached as Appendix C. The HSP was prepared by Earth Safety Dynamics to establish health and safety protocols for personnel working at the Site. This HSP meets federal and State of California (OSHA) standards for hazardous waste operations discussed above.

6.1.4 Personal Protection Equipment (PPE)

Personal Protection Equipment (PPE) will be used to isolate individuals from COC and physical hazards. The minimum level of protection for workers performing excavation activities on Site will be Level D protection:

- Nitrile gloves (direct contact with impacted soil)
- Washable boots
- Safety glasses (optional)
- Hard hat
- Hearing protection (if noise levels exceed 85 dBA)
- Tyvek coveralls (direct contact with impacted soil)

Daily use of PPE and personnel monitoring will be documented by the Contractor and Cornerstone in a daily written log.

6.1.5 Site Security

The Site will be fenced and gated with lock. Access to the Site shall be limited by the Contractor and Aspire Public Schools to authorized personnel. Site control is intended to control the potential spread of contamination from the Site. Prior to excavation activities, the Contractor will divide the Site under into three zones: exclusion zone, decontamination zone, and support zone. The planned areas of excavation are identified as exclusion zones.

6.1.5.1 Exclusion Zones

Ingress to and egress from the exclusion zones (remedial excavation areas) will be controlled by the Contractor until the removal of soil exceeding Environmental Screening Criteria is complete. The exclusion zones and access corridors will be clearly defined in the field by the Contractor with a combination of construction staking, fencing, barricades, and/or caution tape. Unauthorized individuals will not be allowed within the exclusion zone during excavation activities. Temporary access corridors will be used for travel between work zones and to the decontamination zone. The exclusion zones will remain cordoned off until removal activities are complete.

The Contractor will post signs on the perimeter fence around the Site that state:

WARNING **CONTAMINATED WORK AREA** **AUTHORIZED PERSONNEL ONLY** **Questions or Concerns, Please Call:** Client's Phone Number	**WARNING** **This Site contains chemicals known to the State of California to cause cancer or other reproductive toxicity.** **AUTHORIZED PERSONNEL ONLY** **Questions or Concerns, Please Call:** Client's Phone Number

6.1.5.2 Decontamination Zones and Procedures

Prior to the initiation of soil excavation activities, the Contractor will establish the decontamination zone(s). Decontamination procedures will be performed before leaving the work areas as part of general protocols for minimizing the physical transfer of impacted materials from the Site. Vehicles leaving the Site will be observed by Contractor and/or Cornerstone to note that appropriate decontamination and safety measures have been followed; a daily written report prepared by the Contractor will be provided to Cornerstone.

Prior to beginning soil excavation activities, decontamination zones will be established on-Site by the Contractor such that dust, debris and soil are removed from equipment, transportation vehicles and personnel leaving the work zones. The decontamination zone will be large enough to accommodate steam cleaning or pressure washing of all equipment including excavators, dozers and loaders, if necessary. However, personnel decontamination will also take place as Site personnel leave the work zones. The location and size of the decontamination zone for personnel may change as Site conditions and operations dictate.

Due to the presence of NOA, decontamination procedures of equipment and transportation vehicles shall include wet brushing methods such as steam cleaning or pressure washing without detergent. The Contractor will provide washtubs with soap and water and rinse tubs for the cleaning of reusable equipment.

Water used for on-Site decontamination will be collected and stored in on-Site storage containers (drums or closed-top tanks) provided by the Contractor. Wastewater will be analyzed and disposed off-Site at a permitted facility.

6.1.5.3 Support Zone/Staging Area

The support zone/staging area will be set up on-Site by the Contractor prior to starting excavation activities. This area will provide for administrative and support functions (command post, first-aid station, rest area, drinking facility, etc.) necessary to keep the field activities operating smoothly. The Contractor will provide potable water and wash facilities for the field personnel in this location.

6.2 RISK REDUCTION MEASURES

6.2.1 Dust and Erosion Control

The Contractor will utilize effective means of dust and erosion control to minimize the generation of dust and erosion associated with excavation activities, truck and vehicle traffic onto and off the Site, and the effects of ambient wind traversing exposed soil.

Work activities, such as clearing, excavation and grading operations, construction vehicle traffic on unpaved ground, and wind blowing over disturbed soil surfaces may generate dust and particulate matter whenever exposed soil surfaces are dry. The Contractor will eliminate or minimize dust emissions to the maximum extent possible. To accomplish minimal dust emissions, the Contractor will implement dust control measures in accordance with Air District rules and regulations. Since naturally occurring asbestos concentrations do not exceed 0.25 percent, an Asbestos Dust Mitigation Plan and/or Air Monitoring Plan do not need to be prepared for review and approval by Bay Area Air Quality Management District (BAAQMD).

An effective means of dust control will be utilized to minimize the generation of dust associated with the earthwork activities, truck traffic onto and off the Site, and the effects of ambient wind traversing exposed soil. The Contractor will be required to prepare and implement a detailed Dust Control Plan for all phases of construction that contact contaminated soil. Dust control measures utilized at the Site will include several or more of the following on an as needed basis:

- Providing equipment and staffing during normal working hours for watering of all exposed or disturbed soil surfaces sufficient to suppress dust plumes.
- Using dust suppressant additives in the water, which can be a small amount of ordinary liquid detergent.
- Covering or wetting of stockpiles of debris, soil, sand or other materials that can be blown by the wind.
- Misting or spraying water while excavating soil and loading transportation vehicles.
- Minimizing drop heights while loading/unloading excavated soil.

- For track-out prevention, a gravel pad near the Site exit will constructed for vehicle decontamination. Decontamination procedures outlined in Section 6.1.5.2 will be followed.

Any track-out on a paved public road at any location where vehicles exit the work Site will be cleaned by using wet sweeping or a HEPA filter equipped vacuum device by the end of each work day. Dry sweeping of paved roadways will be prohibited.

- Wetting inactive portions of the Site that have exposed soil surfaces or treating these areas with an approved dust suppressant.

- Suspending earth moving or other dust producing activities during periods of high winds whenever dust control measures are unable to prevent visible dust plumes.

Watering to control dust will not result in ponded water or runoff. If runoff occurs, it will be contained on-Site.

6.2.2 Air and Meteorological Monitoring

Air monitoring for the particulate matter at the Site will be performed to document worker exposures and off-Site migration of dust, during activities that significantly disturb COC-impacted soil (i.e. grading, trenching, landscaping, excavation and loading).

6.2.3 Perimeter Dust Monitoring

Perimeter air monitoring will be conducted at the Site to document the effectiveness of dust control measures. Prior to the beginning of excavation or grading activities, a windsock or anemometer will be used to monitor the wind direction at the Site and to help determine the location of monitors along the fence lines. Fence line monitoring will be conducted at three locations: one upwind and two downwind at the Site. Each dust monitor will be positioned within the breathing zone at approximately 5 feet above the ground level. Dust monitoring will be conducted daily during remedial excavation activities, and whenever personal or fence line air monitoring is performed.

- Real time monitoring of total dust (<10 µm diameter) will be conducted daily throughout the duration of the removal action during activities that may significantly disturb COC-impacted soil. The monitoring will be performed using three DataRAM PDR-1000 particulate monitors. These meters log the detected airborne dust concentrations.

- The particulate meters will be monitored by the field engineer or geologist to evaluate if excessive dust is migrating off-Site. Each time the meters are checked, the differences between the average upwind dust concentration and the average downwind concentration will be calculated.

  The DTSC recommended work zone action level is 5 milligrams per cubic meter (mg/m^3). This concentration is half the 8-hour threshold limit value of 10 mg/m^3 for total particulates established by the American Conference of Governmental Industrial Hygienists for occupational exposure. For perimeter dust monitoring, the calculated

difference between the upwind and downwind meter will be compared to the DTSC recommended action level of 0.05 mg/m^3. Similar to asbestos, trigger levels for dust are established at one-half the action level. Exceedance of the trigger levels will require increased dust mitigation measures until the trigger levels can be achieved.

6.2.4 Perimeter Asbestos Sampling

Perimeter monitoring for airborne asbestos will be performed during remedial excavation activities, and for at least three days during the first week of normal grading activities. Up to three additional sampling events will be performed during the first day of selected new field activities involving significant soil disturbance (e.g. grading, trenching, landscaping). Perimeter monitoring may continue at the discretion of DTSC.

- Asbestos samples will be collected on 25 mm 0.45 µm asbestos air monitoring cartridges, provided by the analytical laboratory. Sample collection will be conducted by drawing air through the cartridge using a high-volume pump (Gast 1532 or similar) throughout the 8-hour workday. The pump will be powered by a portable gasoline-powered electric generator.

  Asbestos air samples will be analyzed in general accordance with the CARB Modified AHERA method, which uses the standard Transmission Electron Microscopy (TEM) by the United States Environmental Protection Agency, Asbestos Hazard Emergency Response Act (AHERA) criteria for asbestos (40 CFR, Part 763 Subpart E, Appendix A, adopted October 30, 1987).

- The analytical sensitivity will be 0.001 structures per cubic centimeter (0.001 s/cc).

- All asbestos structures with an aspect ratio greater than three to one (3 to1) will be counted irrespective of length.

- Analysis will be performed by a laboratory certified to perform these analyses (Asbestos TEM Laboratories, Berkeley, CA) with an expedited turnaround time (approximately 24 hours) during the first week.

- The Cal-OSHA Permissible Exposure Limit (PEL) 8-hour time weighted average (TWA) for asbestos is 0.1 structures/cubic centimeter. The table presented below presents the asbestos action levels recommended by DTSC for various Site activities. Trigger levels are also established at one-half of the action level. Exceedances of the trigger levels will require increased dust mitigation measures until the trigger levels can be achieved. If the action level is reached or exceeded, DTSC will be contacted and all work may be stopped.

Activity	Action Level	Trigger Level
Personal Monitoring	0.1 structures per cm^3	0.05 structures per cm^3
Work Zone Excursion 30-Minute Action Level	1 structure per cm^3	0.5 structures per cm^3
Perimeter Fence-line Monitoring	0.01 structure per cm^3 (one tenth of PEL)	0.005 structures per cm^3

6.2.5 Personal Air Monitoring

As discussed in the Site-specific HASP, personal air monitoring will be performed by Site Safety personnel to evaluate airborne asbestos levels in the work zone. Air sampling will be conducted in accordance with 8 CCR Sections 5214, 5155 and 5192. Representative worker exposure monitoring for asbestos will be performed at the outset of soil disturbance. Sufficient worker breathing zone samples will be taken to constitute a negative exposure assessment (both full-shift and short-term or excursion limit) for each job task, area, and condition encountered. Sampling and analysis will be performed in accordance with NIOSH Method 7400.

6.2.6 Pesticide and Lead Air Monitoring

Pesticide and lead exposures (airborne) above Cal/OSHA permissible exposure limits (PELs) during the excavation and off-haul activities are not expected. An evaluation of expected worst-case exposure conditions was performed in the Site-specific HASP using the maximum detected contaminant concentrations in soil at the Site and a conservative (worst case) dust concentration of 5 mg/m^3, which corresponds to a very thick and dark dust cloud. The anticipated exposure concentrations were well below the respective PELs. Based on these conservative calculations, the use of respirators will not likely be required and the need for personal air monitoring for pesticides and lead is not anticipated. As discussed in the HASP, verification personal and perimeter air samples will be collected and analyzed to confirm these conservative assumptions.

6.3 MANAGEMENT OF LEAD AND PESTICIDE-IMPACTED SOIL

6.3.1 Construction Sequence

This section presents a remedial construction sequence the Contractor will be required to follow at the Site. The sequence of activities is provided below followed by a discussion of selected tasks.

Asbestos and Lead-Based Paint Survey →
Asbestos Abatement →
Demolish Buildings to Foundation →
Additional Soil Characterization →
Landscape/Hardscape/Equipment Removal in Excavation Areas →
Perform Remedial Excavation Work →
Remove Building Foundations and Hardscape

6.3.2 Asbestos and Lead-Based Paint Survey

Due to the age of the on-Site structure, building materials may contain asbestos. Prior to demolition, Aspire Public Schools consultant will perform an asbestos and lead-based paint survey as required by local authorities and/or National Emissions Standards for Hazardous Air Pollutants (NESHAP) guidelines. NESHAP guidelines require the removal of potentially friable asbestos-containing building materials (ACBMs) prior to building demolition or renovation that may disturb the ACBM.

6.3.3 Additional Soil Characterization

6.3.3.1 Crawl Space Soil Sampling

Following demolition activities to the foundations, to evaluate soil quality in building crawl spaces, Cornerstone will perform additional characterization soil sampling[1]. This work will be performed prior to the Contractor starting remedial excavation activities. Crawl space soil sampling will be performed at six locations (SB-54 to SB-59) as discussed in the DTSC-approved PEA Work Plan.

6.3.3.2 Fill Characterization

To better evaluate the quality of the suspect imported fill located near the eastern boundary of the Site, Cornerstone will evaluate the extent of fill and perform additional characterization soil sampling. This work will be performed prior to the Contractor starting remedial excavation activities. Test pits will be excavated using a rubber tire backhoe to evaluate the extent of fill. Based on our visual observations, the volume of fill will be estimated to determine the number of fill samples that must be collected and analyzed following the technical document titled, "*Information Advisory on Clean Imported Fill Material*" (DTSC, October 2001).

6.3.4 Landscape/Hardscape/Equipment Removal in Excavation Areas

Prior to starting remedial excavation activities, the Contractor will remove hardscape and selected landscape features within the excavation boundaries (i.e. walkways, patios, trees, shrubs, bushes, etc).

6.3.5 Building Demolition and Crawl Space Activities

Following completion of remedial excavation activities and approval by Aspire Public Schools and Cornerstone, the Contractor will remove building foundations and hardscape materials in preparation for mass grading activities for the planned development.

6.3.6 Excavation of OCP/Lead Impacted Soil

The remedial action consists of excavating soil with COC concentrations exceeding Environmental Screening Criteria and transportation of the excavated material to a permitted off-Site facility for disposal. The preliminary remedial excavation areas and depths are presented on Figures 8, 8A, 8B, and 8C. The final excavation dimensions may vary based on confirmation sampling results.

Soil excavated from each removal area, and possibly in crawl spaces, will be placed in its own temporary soil stockpile. Each stockpile will be sampled by Cornerstone to profile the material for off-Site disposal. The Contractor will off-haul the stockpiled material to a permitted waste disposal facility. Following excavation, Cornerstone will collect confirmation soil samples from the excavations to evaluate if sufficient impacted soil has been removed. Remedial excavation activities will be considered complete when the confirmation samples collected from the

[1] Due to access, this work was not performed during implementation of the PEA Work Plan.

remaining in-place soil do not contain COC concentrations that exceed Environmental Screening Criteria.

6.3.7 Transportation Procedures

This section outlines the requirements and procedures for transportation of impacted soil to an off-Site disposal facility. The Contractor will profile the soil to determine an appropriate disposal facility. The following transportation procedures will be followed. These procedures are based on guidelines contained in the *Transportation Plan – Preparation Guidance for Site Remediation* (. Cal/EPA 1994).

The soil will be transported by a licensed transporter. The necessary documents, such as the bills of lading and/or waste manifest forms, will be completed and accompany the truck driver to the landfill. The trucks will be loaded at the Site and appropriately covered (tarped) in accordance with Department of Transportation (DOT) regulations.

6.3.7.1 Transportation Routes

Loaded trucks will exit the Site onto Derby Avenue heading south, turn right onto International Boulevard heading west, turn left onto 29th Avenue heading south, turn right onto East 12th Street heading west, turn left onto 22nd Avenue heading south, merge onto southbound Interstate 880.

Highway routes are provided for transportation of the soil to the Buttonwillow Landfill (Class I) in Buttonwillow, California, Altamont Landfill (Class II) in Livermore, California, or Newby Island Landfill (Class III sanitary) in Milpitas, California. The Contractor shall verify these landfills accept NOA, pesticide and/or metal-containing waste. These routes are most direct and will provide the least risk of exposure to surrounding communities. The Contractor shall confirm none of the roadways selected are listed with the California Highway Patrol as prohibited for hauling hazardous waste. The trucks will attempt to avoid the major commute times and will avoid residential areas as much as possible. The following is a description of the transportation routes:

- The route to the Buttonwillow Landfill in Buttonwillow, California follows Interstate 880 south. The trucks will continue onto Interstate 580 east then head south on Interstate 5. The trucks will continue on Interstate 5 south to exit 263 toward Buttonwillow/McKittrick. The trucks will proceed on Buttonwillow Drive and will turn right on CA-58 W/Blue Star Memorial Highway. The trucks will turn right on Lokem Road; the landfill is located at 2500 West Lokern Road.

- The route to Altamont Landfill in Livermore, California follows Interstate 880 south. The trucks will continue onto Interstate 580 east. The trucks will follow Interstate 580 east to the Greenville Road exit. The trucks will turn left onto Southfront Road heading east, and then turn left onto Greenville Road heading north. The trucks will then turn right onto Altamont Pass Road, along which the landfill is located.

- The route to Newby Island Landfill in Milpitas, California follows Interstate 880. The trucks will head south on Interstate 880 and turn south to Dixon Landing Road west, along which the landfill is located.

6.3.7.2 Emergency Service and Response

Prior to the start of transport operations, the transportation contractor's Project Manager will contact an Emergency Response Contractor (ERC). In the event of a spill, accident, or breakdown, the transport driver will stay with the truck until law enforcement, California Highway Patrol, or other assistance arrives. The driver should contact their dispatcher who will in turn contact the ERC. Also, the driver should place traffic cones around the spill and keep onlookers away from the area. The driver is not to attempt to clean up the spilled material. The ERC is responsible for contacting all appropriate outside agencies based on the knowledge of the existing conditions (e.g., law enforcement, Caltrans, RWQCB, State or County Health Departments, California Office of Emergency Services). Due to the number of variables that could impact any off-Site spillage scenario, specific spill mitigation procedures are not provided.

6.3.7.3 Training of Transportation Personnel

The selected transportation contractor will have an on-going training program for the truck drivers; such a program will be specifically required in the transportation contract. Drivers will have: DOT required hazardous materials hauler training; and training as required by 29 CFR 1910.120(e), specifically 40 hours of off-site training, and 8-hour refresher training as required. The contractor's Site Safety Officer (SSO) will provide the transportation contractor with a copy of the HSP to allow the contractor to train the drivers regarding the hazardous characteristics of the material being transported. All training will be the responsibility of the transportation contractor.

6.4 CONFIRMATION SOIL SAMPLING

To document removal of soil with COC concentrations that exceed Environmental Screening Criteria, Cornerstone will collect confirmation soil samples from the in-place soil at the base and in the sidewalls of the excavations. The base confirmation samples will be collected at an approximate frequency of one sample for every approximately 500 square feet of excavation base. Sidewall samples will be collected at an approximate frequency of at least one sample for every approximately 50 feet of sidewall.

Confirmation samples will not be collected from those sidewalls that extend to the property line. Additionally, sidewall and bottom confirmation soil samples will not be collected from excavation sidewalls and bottoms that extend to a prior sampling location where a soil sample was previously collected and analyzed and did not contain COC concentrations above Environmental Screening Criteria.

6.4.1 Confirmation Soil Sample Locations and Depths

The confirmation sample locations will be randomly selected in the base and sidewalls of the excavations in accordance with the above-mentioned frequencies. Sidewall soil samples will be collected at mid-point of the sidewall for every 3 feet of excavation sidewall. For example, if the

excavation extends to 3 feet, a sidewall sample will be collected from an approximate depth of 1½ feet. If the excavation depth extends to 5 feet, sidewall soil samples will be collected from approximate depths of 1½ feet and 4 feet. Bottom samples will be collected from the upper ½-foot of soil at the base of the excavation.

6.4.2 Soil Sampling Procedure

Soil samples will be obtained by manually scraping a 1½- by 6-inch brass sampling tube into freshly exposed soil in the excavation sidewall. Bottom samples will be obtained by manually pressing a sampling tube to a depth of approximately 6 inches. If the soil is too dense to manually press the brass sampling tube into the soil, the tube will be driven into the soil using a slide hammer or equivalent device.

The ends of the liners will be covered in Teflon film, fitted with plastic end caps, and labeled with a unique identification number. The samples will then be placed in an ice-chilled cooler and transported to a state-certified analytical laboratory with chain of custody documentation.

6.4.3 Laboratory Analyses

The confirmation soil samples collected from the excavations will be analyzed at a state-certified laboratory for organochlorine pesticides (EPA Test Method 8081A) and/or total lead (EPA Test Method 6010B). Laboratory analyses will be selected based on the compounds that exceeded Environmental Screening Criteria in the soil samples collected from the excavation area during Cornerstone's PEA and SSI investigations. The Contractor should assume that approximately five working days will be needed to obtain the analytical results from the laboratory and for the Cornerstone to review the data.

6.4.4 Additional Excavation and Confirmation Sampling

If concentrations of the COC exceeding Environmental Screening Criteria are detected in the confirmation soil samples, additional excavation will be performed. Cornerstone will select an approximate distance to extend the excavation boundary. This process will be repeated until the remaining concentrations detected in the in-place soil do not exceed Environmental Screening Criteria.

6.5 PROFILING OF EXCAVATED SOIL

To profile stockpiled soil for off-Site disposal, Cornerstone will collect 4-point composite soil samples from each stockpile in random areas and depths. The number of samples and laboratory testing program will be determined based on professional judgement and/or the Contractor's selected waste disposal facility's acceptance criteria. At a minimum, the samples will be submitted to a state-certified laboratory and analyzed for lead and organochlorine pesticides. Depending on the acceptance criteria of the Contractor's selected disposal facility, selected stockpile samples may also be analyzed for California Assessment Manual (CAM17 metals (EPA Test Methods 6000/7000), total petroleum hydrocarbons (EPA Test Method 8015), VOCs (EPA Test Method 8260), and polyaromatic hydrocarbons (EPA Test Method 8270SIM). Based on these results, selected composite samples may also be analyzed for soluble metals using Soluble Threshold Limit Concentration (STLC) and/or Toxicity Characteristic Leaching Procedure (TCLP) extraction techniques.

Cornerstone will provide the analytical results to the Contractor who will then forward the data to disposal facilities to determine the appropriate destination of the stockpiled material. Prior to off-Site disposal, additional analytical testing may be required in accordance with the requirements of the selected disposal facility. Aspire Public Schools will be responsible for signing all waste profile forms and manifests.

6.6 SOIL LOADING PROCEDURES

During loading activities, the Contractor will place heavy plastic sheeting beneath the trucks to collect any spilled soil. To avoid spreading of the contamination, after each truck is loaded and prior to moving off the plastic sheeting, the top rails, fences, tires, and all other surfaces with visible dust or soil spilled during loading will be removed by dry brushing methods at the point of loading. The collected soil on the plastic will be periodically removed to avoid the spreading of impacted soil on the truck tires.

6.7 QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan was presented in the PEA Work Plan that was approved by DTSC. For completeness, the plan is repeated below and will be implemented during RAW soil removal activities.

To check the precision and accuracy of field and laboratory data, we will collect quality assurance and quality control (QA/QC) samples and will review QA/QC data provided by the chemical testing laboratories. This section presents the following QAQC requirements:

- Field Documentation;
- Data Quality:
- Field Duplicates;
- Equipment and Trip Blanks;
- Sample Receipt and Handling;
- Laboratory Quality Control; and
- Data Validation

6.7.1 Field Documentation

Cornerstone will be present on a full-time basis during remedial excavation activities. This individual will be responsible for observing excavation and off-haul activities, monitoring health and safety measures, air monitoring, confirmation sampling, and confirming that Contractor activities are being completed in conformance with this document. As part of this process, daily field reports documenting Site activities will be completed and made available for inspection by authorized oversight personnel for the duration of the project.

Photographs of Site activities will be taken periodically by Cornerstone to further document the remedial action implementation.

6.7.2 Data Quality

Cornerstone selected an analytical laboratory on the basis of qualifications, reputation, and appropriate certifications and licensing. Test America of Pleasanton is a California Department of Health Services (DHS) and National Environmental Laboratory Accreditation Conference (NELAC) certified laboratory (Certificate # 01107CA). FASI, EMSL, MA and, A-TEM are certified by the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP).

6.7.3 Field QA/QC

The field QA/QC procedures will consist of field duplicate and equipment blank collection and analysis.

6.7.3.1 Field Duplicates

Field duplicate samples are two co-located samples of the same matrix, collected in the same approximate location and time, and similar overall homogeneity. Analysis of field duplicates provides a quantitative measure of the variability of the overall sampling and laboratory analysis process due to sample heterogeneity, sampling techniques, and/or analytical methods. The field duplicates will be assigned a different sample ID but will be packaged and transported in the same manner as the primary sample. For this investigation, one field duplicate soil sample will be collected from selected sampling locations.

6.7.3.2 Equipment Blank

Equipment blank samples are collected prior to sampling activities by pouring analyte free water (deionized water) over or through decontaminated field sampling equipment. Analysis of equipment blanks evaluate the adequacy of the decontamination process and assess contamination from the total sampling, sample preparation process, when decontaminated sampling equipment is used to collect samples. For this investigation, one equipment blank will be collected from the hand sampling equipment to be used for soil sampling.

6.7.3.3 Trip Blank

Trip blank samples are provided by the laboratory to determine blank water quality, and whether contamination of a sample occurred during sample container preparation, sample handling, transportation, and storage. An aliquot of laboratory-grade water, sealed in pre-labeled sample bottles, will be shipped by the lab with the requested lab sampling apparatus. The provided bottles of water will travel to the field during sampling, be handled on site at one sampling location, and then placed in the cooler with the samples collected from the Site. The trip blank will be returned to the lab with the other Site samples and analyzed for contaminants of concern.

6.7.4 Sample Receipt and Handling

Sample handling and documentation will be reviewed during the data quality assessment and will include evaluating chain-of-custody documentation, technical sample integrity, preservation, and technical holding times. Samples will be delivered to the analytical laboratory with proper chain-of-custody documentation. Sample cooler temperatures for soil samples submitted to Test America of Pleasanton will be recorded at the time of sample receipt. After transfer of sample custody to the laboratory, the samples will be placed in storage refrigerators, maintaining a temperature of 6° Celsius or below. The analytical testing will be performed within the technical holding times for sample preparation and analyses.

6.7.5 Laboratory Quality Control

Samples will be delivered with proper chain-of-custody documentation to a state-certified analytical laboratory. The analytical laboratory QA/QC program will include sample receipt verification, sample hold times, and the preparation and analysis of laboratory QC samples. Laboratory QC samples will include:

- Method Blanks: A method blank is a laboratory-prepared contaminant-free matrix sample that is carried through the entire sample preparation and analytical process with the analytical batch. The method blank is used to assess the existence and magnitude of contamination resulting from laboratory activities.

- Laboratory Control Samples: A laboratory control sample (LCS) is a contaminant-free matrix (i.e., same used for a method blank), spiked with known concentration(s) of target analyte(s), that is carried through the entire sample preparation and analytical process with the analytical batch. The LCS is used to assess the overall accuracy of the method.

- Matrix Spike and Matrix Spike Duplicates: A matrix spike (MS), and matrix spike duplicate (MSD), are aliquots of a sample that have been spiked with target analyte(s) of known concentration(s) during sample preparation. The impact of sample matrix on target analyte recovery (i.e. accuracy) and precision is assessed by the MS and MSD percent recovery (%R) and RPD.

- Surrogate Recoveries: A surrogate is a non-target analyte spiked during sample preparation at known concentration in every sample, including field and laboratory QC samples. Surrogate analyses are used to monitor method performance on a matrix-specific/sample-specific basis.

At a minimum, one laboratory QC sample is required per 14 days or one per 20 samples (including blanks), whichever is greater. One laboratory QC sample will be chosen at random by the laboratory for the matrix spike and matrix spike duplicate (MS/MSD) per 14 days or one per 20 samples (including blanks), whichever is greater.

6.7.6 Data Validation

To test the validity of the analytical data, Level II data validation will be performed for the analytical data obtained during the PEA investigation. Data validation is a sample-specific process implemented to determine the quality of a given data set beyond the method specification, determines any causes for non-conformance to the standard method, and verifies that the reported results are within acceptable ranges. The data evaluation will be performed by third-party consultant Laboratory Data Consultants, Inc. (LDC) in Carlsbad, California. A Level II Data Validation package will be presented in the completion report.

6.8 SOIL REMOVAL COMPLETION REPORT

After completion of the remedial action, a Soil Removal Completion Report will be prepared. The report will document that the remedial action has been performed in accordance with this document and will include, at a minimum, the following elements:

- Summary of excavation activities (volume, extent, etc.);
- Procedures, location, and results (i.e., analytical reports) of the confirmation soil sampling;
- Documentation of off-Site transport and disposal of excavated soil (bills of lading, waste manifests);
- Health and safety and results of air monitoring.

SECTION 7: NOA MITIGATION MEASURES

The selected remedy for the Site also includes limiting exposure to NOA materials by installing a "cap". The following section and subsections describe specific NOA mitigation measures that will be implemented at the Site to limit future human contact with the NOA materials. The engineering controls are shown on Figure 9.

7.1 HARDSCAPE AREAS

Hardscape is considered by DTSC as an appropriate mitigation measure to help prevent exposure to NOA-containing soil. Concrete walkways, concrete slabs, and asphalt pavements will be constructed over imported Class II Aggregate Base (AB) of varying thickness. Concrete areas will consist of 4 inches of Portland cement concrete (PCC) over 6 inches of AB; pavement areas will consist of 3 inches of asphalt concrete (AC) pavement over 9 inches of AB.

7.2 BUILDING FOUNDATION

The planned building foundation will consist of a concrete pier and grade beam foundation with a concrete floor slab. The floor slab will consist of approximately 5 inches of PCC over 1 inch of sand over 6 inches of AB. The aggregate layers may be replaced by gravel as part of the planned vapor mitigation system.

7.3 PERMEABLE AREAS

As shown on Figure 9, the finished cap surface in non-hardscape areas will consist of synthetic turf, safety surfacing in the play area, and bio-retention areas. The synthetic turf area is approximately 2,580 square feet and will consist of all rubber turf over imported fine aggregate and drain rock; the safety surfacing in the play area will consist of 3 inches of rubber over six inches of imported drain rock; the bio-retention areas will consist of 18 inches of imported bio-filtration soil over 12 inches of drain rock.

7.4 IMPORTED FILL

To limit the potential introduction of contaminated fill onto the Site, possible sources of import fill will be evaluated. Adequate documentation will be required so it can be verified that the fill source is appropriate for the Site. The documentation will include detailed information on previous land use of the fill source, any environmental site assessments performed and the findings, and the results of any analytical testing performed. If no documentation is available or the documentation is inadequate, or if no analytical testing has been performed, samples of the potential fill material will be collected and analyzed. The analyses performed will be based on the fill source and knowledge of the previous land use. The sample frequency for potential fill material will be in accordance with that outlined in the technical document titled, "*Information Advisory on Clean Imported Fill Material*" (DTSC, October 2001 or latest version). When analyzing the proposed fill material for asbestos, the samples shall be analyzed using both PLM and TEM methods following the same analytical protocols and evaluation criteria as used in the DTSC-approved PEA.

No fill material will be accepted if detected contaminant concentrations exceed Environmental Screening Criteria, and/or background concentrations of metals.

For those areas where the clean fill will be placed over the soil containing NOA, a geotextile warning barrier shall be installed between the two soil layers.

7.5 ADMINISTRATIVE CONTROLS – OPERATION AND MAINTENANCE PLAN

DTSC's NOA guidance document requires that a long-term operations and maintenance (O&M) Plan be prepared to help establish perpetual integrity of the mitigation measures. Cornerstone will prepare under separate cover an O&M Plan that will define procedures and requirements for long-term operation, monitoring, inspections, data acquisition, reporting, and maintenance. The O&M Plan will include the following:

- A Site plan showing all buildings, utility line trenches, finish grade elevations, landscape areas, and areas of imported fill;
- Description of periodic, routine observation and maintenance work to be performed at the Site;
- Description of soil management and handling if repair or construction work is needed that requires digging into asbestos containing soils;

- Description of maintenance and monitoring activities;
- Description of reporting format and frequency.
- Restrictions on any future intrusive activities that may potentially expose the NOA materials;
- NOA material brought to the surface by future excavation or trenching should be managed in accordance with O&M Plan and applicable local, state and federal laws and requirements; and
- Inspections after triggering events (e.g. earthquake, heavy rain) that may result in exposure of NOA materials at the Site.

A copy of the draft NOA O&M Plan is included in Appendix D.

SECTION 8: VAPOR INTRUSION MITIGATION PLAN

The selected remedy for the Site also includes installation of a vapor mitigation system beneath the planned school building. Detailed engineering drawings and specifications of the mitigation system will be provided under separate cover. This section provides a description of the selected vapor mitigation system, its key components, construction quality control measures, and startup and operation and maintenance of the planned system.

8.1 VAPOR INTRUSION PROCESS

Vapor intrusion is the movement of chemical vapors from contaminated ground water or soil into a nearby building. As vapor accumulates underneath a building slab, the vapor concentration and pressure in the soil pores increases. Pressure gradient is the primary driving force for vapor migration (e.g., vapor flows from high to low pressure). Accumulated soil vapor will potentially migrate through cracks in the foundation, drain tiles, utility pipes, sumps, and conduit penetrations if the pressure underneath the slab is greater than the pressure inside the building. Once inside the workplace, vapors may be inhaled posing potential health risks.

8.2 DESCRIPTION OF SELECTED VAPOR MITIGATION SYSTEM

To help eliminate vapor intrusion concerns into the planned school building, a passive sub-slab ventilation (SSV) system will be installed. The purpose of the SSV system is to inhibit the accumulation of soil vapors underneath the building slab by use of soil vapor vent pipe routed outside the building to the outdoor air. A spray-applied membrane will also be installed to provide an additional level of protection. This membrane will be placed between the foundation of the building and the base materials, effectively sealing penetrations and the subslab to create an additional barrier to vapors from permeating through the slab and into the building.

If the performance criteria for the passive SSV system discussed in Section 8.7 are not met, the system will be converted into an active sub-slab depressurization (SSD) system. The SSD system will be designed to function by continuously creating a lower pressure directly

underneath the building slab relative to the pressure within the building. The resulting sub-slab negative pressure will inhibit soil gases from flowing into the building. If present, volatile chemicals caught in this negative pressure field will be collected and piped to ambient air discharge points.

8.3 KEY SYSTEM COMPONENTS

8.3.1 Permeable Gravel Layer

The SSV or SSD system includes a vapor permeable gravel layer that will be placed across the entire footprint of the building. The gravel will provide a path of least resistance for the soil vapor to migrate, and a system of perforated pipes (soil vapor vent pipes) to collect the vapor and vent it to the atmosphere (vent risers). A minimum 4-inch thick permeable gravel blanket will be installed over the compacted sub-grade of the entire building footprint.

8.3.2 Sub-Slab Vent System

The sub-slab vent system piping layout will extend across the entire building footprint with maximum spacing of 50 foot on center and 25 feet from the building perimeter. The piping networks will be embedded in the permeable gravel layer and connected to 2 to 4 vent riser pipes. The solid vent riser pipes will extend from below the slab to the rooftop within utility chases.

The vent piping below the slab will consist of 3-inch diameter ADS 401 polyethylene piping. Near the slab penetration but below the slab, the ADS pipe will transition to cast iron piping. Above the slab, piping will consist of 3-inch diameter Schedule 40 threaded steel or cast iron vent riser pipe.

8.3.3 Vapor Barrier System

The vapor barrier system beneath the building slab will consist of two main components: a vapor barrier product installed on top of the gravel layer; and one installed below the gravel layer. The barrier system on top of the gravel layer will consist of three products manufactured by Epro Services: a protection base course, middle course vapor barrier, and a protection top course. The Ecoshield-P base course will be placed directly on top of the gravel layer and consists of an approximately 5-mil HDPE film laminated with a nonwoven polypropylene fabric geo-membrane with a combined thickness of 18 mil. Ecoshield-P also meets the Class A requirement for water vapor barriers; Class A is the highest rating for puncture resistance. The Econoline–S spray-applied vapor barrier will be installed over the base course at a minimum 60 mil thickness. The Ecoshield-PP top course, similar to the Ecoshield-P except with micro-perforations, will be placed over the spray-applied membrane.

Directly on top of the compacted sub-grade, and below the gravel layer, a minimum 12 mil thickness HDPE geomembrane or 15 mil thickness Stego® Wrap vapor barrier will be installed. A 10-ounce nonwoven geotextile protection course will be installed on top of the geomembrane.

8.3.4 Sub-Slab Monitoring Probes

To help evaluate the effectiveness of SSV/SSD system, five sub-slab monitoring probes will be installed: one near each building corner and one at a central location. The probes will consist of a porous polypropylene tip embedded in the permeable gravel layer and connected to ¼-inch diameter polyethylene tubing. The tubing for the six probes will be routed to the building rooftop (or other location selected by Aspire Public Schools) in a single PVC conduit protective pipe. The tubing will terminate in a weatherproof control panel installed with sampling port valves installed on each tubing.

8.3.5 Plumbing for Possible Conversion to Active SSD System

Design and installation of the passive SSV system will also include the necessary plumbing and equipment for easy conversion to an active SSD system, if required. A 110-volt power supply and electrical disconnect will be installed on the building rooftop. Conduit and cabling for internet service will also be routed to the control panel to allow for the possible option of real-time remote monitoring and data logging and integration into the Building Management System. Additionally, to allow for measuring differential pressure between the sub slab and building indoor air (during active depressurization), an interior air pressure monitoring point will be installed inside the building and connected to tubing that will be routed to the control panel.

8.4 CONSTRUCTION QUALITY CONTROL

8.4.1 Submittals

Before any of the materials identified in the engineering drawings are delivered to the job Site, the installation contractor will be required to submit complete certified Shop Drawings for review and approval by Cornerstone and/or their representative. The Shop Drawings will include all details of fabrication, assembly, installation, descriptive literature, bulletins, catalog cut sheets of the components, complete manufacturer's specifications and materials of construction, and manufacturer's current recommended method of installation for materials provided.

8.4.2 Field Documentation

Cornerstone and/or their designated representative will perform periodic observations to document installation activities are performed in accordance with the approved engineering drawings. As part of this process, daily field reports documenting Site activities will be completed and made available for inspection by authorized oversight personnel for the duration of the project. At a minimum, field observation will be performed during the following stages of the installation:

- Installation of geomembrane placed directly on top of the compacted sub-grade;
- Installation of the sub-slab vent piping and monitoring probes;
- Placement and backfilling of the permeable gravel layer;

- Installation of the vapor barrier system; and
- Installation and integrity testing of the vent lines.

Photographs will be taken to help document information entered in the daily field report. When a photograph is taken, the following information will be written in the daily field report:

- Time, date, location, and, if appropriate, weather conditions;
- Description of the subject photographed; and
- Name of person taking the photograph.

8.5 VAPOR BARRIER INSTALLATION

8.5.1 Permitting

Aspire Public Schools and/or their representative will obtain the required building permits for construction of the vapor barrier system.

8.5.2 Contractor Certification

The selected vapor barrier contractor/applicator must be trained and approved by the vapor barrier manufacturer. The contractor/applicator will be required to provide a letter from the manufacturer confirming the contractor/applicator is certified by the manufacturer for installation of the product and warranting its product to be free of defects when that product is installed by the certified contractor/applicator.

8.5.3 Vapor Membrane Coupon Sampling

Coupon samples of the Ecoline-S vapor membrane will be collected to confirm the membrane thickness meets or exceeds 60 mils. A maximum area of 2 square inches will cut from the membrane for every approximately 500 square feet of application. Calipers will be used to measure its thickness. The coupon samples will be retained by Cornerstone for review by authorized representatives. Prior to performance of the integrity testing described in Section 8.5.4, the coupon sample location will be patched in accordance with the manufacturers approved methods. Spray or trowel applied Ecoline-S will then be applied to an approximate 120 mil minimum dry thickness, extending at least three inches beyond the geotextile patch.

8.5.4 Vapor-Tight Integrity Testing

Following installation of the vapor barrier, but before placement of the protection top course, smoke/pressure testing will be performed to confirm the integrity of the membrane system. The smoke/pressure testing procedure typically involves using the following equipment: portable and reversible blower or ventilator capable of producing an airflow rate of 200 cubic feet per minute (cfm) at 2 inches water column equivalency; a fireproof smoke chamber with a 2-inch hose for connection to the geomembrane ventilation hole; and industrial smoke bombs or canisters sufficient to produce a quantity of smoke equal to two volumes of the soil vapor venting system.

The smoke/pressure testing will be completed the contractor/applicator and verified by Cornerstone and/or their representative. The smoke testing procedure generally consists of the following steps:

1) The smoke testing assembly (blower and smoke chamber) is connected to a vent riser stub-up piping.

2) To facilitate airflow through the collection layer and vent piping, a penetration of the vapor membrane is made to allow the smoke to displace the existing air volume. The initial ventilation hole should be located on the opposite side of the building from the soil vapor ventilation piping.

3) The vapor membrane, seams, penetration boots, and perimeter batten seals should be observed to document no leakage of smoke (or air) occurs at any location other than the ventilation hole. The vent hole should also be monitored to observe if air and/or smoke are dispersed through the soil vapor venting system and vented out through the penetration.

4) At a minimum, two additional geomembrane penetrations and subsequent smoke tests (completed individually), as outlined above, will be completed in selected locations across the building footprint. Typical locations for vent holes within a building footprint are at diagonally opposite corners (e.g., northeast corner and southwest corner of building footprint).

5) Following completion of the additional individual penetrations and smoke/pressure tests, all penetrations will be permanently sealed.

6) Any leaks in the geomembrane, perimeter batten seals, and/or piping boots other than the induced ventilation holes will need to be marked and appropriately repaired, followed by the completion of an additional smoke/pressure test to verify the vapor-tight integrity of the membrane.

8.6 OPERATION AND MAINTENANCE OF PASSIVE SSV SYSTEM

System monitoring will generally entail two phases: (i) an initial post-construction phase; and (ii) a subsequent phase, which will be comprised of fewer diagnostic tests to be conducted periodically. Adjustments to the mitigation system and/or additional diagnostic testing may be warranted if the results of such testing do not clearly demonstrate that the system is achieving its intended performance and effectiveness.

8.6.1 Initial Post-Construction Monitoring

Initial post-construction monitoring activities will include: 1) collecting system measurements such as vacuum, air velocity / flow, and pressure differential readings from the monitoring probes; and 2) collecting and analyzing air samples from indoor air, outdoor ambient air, and sub-slab monitoring probes.

8.6.1.1 System Measurements

Prior to each air sampling event, system measurements will be recorded. Vacuum measurements will be taken using an appropriately-scaled micromanometer from the sub-slab monitoring probes and vent risers. Air velocity / flow measurements will also be taken from the vent risers using a pitot tube and micromanometer. Air velocity is measured in feet per minute and then multiplied by the cross-sectional surface area of the pipe to obtain flow in cubic feet per minute (CFM). Pressure differential readings between the indoor air and sub slab air will also be recorded.

Air samples collected from the sub-slab monitoring probes will also be screened for volatile hydrocarbons using an organic vapor meter (OVM). This data will be compared to the sub-slab analytical results to help correlate OVM readings.

8.6.1.2 Air Sample Collection and Analyses – Sub-Slab Probes

Sampling of the sub-slab probes will consist of connecting Teflon tubing (¼-inch diameter) to a dedicated sampling port and the other end of the tubing to a "T" fitting. A 6-liter Summa canister will be connected to the "T" fitting. The other end of the "T" fitting will be affixed to a digital vacuum gauge and a 1-liter Summa canister utilized for purging.

A minimum 10-minute vacuum tightness test will be performed on the manifold and connections by opening and closing the 1-liter purge canister valve and applying and monitoring a vacuum on the vacuum gauge. The sample shut-off valve on the downhole side of the sampling manifold will remain in the "off" position. When gauge vacuum is maintained for at least 10 minutes without any noticeable decrease (less than approximately 0.1 inches of mercury (Hg) for properly connected fittings), purging will begin. The shut off valve will be opened and approximately three tubing volumes of vapor will be removed using the purging 1-liter Summa. The volume of air removed will be estimated by the calculated pressure drop in the purging Summa canister. The purge volume will be calculated based on the length and inner diameter of the Teflon sampling tube and the connected sampling tubing and equipment.

The air samples will be collected in 6-liter Summa canisters using a 24-hour flow controller. The canister and sampling trains will be individually certified by the laboratory for low level SIM analyses. Canister pressures will be measured before and after the monitoring period, and will be verified on receipt at the laboratory.

The samples will be submitted under standard chain of custody to Eurofins Airtoxics, for analysis of PCE, TCE, 1,1-DCE, cis-1,2 DCE, trans-1,2 DCE, and vinyl chloride using EPA Method TO-15 GC/MS analysis by SIM mode for the highest sensitivity analysis. Eurofins Airtoxics is an accredited laboratory in California and several other states under the National Environmental Laboratory Accreditation Program (NELAP).

8.6.1.3 Air Sample Collection and Analyses – Indoor/Outdoor Air

Indoor air sampling will be performed at four locations: two locations at ground level and two locations at the second floor level. The intake sampling port of the Summa Canister will be

placed approximately 3 to 4 feet above the ground surface. To the extent practical, doors, windows, intake vents, and other openings will remain closed during sampling activities.

Outdoor air sampling will also be performed: one location at ground level at an up-wind location and one location at the building rooftop.

The indoor and outdoor air samples will be collected in 6-liter Summa canisters using a 24-hour flow controller. The canister and sampling trains will be individually certified by the laboratory for low level SIM analyses. Canister pressures will be measured before and after the monitoring period, and will be verified on receipt at the laboratory. The samples will be submitted under standard chain of custody to Eurofins Airtoxics, for analysis of PCE, TCE, 1,1-DCE, cis-1,2 DCE, trans-1,2 DCE, and vinyl chloride using EPA Method TO-15 GC/MS analysis by SIM mode for the highest sensitivity analysis.

8.6.2 Long-Term Operation and Maintenance

Once an adequate demonstration of effectiveness has been made for the vapor intrusion mitigation system, periodic monitoring will be performed to verify that this performance is sustained. As-built plans and post-construction monitoring activities will be included in the School O&M Plan discussed in Section 7.5. Long-term operation and maintenance of the passive or active mitigation system will involve the following activities:

- Routine observation of all visible components of the vapor intrusion mitigation system, including piping, seals, membranes and collection points will be performed to evaluate potential signs of degradation.
- The school facility manager will be interviewed to evaluate whether any significant changes were made (such as tenant improvements and/or modifications to the HVAC system) that would affect the design and operation of the vapor intrusion mitigation system or the general environment in which it is operated.
- Air samples will be collected from the sub-slab monitoring probes and screened in the field for volatile hydrocarbons using an organic vapor meter.

8.6.3 Monitoring and O&M Inspection Schedule

Table 1 provided below presents the monitoring and O&M observation schedule that will be implemented after Aspire Public Schools has received their certificate of building occupancy. Prior to starting post-construction monitoring activities, an Indoor Air Monitoring Plan will be submitted to DTSC for review and approval.

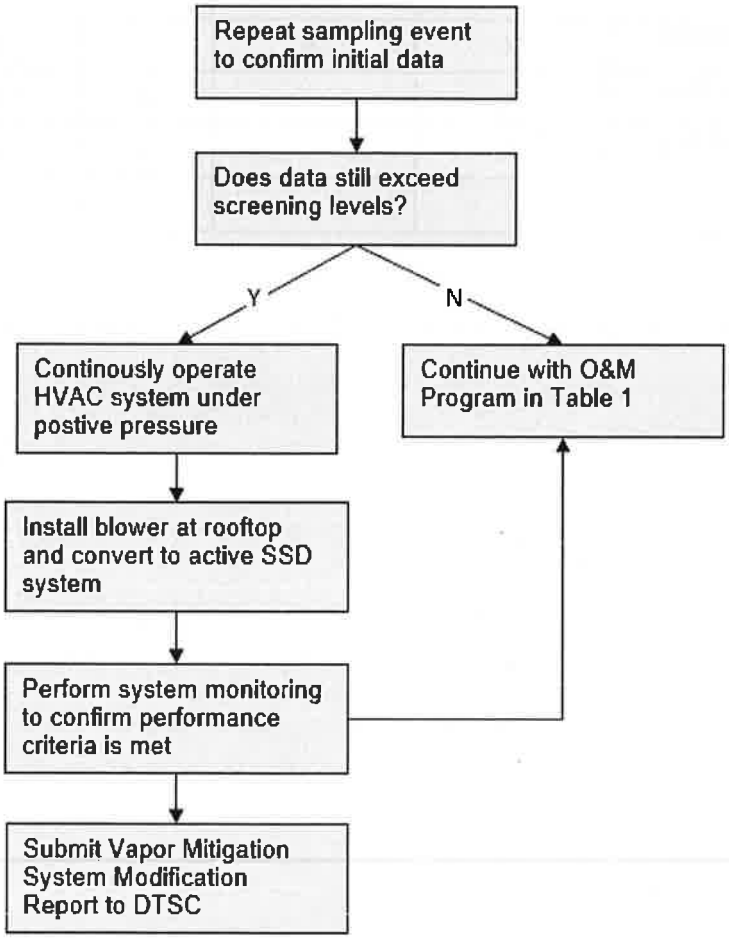
Initial monitoring/sampling will be performed approximately 30 days after building occupancy and normal operation of the HVAC system, then repeated while the HVAC system remains off following an approximately 36-hour shutdown period. Subsequent monitoring/sampling events will be performed on an approximate quarterly basis during the first year of operation. Sampling of the sub-slab probes, indoor air, and/or outdoor air will be performed concurrently, during the same 24-hour sampling period.

TABLE 1. Post-Construction Monitoring and O&M Inspection Schedule

Inspection Event	System Measurements	Sub-Slab Probe Sampling	Indoor Air Sampling	Outdoor Air Sampling	Periodic Monitoring
30 days after occupancy – HVAC on	X	X	X	X	
30 days after occupancy – HVAC off	X		X	X	
3 months after occupancy – HVAC on	X	X	X	X	
6 months after occupancy – HVAC on	X		X	X	
9 months after occupancy – HVAC on	X		X	X	
Annually					X

8.7 CONTINGENCY ACTIONS FOR CONVERSION TO ACTIVE SSD SYSTEM

If COC are detected in the indoor air samples at concentrations that exceed Environmental Screening Criteria, and the source of the indoor air contaminants is due to vapor intrusion, the contingency actions presented in the following flow chart will be implemented.



As an initial step, the sampling event will be repeated to help confirm that indoor air concentrations exceed Environmental Screening Criteria and vapor intrusion is occurring. The interim response action will consist of continuously operating the HVAC system under positive pressure: 24 hours a day, seven days a week.

To mechanically depressurize the gravel zone below the building slab, a 1.0 horsepower Ametek Rotron DR404 regenerative blower will be installed at the rooftop and connected in-line with the exhaust vent piping. Operation of the blower will result in drawing fresh air from other vent lines (installed beneath the building slab around its perimeter) and movement of this air toward the more centrally located perforated exhaust vent piping. The blower will operate

continuously. The blower is designed to achieve a sub-slab pressure field that more than adequately compensates for the depressurization of the sub-slab gravel layer, thus eliminating the driving force for soil gas entry into the building. In general, active SSD systems should achieve a pressure differential (pre-startup baseline versus operational) of at least 0.004 inches of water column (1 Pascal) across the slab for the mitigation of vapor intrusion.

For a higher margin of safety, the design objective for the converted active SSD system will be to sustain a measured differential pressure of approximately 0.05 inches of water column but not less than 0.01 inches of water column between building interior pressure and the pressure measured at the control panel for each sub-slab monitoring probe.

8.8 REPORTING

Following certificate of occupancy, and during the first year of operation, quarterly progress reports will be prepared and forwarded to DTSC for review and approval. The progress reports will include the following main components:

- Contractor certification indicating that the vapor barrier has been installed and tested in accordance with manufacturer's specifications and is free of leaks;
- As-built plans of the vapor mitigation system including approved construction submittals and shop drawings provided by the installation contractor;
- Results of the vapor membrane coupon sampling and vapor-tight integrity testing;
- Documentation of startup activities including the O&M visits and results of the performance monitoring to document effectiveness of the mitigation system;
- Analytical results of the ambient air, outdoor air, and sub-slab sampling performed during the O&M visits.
- Summary of deviations to the construction, installation, operation, and/or maintenance of the vapor mitigation system.

After the first year of operation, reporting will be performed following the protocols of the DTSC-approved O&M Plan that will be provided under separate cover. Additional details regarding the O&M Plan are presented in Section 7.5.

SECTION 9: PUBLIC PARTICIPATION

The public participation requirements for the RAW process included: (1) the development of a community profile, (2) publishing a notice of the availability of the Draft RAW for a 30-day public review and comment, (3) making the Draft RAW and other supporting documents available at DTSC's office and in the local information repository, and (4) responding to public comments received on the Draft RAW and CEQA documents.

DTSC completed the Community Profile and prepared a fact sheet and a public notice that announced the availability of the Draft RAW for public review and comment. Copies of these

documents are included in Appendix E. The fact sheet was distributed to residents and businesses within 1/4-mile radius of the Site, and to affected and interested individuals and organization. The public comment period was from April 28, 2017 to May 29, 2017. No public comments were received.

SECTION 10: CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) is a statute that requires State and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. In response to the passage of the National Environmental Policy Act (NEPA) in 1969, the California Legislature passed the CEQA in 1970 as a system of checks and balances for land use development and management decisions in California.

A CEQA project is a California project that has a potential for resulting in a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. CEQA applies to discretionary CEQA projects proposed to be carried out or approved by California public agencies, unless an exemption applies. Once an activity is determined as a CEQA project, the lead agency shall conduct a preliminary review to determine whether the project is exempt from CEQA. When the lead agency approves or determines to carry out a CEQA-exempt project, the agency may file a Notice of Exemption (NOE).

In compliance with CEQA, DTSC prepared a Notice of Exemption having determined that the proposed project of implementing the RAW has no potential for a significant impact on the environment. The NOE will be made available for review during the public comment period on the RAW.

SECTION 11: LIMITATIONS

This report was prepared for the sole use of Aspire Public Schools and the Department of Toxic Substances Control. Cornerstone makes no warranty, expressed, or implied, except that our services have been performed in accordance with environmental principals generally accepted at this time and location.

SECTION 12: REFERENCES

Cal/EPA. Revised September 2010. *Use of California Human Health Screening Levels (CHHSLs) in Evaluation of Contaminated Properties.*

California Department of Public Health. July 2014. *Maximum Contaminant Levels (MCLs).*

Cornerstone Earth Group. July 1, 2016. *Draft Preliminary Environmental Assessment (PEA) Report, Planned Aspire Public Schools, 2956 International Boulevard, Oakland, California.*

DTSC. October 2001. *Information Advisory Clean Imported Fill Material.*

DTSC. October 2011. *Final Guidance for the evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance).*

DTSC. Revised June 2006. *Interim Guidance Evaluation of School Sites with Potential Soil Contamination as a Result of Lead From Lead-Based Paint, Organochlorine Pesticides from Termiticides, and Polychlorinated Biphenyls from Electrical Transformers.*

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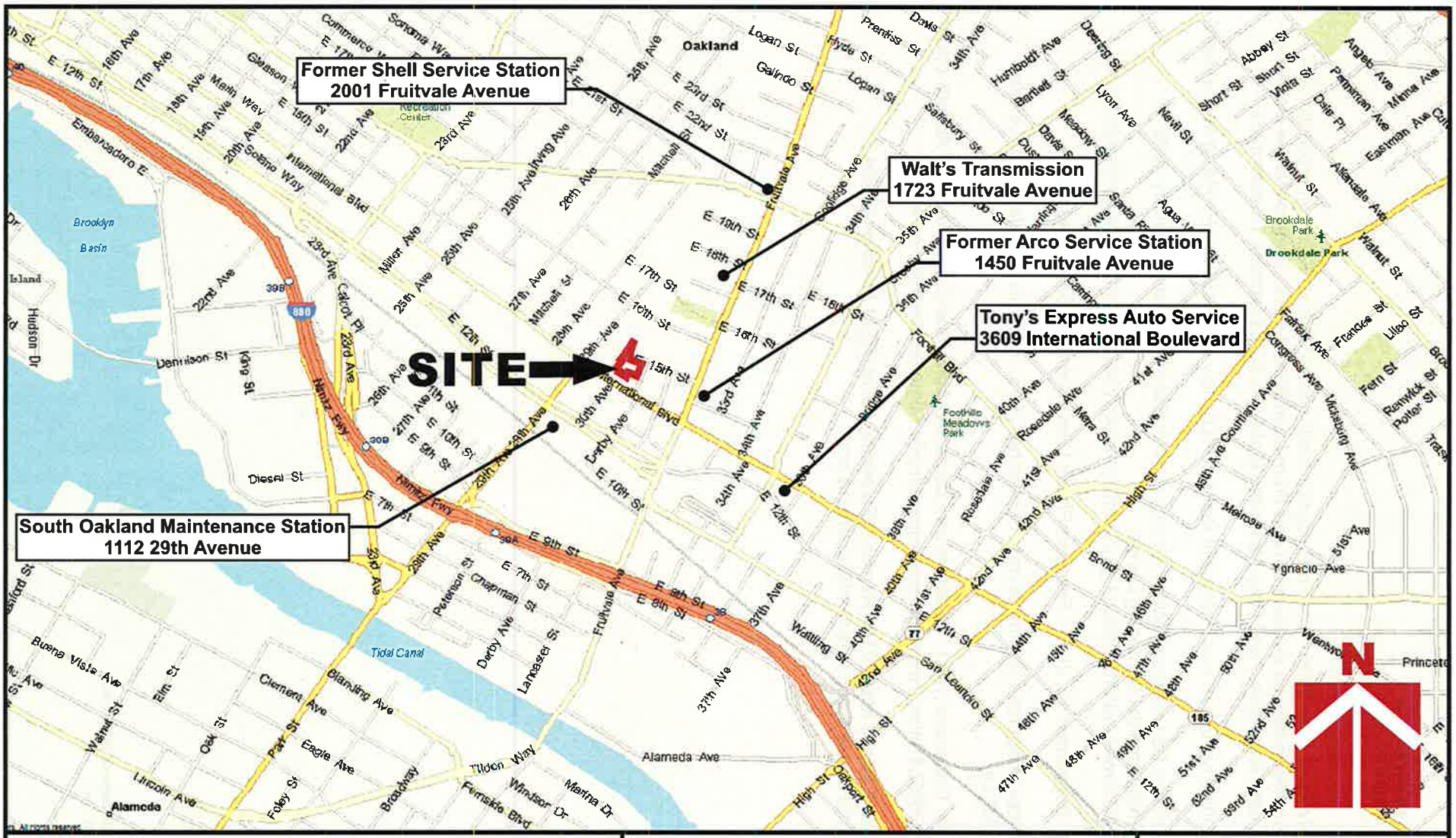
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Stantec. September 25, 2015. *Fruitvale Phase I Environmental Site Assessment.*

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U.S. EPA. December 1993. *Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA.* https://www.epa.gov/superfund/non-time-critical-removal-actions

U.S. EPA. Revised May 2016. *Regional Screening Level (RSL) Summary Table.* http://www.epa.gov/region9/superfund/prg/



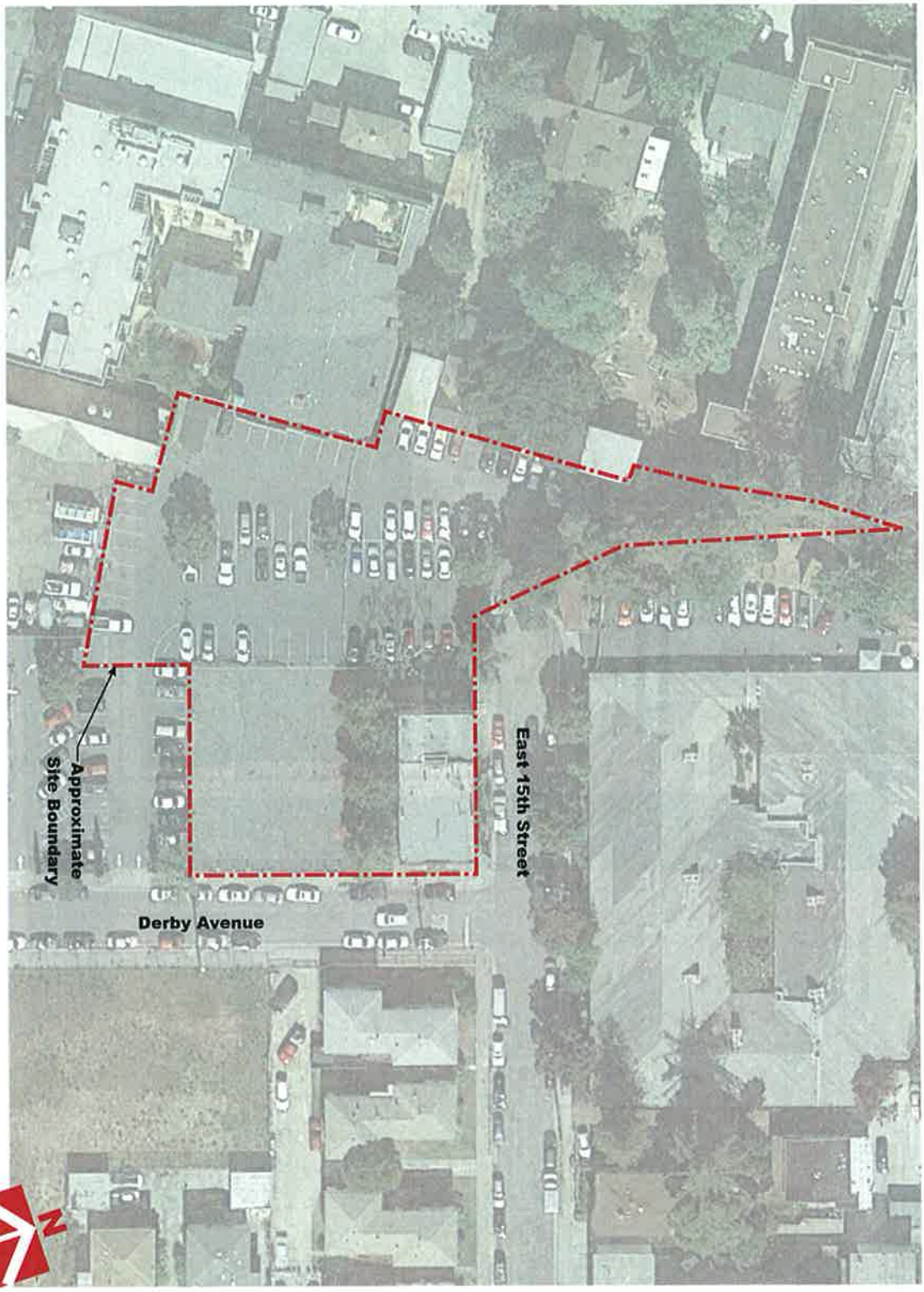
CORNERSTONE EARTH GROUP

Vicinity Map

2956 International Boulevard
Oakland, CA

Project Number	729-4-5
Figure Number	Figure 1
Date	August 2016
Drawn By	RRN

Base by Google Earth, dated 5/1/2015



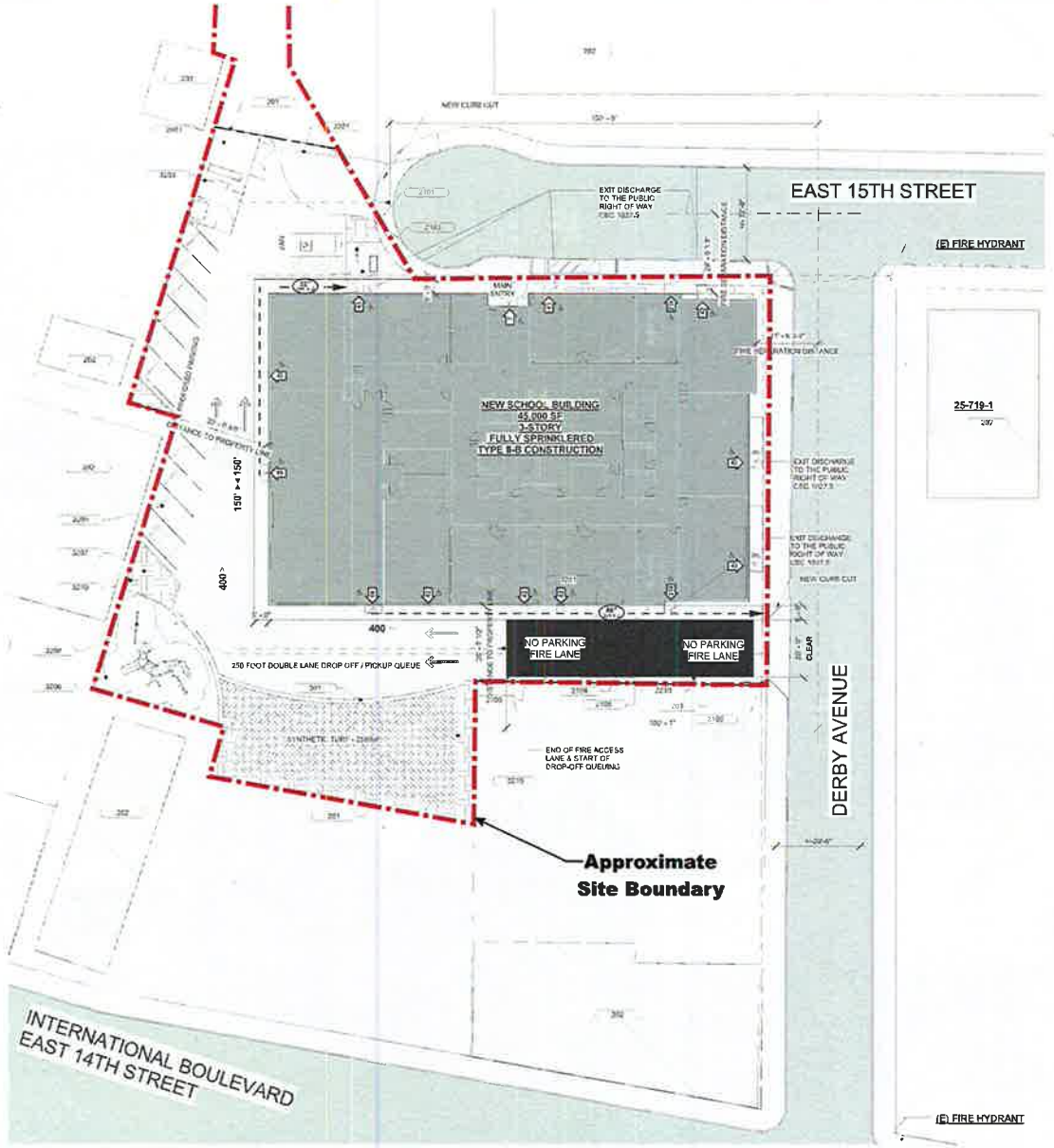
APPROXIMATE SCALE (FEET) 0 50 100

CORNERSTONE EARTH GROUP

Site Plan - Aerial

2956 International Boulevard
Oakland, CA

Project Number	729-4-5
Figure Number	Figure 2
Date	August 2016
Drawn By	RRN, FLL



Base by K2A, Site Fire and Egress Plans - A0.04, dated 4/18/2016

N

0 40 80

APPROXIMATE SCALE (FEET)

CORNERSTONE EARTH GROUP

Planned Development

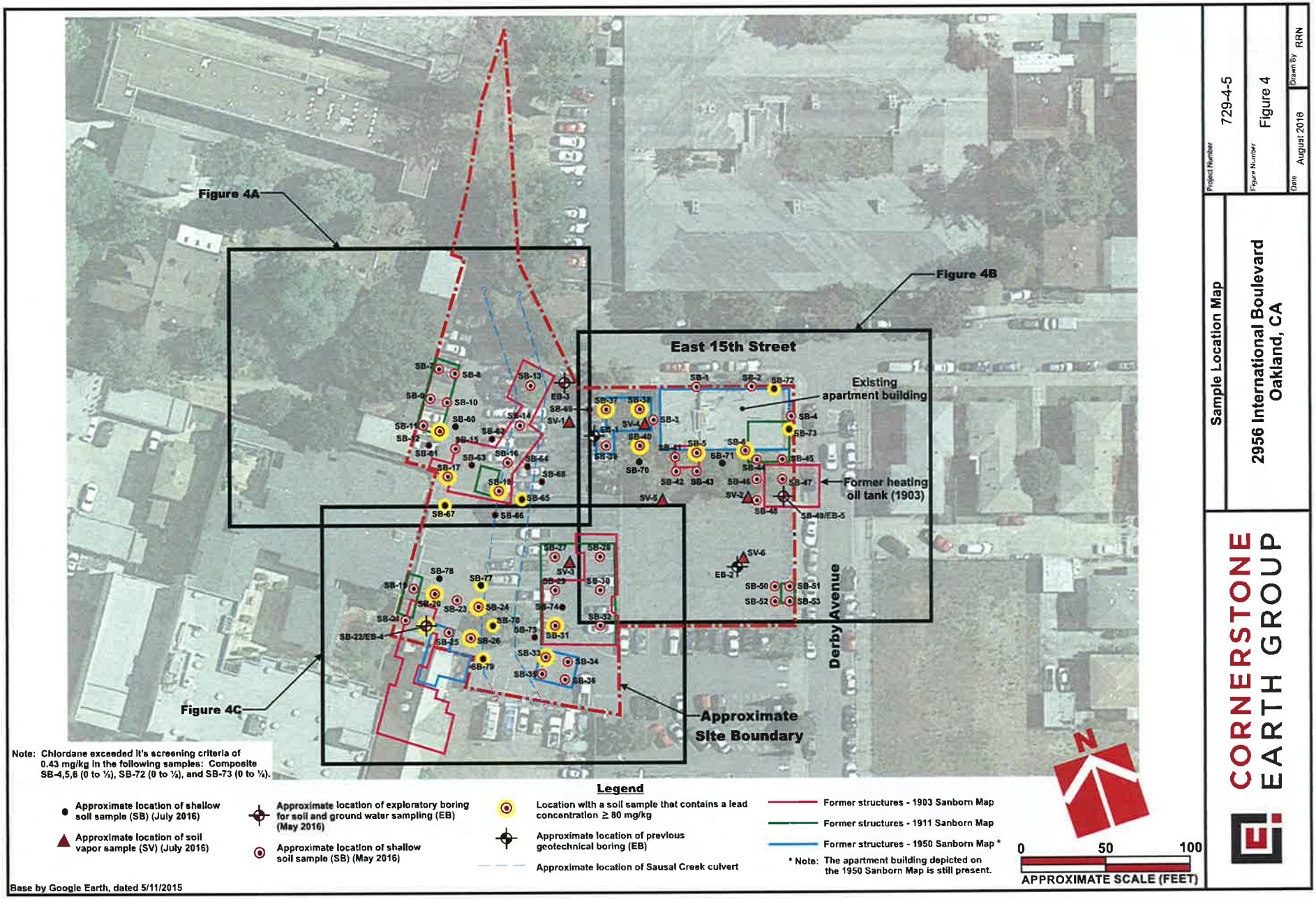
2956 International Boulevard
Oakland, CA

Project Number 729-4-5

Figure Number Figure 3

Date August 2016

Drawn By RRN



Sample Location Map

2956 International Boulevard
Oakland, CA

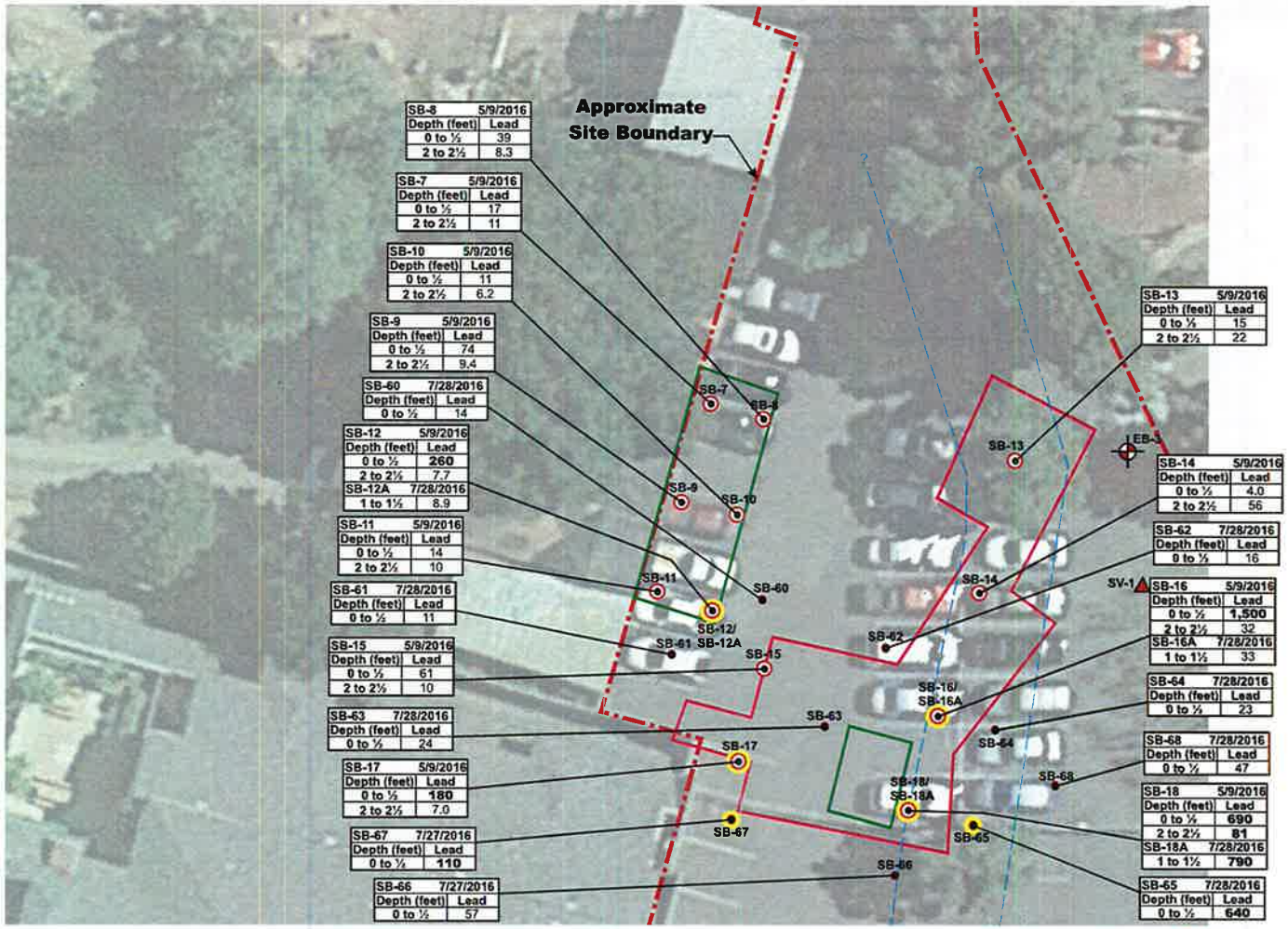
Project Number 729-4-5
Figure Number Figure 4
Date August 2016
Drawn by RRN

CORNERSTONE EARTH GROUP

Screening Level	
	DTSC-SL [1]
Lead	80 mg/kg

[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016

BOLD Concentration exceeds selected environmental screening criteria



Legend

- Approximate location of shallow soil sample (SB) (July 2016)
- Approximate location of soil vapor sample (SV) (July 2016)
- Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
- Approximate location of shallow soil sample (SB) (MAY 2016)
- Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
- Approximate location of Sausal Creek culvert
- Former structures - 1903 Sanborn Map
- Former structures - 1911 Sanborn Map
- Former structures - 1950 Sanborn Map *

* Note: The apartment building depicted on the 1950 Sanborn Map is still present.

N

0 20 40

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 5/11/2015

Lead Concentrations in Soil - Northwest

2956 International Boulevard
Oakland, CA

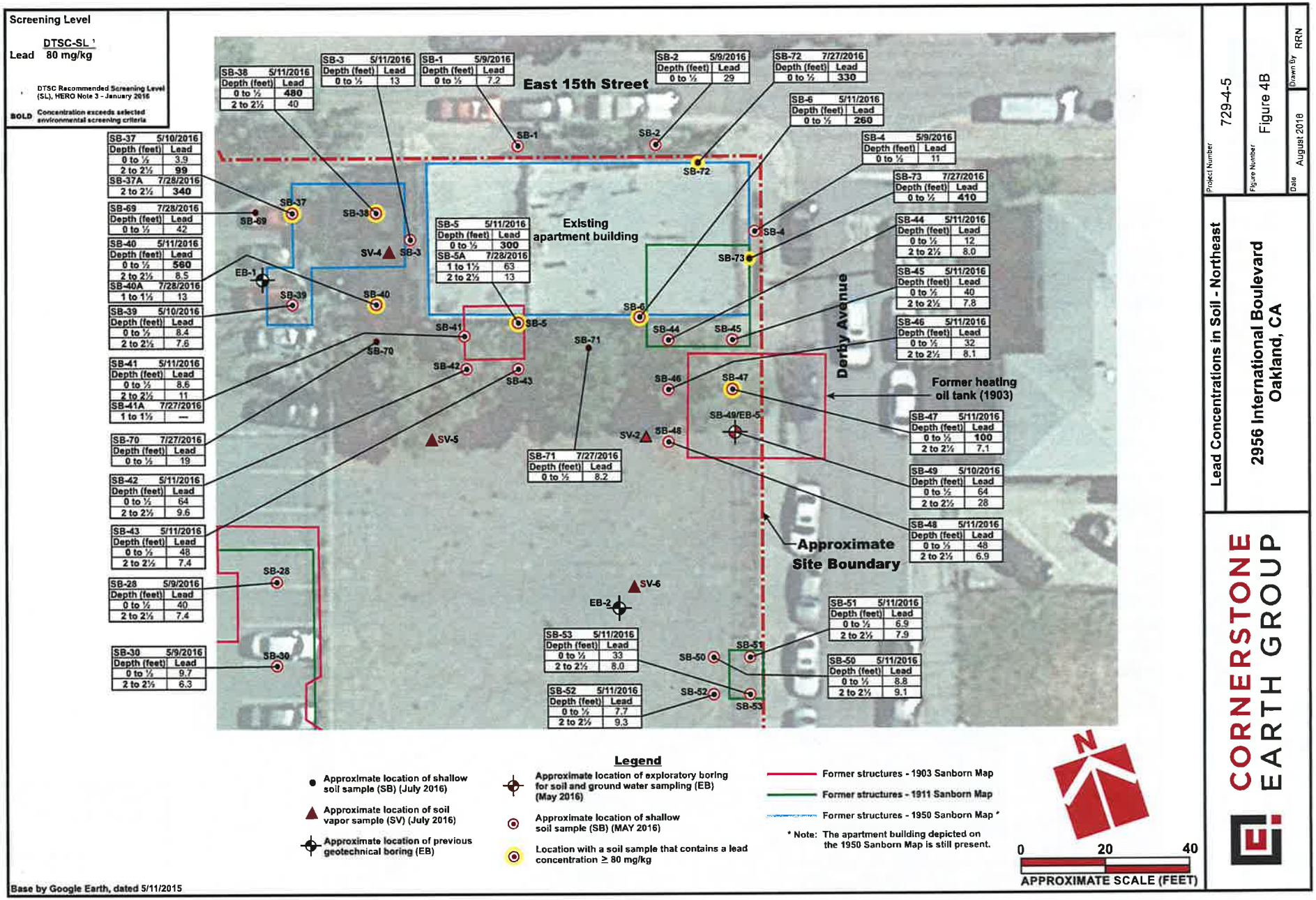
Project Number 729-4-5

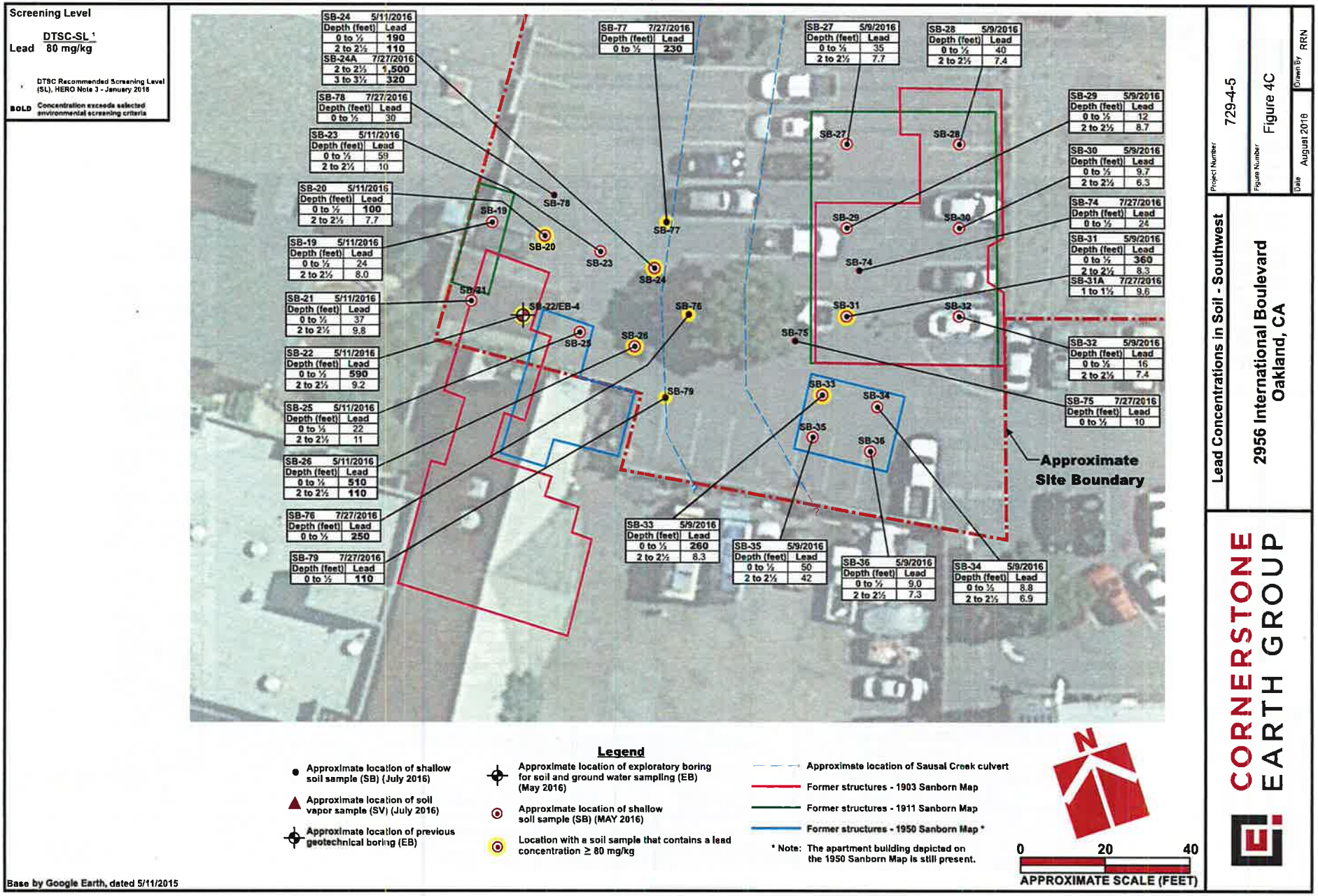
Figure Number Figure 4A

Date August 2016

Drawn By RRN

CORNERSTONE EARTH GROUP


Screening Level
DTSC-SL [1]
Lead 80 mg/kg
[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
East 15th Street
Existing apartment building
Derby Avenue
Former heating oil tank (1903)
Approximate Site Boundary
SB-38 5/11/2016 Depth (feet) Lead 0 to ½ 480 2 to 2½ 40
SB-3 5/11/2016 Depth (feet) Lead 0 to ½ 13
SB-1 5/9/2016 Depth (feet) Lead 0 to ½ 7.2
SB-2 5/9/2016 Depth (feet) Lead 0 to ½ 29
SB-72 7/27/2016 Depth (feet) Lead 0 to ½ 330
SB-6 5/11/2016 Depth (feet) Lead 0 to ½ 260
SB-4 5/9/2016 Depth (feet) Lead 0 to ½ 11
SB-73 7/27/2016 Depth (feet) Lead 0 to ½ 410
SB-37 5/10/2016 Depth (feet) Lead 0 to ½ 3.9 2 to 2½ 99
SB-37A 7/28/2016 2 to 2½ 340
SB-69 7/28/2016 Depth (feet) Lead 0 to ½ 42
SB-40 5/11/2016 Depth (feet) Lead 0 to ½ 560 2 to 2½ 8.5
SB-40A 7/28/2016 1 to 1½ 13
SB-39 5/10/2016 Depth (feet) Lead 0 to ½ 8.4 2 to 2½ 7.6
SB-41 5/11/2016 Depth (feet) Lead 0 to ½ 8.6 2 to 2½ 11
SB-41A 7/27/2016 1 to 1½ —
SB-70 7/27/2016 Depth (feet) Lead 0 to ½ 19
SB-42 5/11/2016 Depth (feet) Lead 0 to ½ 64 2 to 2½ 9.6
SB-43 5/11/2016 Depth (feet) Lead 0 to ½ 48 2 to 2½ 7.4
SB-28 5/9/2016 Depth (feet) Lead 0 to ½ 40 2 to 2½ 7.4
SB-30 5/9/2016 Depth (feet) Lead 0 to ½ 9.7 2 to 2½ 6.3
SB-5 5/11/2016 Depth (feet) Lead 0 to ½ 300
SB-5A 7/28/2016 1 to 1½ 63 2 to 2½ 13
SB-71 7/27/2016 Depth (feet) Lead 0 to ½ 8.2
SB-44 5/11/2016 Depth (feet) Lead 0 to ½ 12 2 to 2½ 8.0
SB-45 5/11/2016 Depth (feet) Lead 0 to ½ 40 2 to 2½ 7.8
SB-46 5/11/2016 Depth (feet) Lead 0 to ½ 32 2 to 2½ 8.1
SB-47 5/11/2016 Depth (feet) Lead 0 to ½ 100 2 to 2½ 7.1
SB-49 5/10/2016 Depth (feet) Lead 0 to ½ 64 2 to 2½ 28
SB-48 5/11/2016 Depth (feet) Lead 0 to ½ 48 2 to 2½ 6.9
SB-51 5/11/2016 Depth (feet) Lead 0 to ½ 6.9 2 to 2½ 7.9
SB-50 5/11/2016 Depth (feet) Lead 0 to ½ 8.8 2 to 2½ 9.1
SB-53 5/11/2016 Depth (feet) Lead 0 to ½ 33 2 to 2½ 8.0
SB-52 5/11/2016 Depth (feet) Lead 0 to ½ 7.7 2 to 2½ 9.3
SB-1 SB-2 SB-72 SB-4 SB-73 SB-38 SB-3 SB-37 SB-69 SV-4 SB-5 SB-5A SB-6 SB-44 SB-45 EB-1 SB-39 SB-40 SB-41 SB-70 SB-71 SB-42 SB-43 SB-46 SB-47 SB-49/EB-5 SV-5 SV-2 SB-48 SB-28 SB-30 SV-6 EB-2 SB-53 SB-51 SB-50 SB-52
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of soil vapor sample (SV) (July 2016)
Approximate location of previous geotechnical boring (EB)
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (MAY 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Former structures - 1903 Sanborn Map
Former structures - 1911 Sanborn Map
Former structures - 1950 Sanborn Map *
* Note: The apartment building depicted on the 1950 Sanborn Map is still present.
N
0 20 40
APPROXIMATE SCALE (FEET)
Base by Google Earth, dated 5/11/2015
Lead Concentrations in Soil - Northeast
2956 International Boulevard Oakland, CA
Project Number 729-4-5
Figure Number Figure 4B
Date August 2018
Drawn by RRN
CORNERSTONE EARTH GROUP


Screening Level
Lead DTSC-SL [1] 80 mg/kg
[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
SB-24 5/11/2016
Depth (feet) Lead
0 to ½ 190
2 to 2½ 110
SB-24A 7/27/2016
2 to 2½ 1,500
3 to 3½ 320
SB-78 7/27/2016
Depth (feet) Lead
0 to ½ 30
SB-23 5/11/2016
Depth (feet) Lead
0 to ½ 59
2 to 2½ 10
SB-20 5/11/2016
Depth (feet) Lead
0 to ½ 100
2 to 2½ 7.7
SB-19 5/11/2016
Depth (feet) Lead
0 to ½ 24
2 to 2½ 8.0
SB-21 5/11/2016
Depth (feet) Lead
0 to ½ 37
2 to 2½ 9.8
SB-22 5/11/2016
Depth (feet) Lead
0 to ½ 590
2 to 2½ 9.2
SB-25 5/11/2016
Depth (feet) Lead
0 to ½ 22
2 to 2½ 11
SB-26 5/11/2016
Depth (feet) Lead
0 to ½ 510
2 to 2½ 110
SB-76 7/27/2016
Depth (feet) Lead
0 to ½ 250
SB-79 7/27/2016
Depth (feet) Lead
0 to ½ 110
SB-77 7/27/2016
Depth (feet) Lead
0 to ½ 230
SB-27 5/9/2016
Depth (feet) Lead
0 to ½ 35
2 to 2½ 7.7
SB-28 5/9/2016
Depth (feet) Lead
0 to ½ 40
2 to 2½ 7.4
SB-29 5/9/2016
Depth (feet) Lead
0 to ½ 12
2 to 2½ 8.7
SB-30 5/9/2016
Depth (feet) Lead
0 to ½ 9.7
2 to 2½ 6.3
SB-74 7/27/2016
Depth (feet) Lead
0 to ½ 24
SB-31 5/9/2016
Depth (feet) Lead
0 to ½ 360
2 to 2½ 8.3
SB-31A 7/27/2016
1 to 1½ 9.6
SB-32 5/9/2016
Depth (feet) Lead
0 to ½ 16
2 to 2½ 7.4
SB-75 7/27/2016
Depth (feet) Lead
0 to ½ 10
SB-33 5/9/2016
Depth (feet) Lead
0 to ½ 260
2 to 2½ 8.3
SB-35 5/9/2016
Depth (feet) Lead
0 to ½ 50
2 to 2½ 42
SB-36 5/9/2016
Depth (feet) Lead
0 to ½ 9.0
2 to 2½ 7.3
SB-34 5/9/2016
Depth (feet) Lead
0 to ½ 8.8
2 to 2½ 6.9
Approximate Site Boundary
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of soil vapor sample (SV) (July 2016)
Approximate location of previous geotechnical boring (EB)
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (MAY 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Approximate location of Sausal Creek culvert
Former structures - 1903 Sanborn Map
Former structures - 1911 Sanborn Map
Former structures - 1950 Sanborn Map *
* Note: The apartment building depicted on the 1950 Sanborn Map is still present.
N
0 20 40
APPROXIMATE SCALE (FEET)
Base by Google Earth, dated 5/11/2015
Project Number 729-4-5
Figure Number Figure 4C
Date August 2016
Drawn By RRN
Lead Concentrations in Soil - Southwest
2956 International Boulevard
Oakland, CA
CORNERSTONE EARTH GROUP

Screening Levels	Residential DTSC-SL Ambient Air [1]	AF = 0.001 [2]	MCL [3] - Drinking Water
PCE	0.48 µg/m³	480 µg/m³	5.0 µg/L

1 DTSC Recommended Screening Level (DTSC-SL), for Ambient Air (HERO Note 3) - March 2016

2 Calculated soil vapor screening level using an Attenuation Factor (AF) = 0.001 for future residential buildings (DTSC) - October 2011

3 Maximum Contaminant Level (MCL), State Water Resources Control Board - September 2015

BOLD Concentration exceeds calculated screening level for soil vapor or drinking water MCL for ground water

Soil Vapor (µg/m³) SV-1	7/29/2016
Depth (ft)	PCE
5.0	110
14.5	950

Ground Water (µg/L) EB-3	5/10/2016
PCE	8.6

Soil Vapor (µg/m³) SV-4	7/29/2016
Depth (ft)	PCE
5.1	120
14.0	91

Soil Vapor (µg/m³) SV-5	7/29/2016
Depth (ft)	PCE
5.0	1,300
14.5	8,400

Soil Vapor (µg/m³) SV-2	7/29/2016
Depth (ft)	PCE
4.5	1,200
14.5	8,100

Ground Water (µg/L) EB-5	5/10/2016
PCE	12

Soil Vapor (µg/m³) SV-3	7/29/2016
Depth (ft)	PCE
5.0	4,000
14.5	7,700

Soil Vapor (µg/m³) SV-6	7/29/2016
Depth (ft)	PCE
14.6	6,400

Ground Water (µg/L) EB-4	5/11/2016
PCE	15

EAST 15TH STREET

(E) FIRE HYDRANT

25-716-16

EB-3

SV-1

SV-4

NEW SCHOOL BUILDING
45,000 SF
3-STORY
FULLY SPRINKLERED
TYPE II-B CONSTRUCTION

SV-2

EB-5

SV-5

SV-3

SV-6

400

NO PARKING FIRE LANE

NO PARKING FIRE LANE

EB-4

DERBY AVENUE

Approximate Site Boundary

INTERNATIONAL BOULEVARD
EAST 14TH STREET

(E) FIRE HYDRANT

Legend

- Approximate location of grab ground water sample (EB)
- Approximate location of proposed soil vapor sample (SV)

N

0 40 80

APPROXIMATE SCALE (FEET)

Base by K2A Architecture, Site Egress - A0.04, dated 4/18/2016

Project Number 729-4-5

Figure Number Figure 5

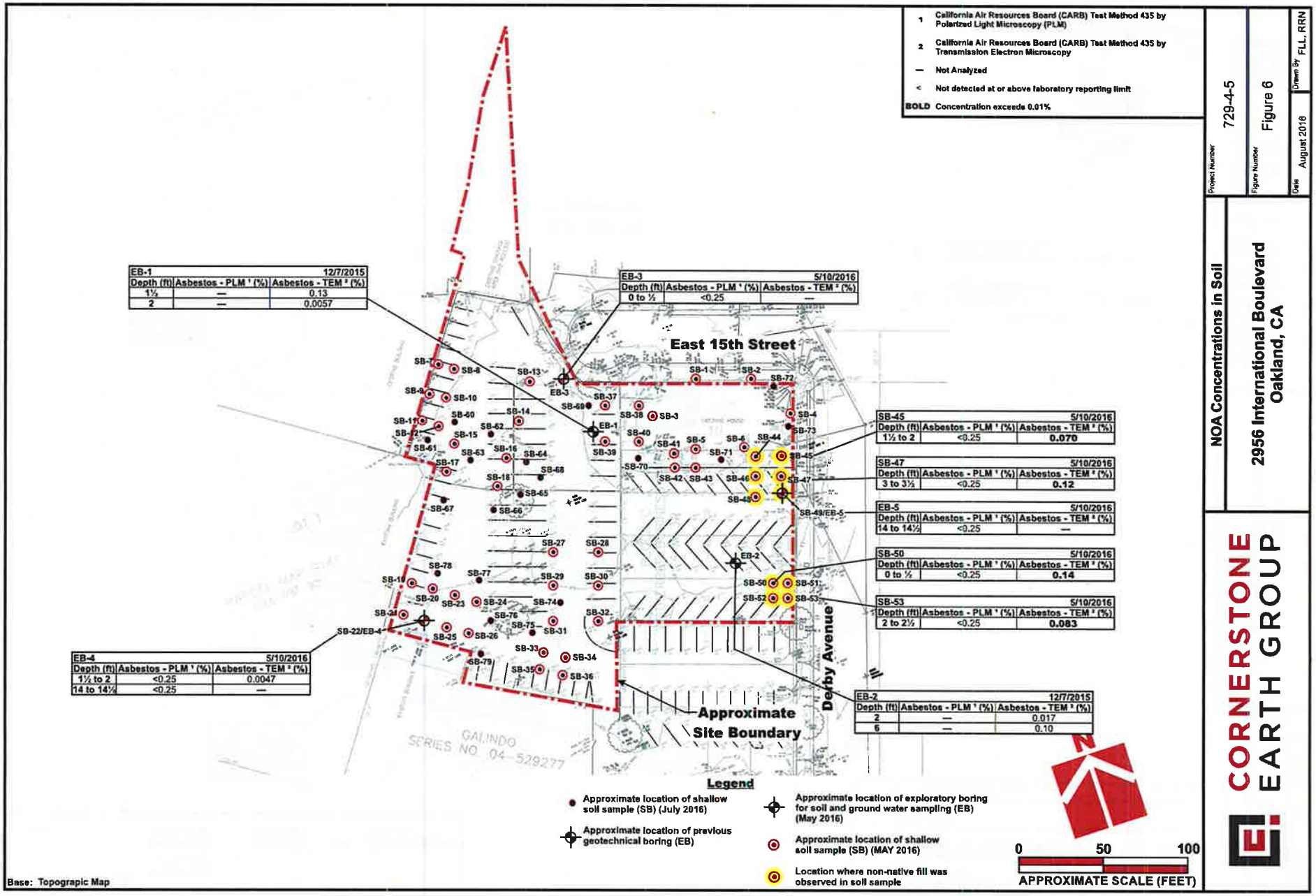
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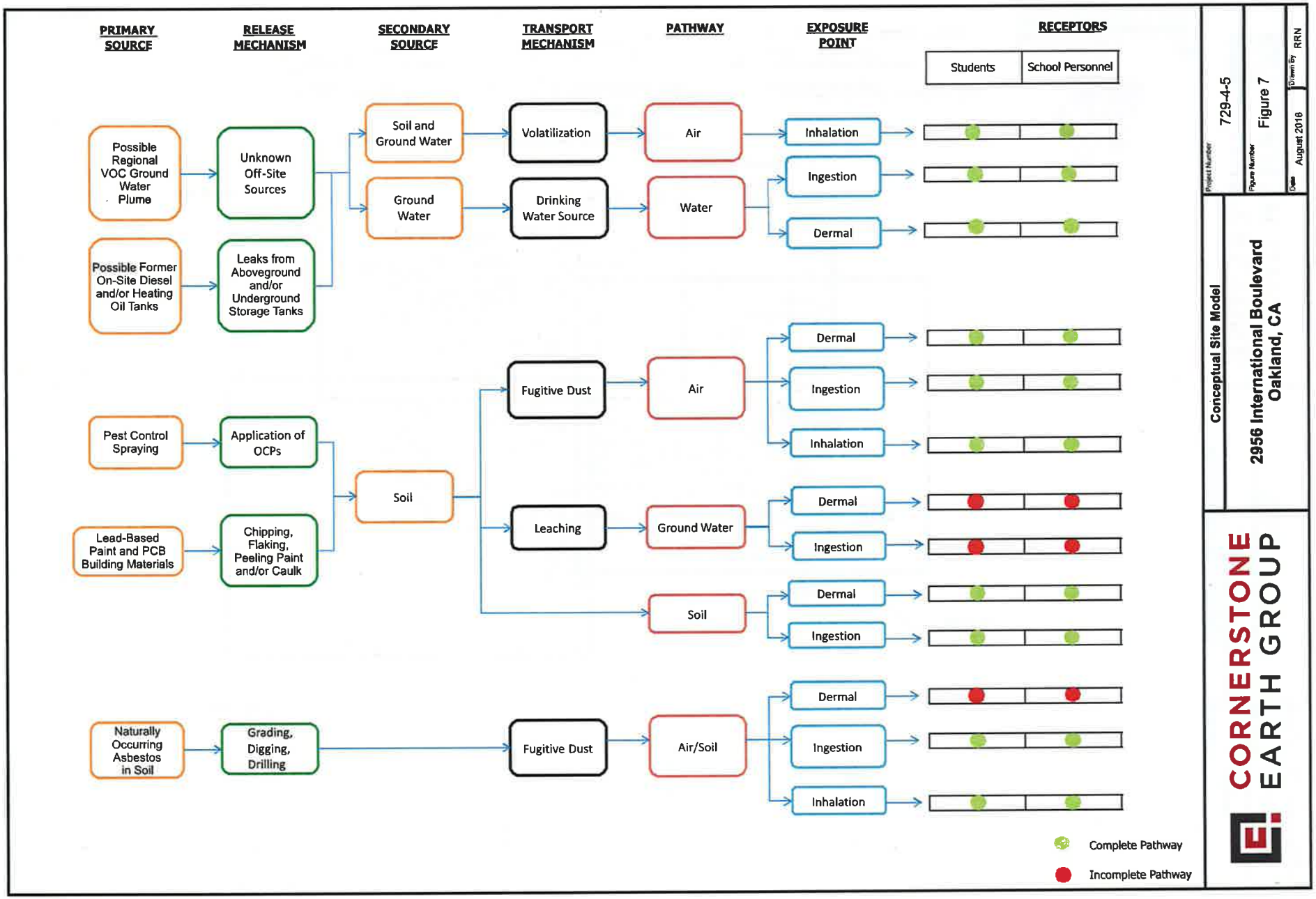
Date August 2016

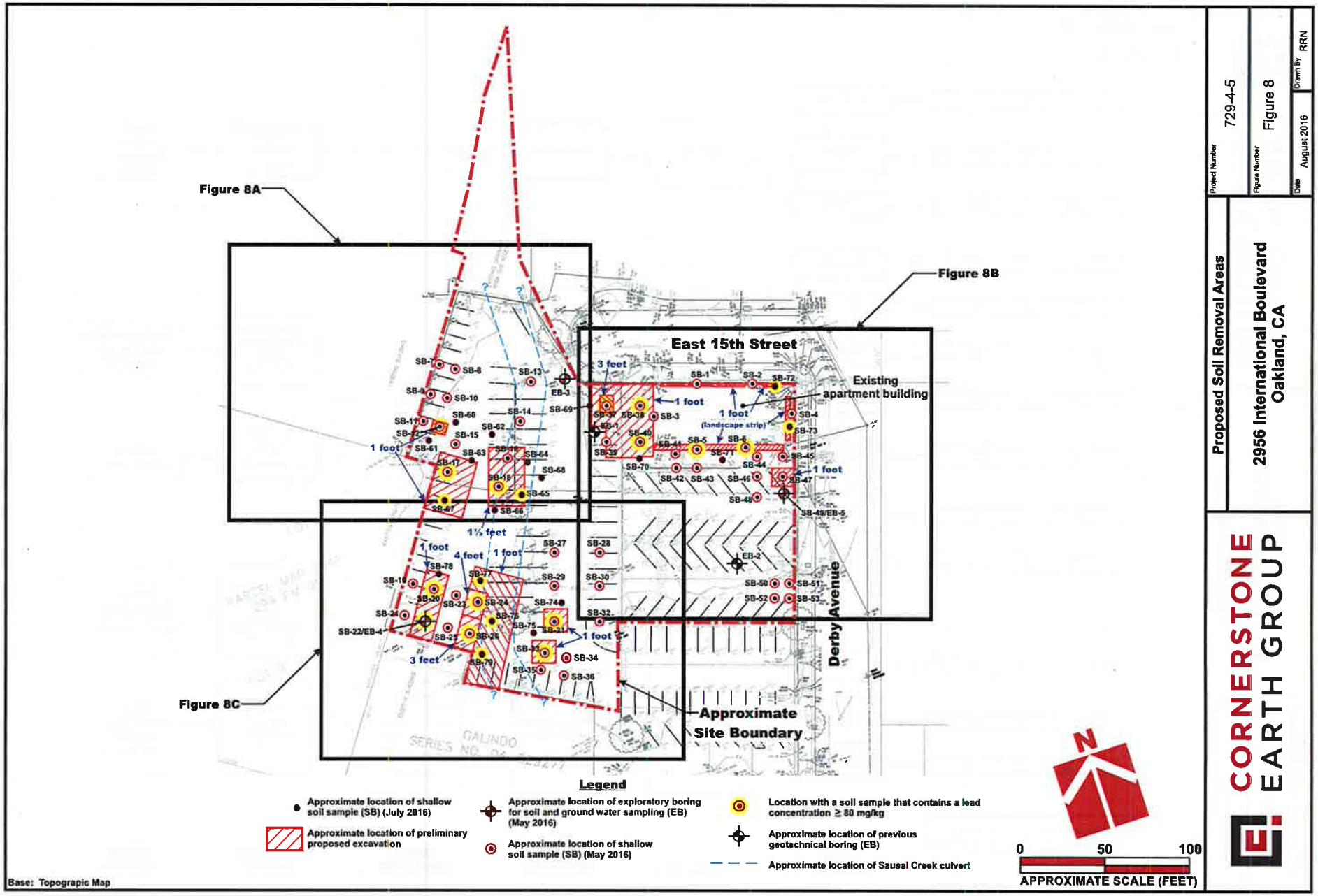
PCE Concentrations in Soil Vapor and Ground Water

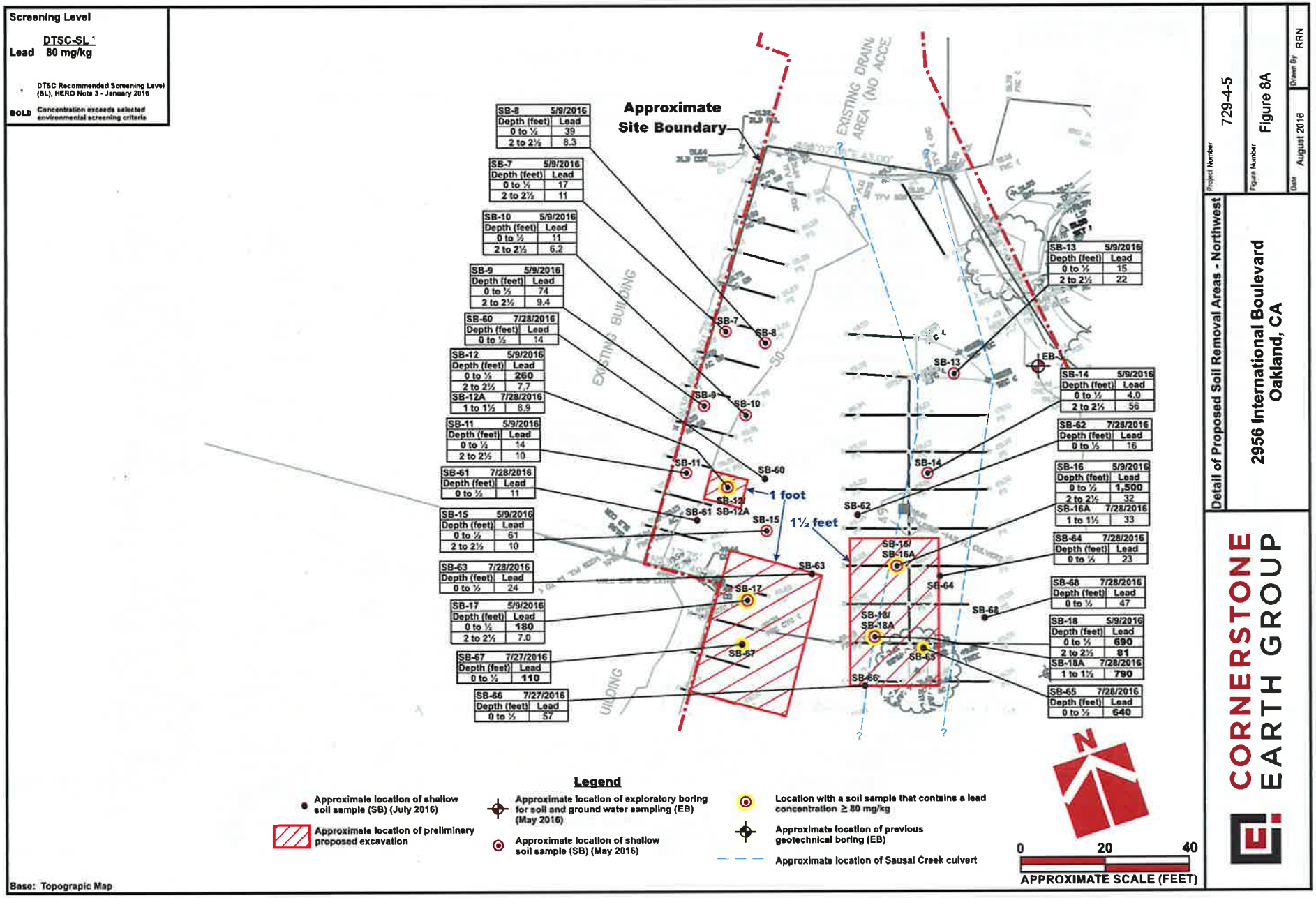
2956 International Boulevard
Oakland, CA

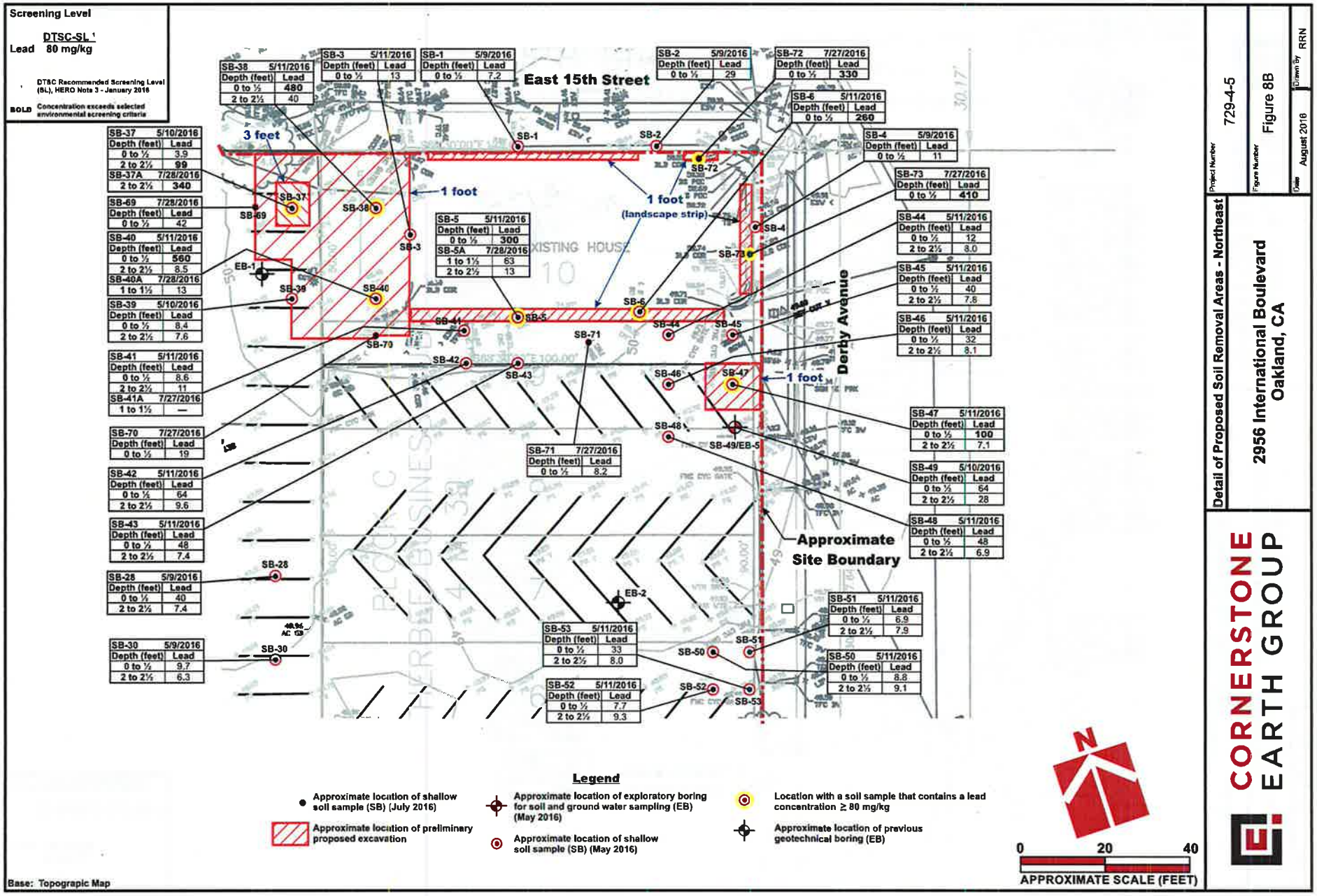
CORNERSTONE EARTH GROUP

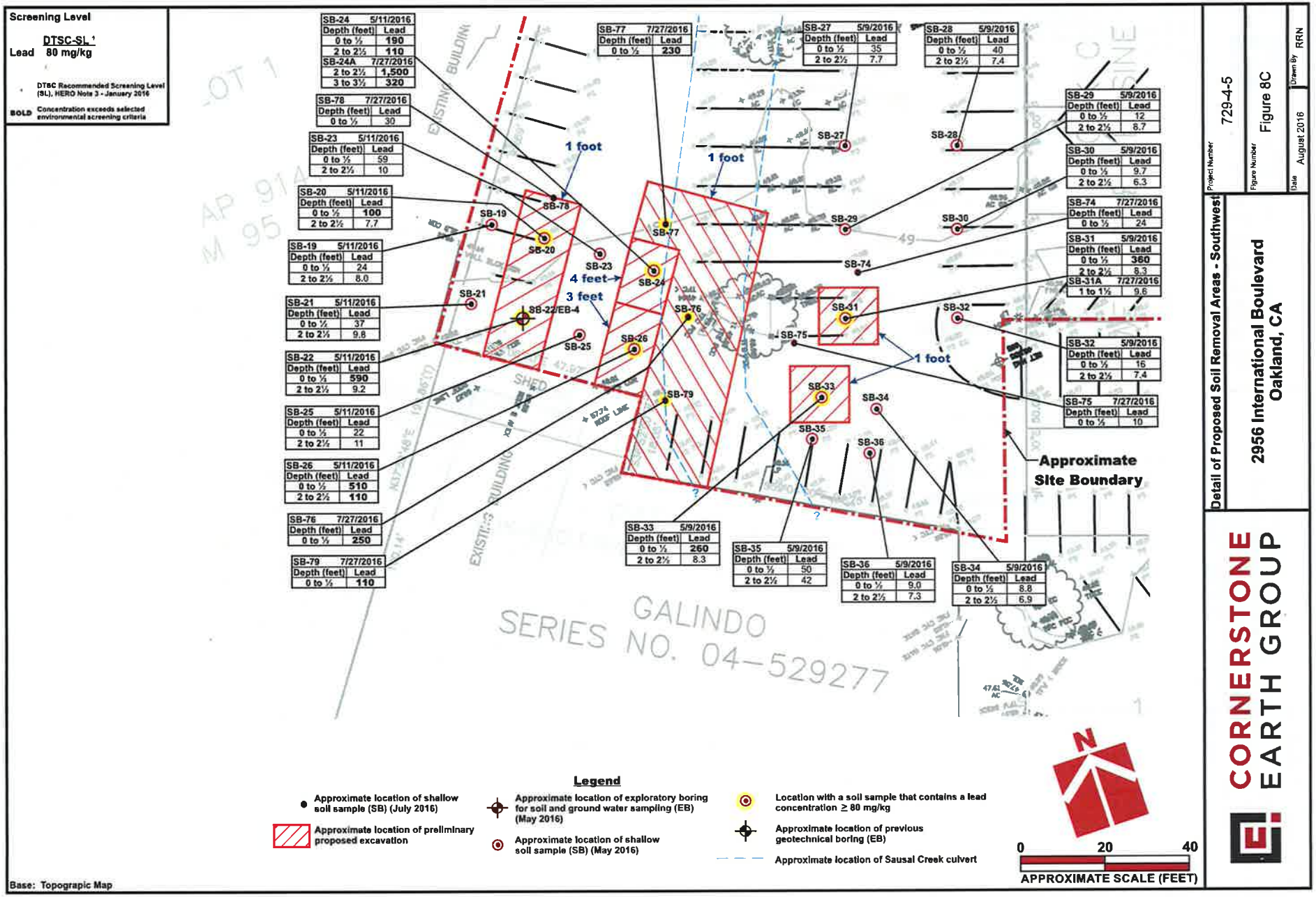

1 California Air Resources Board (CARB) Test Method 435 by Polarized Light Microscopy (PLM)
2 California Air Resources Board (CARB) Test Method 435 by Transmission Electron Microscopy
— Not Analyzed
< Not detected at or above laboratory reporting limit
BOLD Concentration exceeds 0.01%
EB-1 12/7/2015
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
1½ | — | 0.13
2 | — | 0.0057
EB-3 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
0 to ½ | <0.25 | —
SB-45 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
1½ to 2 | <0.25 | 0.070
SB-47 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
3 to 3½ | <0.25 | 0.12
EB-5 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
14 to 14½ | <0.25 | —
SB-50 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
0 to ½ | <0.25 | 0.14
SB-53 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
2 to 2½ | <0.25 | 0.083
EB-2 12/7/2015
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
2 | — | 0.017
6 | — | 0.10
EB-4 5/10/2016
Depth (ft) | Asbestos - PLM 1 (%) | Asbestos - TEM 2 (%)
1½ to 2 | <0.25 | 0.0047
14 to 14½ | <0.25 | —
East 15th Street
Derby Avenue
Approximate Site Boundary
GALINDO SERIES NO. 04-529277
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of previous geotechnical boring (EB)
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (MAY 2016)
Location where non-native fill was observed in soil sample
N
0 50 100
APPROXIMATE SCALE (FEET)
Base: Topograpic Map
NOA Concentrations in Soil
2956 International Boulevard
Oakland, CA
CORNERSTONE EARTH GROUP
Project Number 729-4-5
Figure Number Figure 6
Date August 2016
Drawn by FLL, RRN

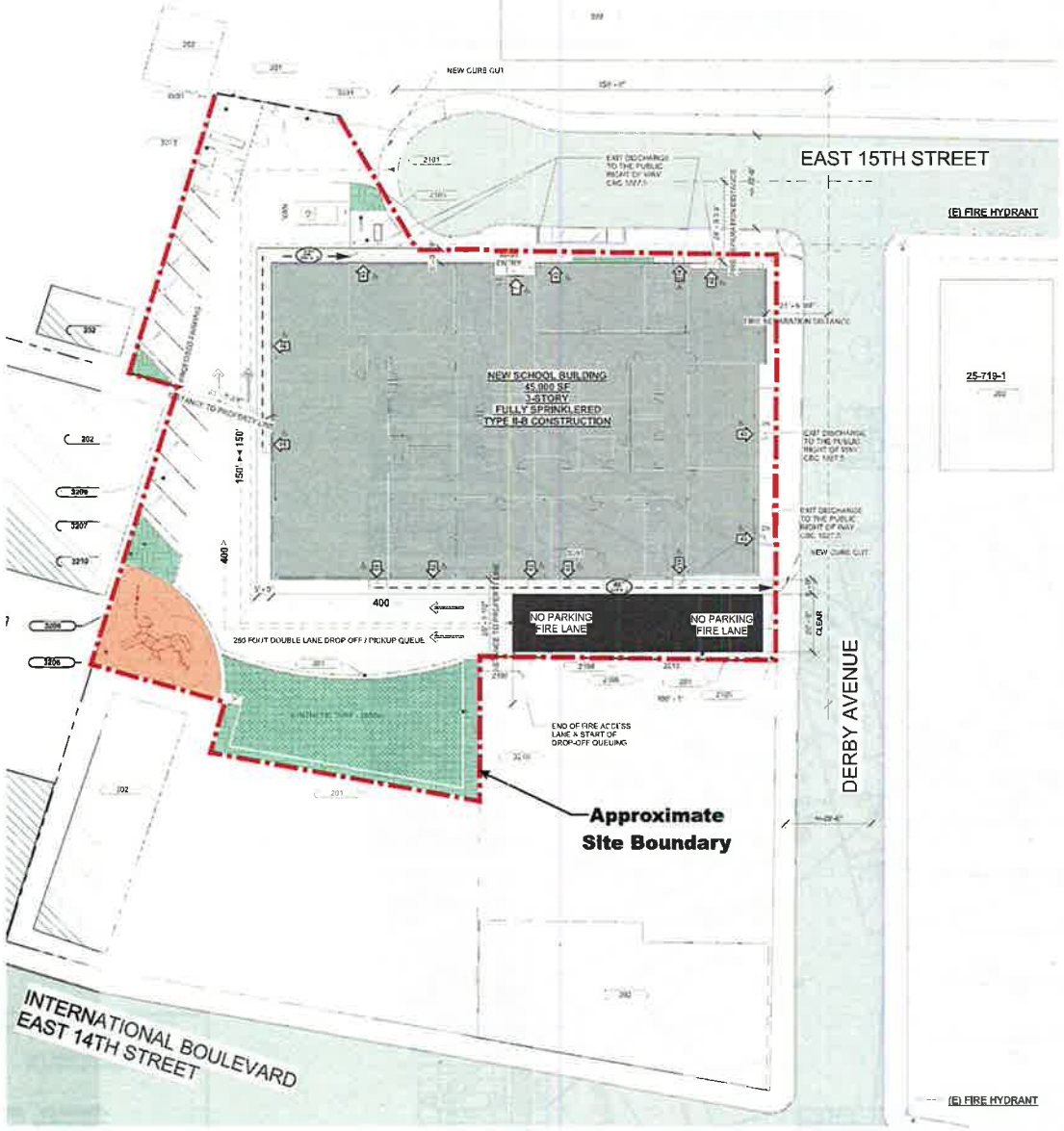

PRIMARY SOURCE
RELEASE MECHANISM
SECONDARY SOURCE
TRANSPORT MECHANISM
PATHWAY
EXPOSURE POINT
RECEPTORS
Students
School Personnel
Possible Regional VOC Ground Water Plume
Possible Former On-Site Diesel and/or Heating Oil Tanks
Unknown Off-Site Sources
Leaks from Aboveground and/or Underground Storage Tanks
Soil and Ground Water
Ground Water
Volatilization
Drinking Water Source
Air
Water
Inhalation
Ingestion
Dermal
Pest Control Spraying
Lead-Based Paint and PCB Building Materials
Application of OCPs
Chipping, Flaking, Peeling Paint and/or Caulk
Soil
Fugitive Dust
Leaching
Air
Ground Water
Soil
Dermal
Ingestion
Inhalation
Dermal
Ingestion
Dermal
Ingestion
Naturally Occurring Asbestos in Soil
Grading, Digging, Drilling
Fugitive Dust
Air/Soil
Dermal
Ingestion
Inhalation
Complete Pathway
Incomplete Pathway
Conceptual Site Model
2956 International Boulevard
Oakland, CA
Project Number 729-4-5
Figure Number Figure 7
Date August 2018
Drawn By RRN
CORNERSTONE EARTH GROUP


Figure 8A
Figure 8B
Figure 8C
East 15th Street
Existing apartment building
Derby Avenue
Approximate Site Boundary
1 foot
3 feet
4 feet
1½ feet
(landscape strip)
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of preliminary proposed excavation
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (May 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Approximate location of previous geotechnical boring (EB)
Approximate location of Sausal Creek culvert
N
0
50
100
APPROXIMATE SCALE (FEET)
Base: Topograpic Map
Proposed Soil Removal Areas
2956 International Boulevard
Oakland, CA
Project Number 729-4-5
Figure Number Figure 8
Date August 2016
Drawn By RRN
CORNERSTONE EARTH GROUP


Screening Level
DTSC-SL [1]
Lead 80 mg/kg
DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
Approximate Site Boundary
EXISTING DRAINAGE AREA (NO ACCESS)
EXISTING BUILDING
SB-8 5/9/2016
Depth (feet) Lead
0 to ½ 39
2 to 2½ 8.3
SB-7 5/9/2016
Depth (feet) Lead
0 to ½ 17
2 to 2½ 11
SB-10 5/9/2016
Depth (feet) Lead
0 to ½ 11
2 to 2½ 6.2
SB-9 5/9/2016
Depth (feet) Lead
0 to ½ 74
2 to 2½ 9.4
SB-60 7/28/2016
Depth (feet) Lead
0 to ½ 14
SB-12 5/9/2016
Depth (feet) Lead
0 to ½ 260
2 to 2½ 7.7
SB-12A 7/28/2016
1 to 1½ 8.9
SB-11 5/9/2016
Depth (feet) Lead
0 to ½ 14
2 to 2½ 10
SB-61 7/28/2016
Depth (feet) Lead
0 to ½ 11
SB-15 5/9/2016
Depth (feet) Lead
0 to ½ 61
2 to 2½ 10
SB-63 7/28/2016
Depth (feet) Lead
0 to ½ 24
SB-17 5/9/2016
Depth (feet) Lead
0 to ½ 180
2 to 2½ 7.0
SB-67 7/27/2016
Depth (feet) Lead
0 to ½ 110
SB-66 7/27/2016
Depth (feet) Lead
0 to ½ 57
SB-13 5/9/2016
Depth (feet) Lead
0 to ½ 15
2 to 2½ 22
SB-14 5/9/2016
Depth (feet) Lead
0 to ½ 4.0
2 to 2½ 56
SB-62 7/28/2016
Depth (feet) Lead
0 to ½ 16
SB-16 5/9/2016
Depth (feet) Lead
0 to ½ 1,500
2 to 2½ 32
SB-16A 7/28/2016
1 to 1½ 33
SB-64 7/28/2016
Depth (feet) Lead
0 to ½ 23
SB-68 7/28/2016
Depth (feet) Lead
0 to ½ 47
SB-18 5/9/2016
Depth (feet) Lead
0 to ½ 690
2 to 2½ 81
SB-18A 7/28/2016
1 to 1½ 790
SB-65 7/28/2016
Depth (feet) Lead
0 to ½ 640
1 foot
1½ feet
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of preliminary proposed excavation
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (May 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Approximate location of previous geotechnical boring (EB)
Approximate location of Sausal Creek culvert
N
0 20 40
APPROXIMATE SCALE (FEET)
Base: Topograpic Map
Project Number 729-4-5
Figure Number Figure 8A
Date August 2016
Drawn By RRN
Detail of Proposed Soil Removal Areas - Northwest
2956 International Boulevard
Oakland, CA
CORNERSTONE EARTH GROUP


Screening Level
DTSC-SL [1]
Lead 80 mg/kg
[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
East 15th Street
Derby Avenue
3 feet
1 foot
1 foot
(landscape strip)
1 foot
EXISTING HOUSE
Approximate Site Boundary
SB-38 5/11/2016
Depth (feet) Lead
0 to ½ 480
2 to 2½ 40
SB-3 5/11/2016
Depth (feet) Lead
0 to ½ 13
SB-1 5/9/2016
Depth (feet) Lead
0 to ½ 7.2
SB-2 5/9/2016
Depth (feet) Lead
0 to ½ 29
SB-72 7/27/2016
Depth (feet) Lead
0 to ½ 330
SB-6 5/11/2016
Depth (feet) Lead
0 to ½ 260
SB-37 5/10/2016
Depth (feet) Lead
0 to ½ 3.9
2 to 2½ 99
SB-37A 7/28/2016
2 to 2½ 340
SB-4 5/9/2016
Depth (feet) Lead
0 to ½ 11
SB-73 7/27/2016
Depth (feet) Lead
0 to ½ 410
SB-69 7/28/2016
Depth (feet) Lead
0 to ½ 42
SB-5 5/11/2016
Depth (feet) Lead
0 to ½ 300
SB-5A 7/28/2016
1 to 1½ 63
2 to 2½ 13
SB-44 5/11/2016
Depth (feet) Lead
0 to ½ 12
2 to 2½ 8.0
SB-40 5/11/2016
Depth (feet) Lead
0 to ½ 560
2 to 2½ 8.5
SB-40A 7/28/2016
1 to 1½ 13
SB-45 5/11/2016
Depth (feet) Lead
0 to ½ 40
2 to 2½ 7.8
SB-39 5/10/2016
Depth (feet) Lead
0 to ½ 8.4
2 to 2½ 7.6
SB-46 5/11/2016
Depth (feet) Lead
0 to ½ 32
2 to 2½ 8.1
SB-41 5/11/2016
Depth (feet) Lead
0 to ½ 8.6
2 to 2½ 11
SB-41A 7/27/2016
1 to 1½ —
SB-47 5/11/2016
Depth (feet) Lead
0 to ½ 100
2 to 2½ 7.1
SB-70 7/27/2016
Depth (feet) Lead
0 to ½ 19
SB-71 7/27/2016
Depth (feet) Lead
0 to ½ 8.2
SB-49 5/10/2016
Depth (feet) Lead
0 to ½ 64
2 to 2½ 28
SB-42 5/11/2016
Depth (feet) Lead
0 to ½ 64
2 to 2½ 9.6
SB-48 5/11/2016
Depth (feet) Lead
0 to ½ 48
2 to 2½ 6.9
SB-43 5/11/2016
Depth (feet) Lead
0 to ½ 48
2 to 2½ 7.4
SB-28 5/9/2016
Depth (feet) Lead
0 to ½ 40
2 to 2½ 7.4
SB-51 5/11/2016
Depth (feet) Lead
0 to ½ 6.9
2 to 2½ 7.9
SB-53 5/11/2016
Depth (feet) Lead
0 to ½ 33
2 to 2½ 8.0
SB-50 5/11/2016
Depth (feet) Lead
0 to ½ 8.8
2 to 2½ 9.1
SB-30 5/9/2016
Depth (feet) Lead
0 to ½ 9.7
2 to 2½ 6.3
SB-52 5/11/2016
Depth (feet) Lead
0 to ½ 7.7
2 to 2½ 9.3
SB-1
SB-2
SB-72
SB-4
SB-73
SB-37
SB-38
SB-69
SB-3
SB-5
SB-6
SB-44
SB-45
EB-1
SB-39
SB-40
SB-41
SB-70
SB-71
SB-42
SB-43
SB-46
SB-47
SB-48
SB-49/EB-5
EB-2
SB-28
SB-30
SB-51
SB-50
SB-52
SB-53
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of preliminary proposed excavation
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (May 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Approximate location of previous geotechnical boring (EB)
N
0 20 40
APPROXIMATE SCALE (FEET)
Base: Topograpic Map
Detail of Proposed Soil Removal Areas - Northeast
2956 International Boulevard
Oakland, CA
Project Number 729-4-5
Figure Number Figure 8B
Date August 2016
Drawn by RRN
CORNERSTONE EARTH GROUP


Screening Level
DTSC-SL [1]
Lead 80 mg/kg
[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
SB-24 5/11/2016
Depth (feet) Lead
0 to ½ 190
2 to 2½ 110
SB-24A 7/27/2016
2 to 2½ 1,500
3 to 3½ 320
SB-78 7/27/2016
Depth (feet) Lead
0 to ½ 30
SB-23 5/11/2016
Depth (feet) Lead
0 to ½ 59
2 to 2½ 10
SB-20 5/11/2016
Depth (feet) Lead
0 to ½ 100
2 to 2½ 7.7
SB-19 5/11/2016
Depth (feet) Lead
0 to ½ 24
2 to 2½ 8.0
SB-21 5/11/2016
Depth (feet) Lead
0 to ½ 37
2 to 2½ 9.8
SB-22 5/11/2016
Depth (feet) Lead
0 to ½ 590
2 to 2½ 9.2
SB-25 5/11/2016
Depth (feet) Lead
0 to ½ 22
2 to 2½ 11
SB-26 5/11/2016
Depth (feet) Lead
0 to ½ 510
2 to 2½ 110
SB-76 7/27/2016
Depth (feet) Lead
0 to ½ 250
SB-79 7/27/2016
Depth (feet) Lead
0 to ½ 110
SB-77 7/27/2016
Depth (feet) Lead
0 to ½ 230
SB-27 5/9/2016
Depth (feet) Lead
0 to ½ 35
2 to 2½ 7.7
SB-28 5/9/2016
Depth (feet) Lead
0 to ½ 40
2 to 2½ 7.4
SB-29 5/9/2016
Depth (feet) Lead
0 to ½ 12
2 to 2½ 8.7
SB-30 5/9/2016
Depth (feet) Lead
0 to ½ 9.7
2 to 2½ 6.3
SB-74 7/27/2016
Depth (feet) Lead
0 to ½ 24
SB-31 5/9/2016
Depth (feet) Lead
0 to ½ 360
2 to 2½ 8.3
SB-31A 7/27/2016
1 to 1½ 9.6
SB-32 5/9/2016
Depth (feet) Lead
0 to ½ 16
2 to 2½ 7.4
SB-75 7/27/2016
Depth (feet) Lead
0 to ½ 10
SB-33 5/9/2016
Depth (feet) Lead
0 to ½ 260
2 to 2½ 8.3
SB-35 5/9/2016
Depth (feet) Lead
0 to ½ 50
2 to 2½ 42
SB-36 5/9/2016
Depth (feet) Lead
0 to ½ 9.0
2 to 2½ 7.3
SB-34 5/9/2016
Depth (feet) Lead
0 to ½ 8.8
2 to 2½ 6.9
1 foot
1 foot
4 feet
3 feet
1 foot
Approximate Site Boundary
EXISTING BUILDING
SHED
GALINDO SERIES NO. 04-529277
Legend
Approximate location of shallow soil sample (SB) (July 2016)
Approximate location of preliminary proposed excavation
Approximate location of exploratory boring for soil and ground water sampling (EB) (May 2016)
Approximate location of shallow soil sample (SB) (May 2016)
Location with a soil sample that contains a lead concentration ≥ 80 mg/kg
Approximate location of previous geotechnical boring (EB)
Approximate location of Sausal Creek culvert
N
0 20 40
APPROXIMATE SCALE (FEET)
Base: Topograpic Map
Detail of Proposed Soil Removal Areas - Southwest
2956 International Boulevard
Oakland, CA
Project Number 729-4-5
Figure Number Figure 8C
Date August 2016
Drawn By RRN
CORNERSTONE EARTH GROUP



Base by K2A, Site Fire and Egress Plans - A0.04, dated 4/18/2016

Impermeable Surfaces

- BUILDING FOOTPRINT (5" concrete over 1" sand over 6" Class II aggregate base)
- CONCRETE PAVING (4" concrete over 4" Class II aggregate base)
- ASPHALT PAVING (3" concrete over 9" Class II aggregate base)

Permeable Surfaces

- LANDSCAPE/SOFTSCAPE (18" bio-retention soil over 12" drain rock)
- ACC. RUBBER MAT (3" rubber over 6" drain rock)
- SYNTHETIC TURF

N

0 40 80

APPROXIMATE SCALE (FEET)

Project Number 729-4-5

Figure Number Figure 9

Drawn By RRN

Date August 2016

Planned Cap Materials

2956 International Boulevard
Oakland, CA

CORNERSTONE EARTH GROUP

CORNERSTONE EARTH GROUP

DATA SUMMARY TABLES

CORNERSTONE EARTH GROUP

Table 1. Analytical Results of Selected Soil Samples - OCPs
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	4,4´-DDD	4,4´-DDE	4,4´-DDT	DDT Total	alpha-Chlordane	Chlordane	gamma-Chlordane	Heptachlor epoxide
Exterior Perimeter of Existing Apartment Building	COMPOSITE SB-1,2,3 (0-0.5)	5/11/2016	0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
	COMPOSITE SB-1,2,3 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
	COMPOSITE SB-4,5,6 (2-2.5)		2-2½	<0.002	0.0044	0.0099	0.0143	0.027	0.16	0.028	0.0033
	COMPOSITE SB-4,5,6 (0-0.5)		0-½	<0.0099	0.033	0.075	0.108	0.48	**1.9**	0.29	0.041
	SB-5A (1-1 1/2)	7/28/2016	1-1½	0.0046	<0.002	<0.002	0.0046	<0.002	<0.04	<0.002	<0.002
	SB-5A (2-2 1/2)		2-2½	<0.002	<0.002	<0.002	<0.002	0.0065	<0.039	0.0066	<0.002
	SB-72 (0-0.5)	7/27/2016	0-½	<0.2	<0.2	<0.2	<0.2	3.4	**18**	3.1	**0.39**
	SB-73 (0-0.5)		0-½	0.088	0.24	0.09	0.418	1.8	**8.1**	1.7	**0.27**
Former Residence	COMPOSITE SB-7,8,9 (0-0.5)	5/9/2016	0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-7,8,9 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-10,11,11 (0-0.5)		0-½	<0.0099	<0.0099	<0.0099	<0.0099	<0.0099	<0.2	<0.0099	<0.0099
	COMPOSITE SB-10,11,12 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
Former Sheds and Outbuildings	COMPOSITE SB-13,14,15 (0-0.5)		0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-13,14,15 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
	COMPOSITE SB-16,17,18 (0-0.5)		0-½	<0.02	<0.02	<0.02	<0.02	<0.02	<0.39	<0.02	<0.02
	COMPOSITE SB-16,17,18 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
Former Shed, partial Office, and partial Residence	COMPOSITE SB-19,20,21,22 (0-0.5)	5/10/2016	0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-19,20,21,22 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-23,24,25,26 (0-0.5)		0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-23,24,25,26 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
Former Residence	COMPOSITE SB-27,28,29 (0-0.5)	5/9/2016	0-½	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.039	<0.0019	<0.0019
	COMPOSITE SB-27,28,29 (2-2.5)		2-2½	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.039	<0.0019	<0.0019
	COMPOSITE SB-30,31,32 (0-0.5)		0-½	<0.0098	<0.0098	<0.0098	<0.0098	<0.0098	<0.2	<0.0098	<0.0098
	COMPOSITE SB-30,31,32 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
RSL[1] (Residential)				2.3	2	1.9	NE	NE	1.7	NE	0.07
DTSC-SL[2] (Residential)				NE	NE	NE	NE	NE	0.43	NE	NE

CORNERSTONE EARTH GROUP

Table 1. Analytical Results of Selected Soil Samples - OCPs
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	4,4´-DDD	4,4´-DDE	4,4´-DDT	DDT Total	alpha-Chlordane	Chlordane	gamma-Chlordane	Heptachlor epoxide
Former Office	COMPOSITE SB-33,34,35,36 (0-0.5)	5/9/2016	0-½	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.039	<0.0019	<0.0019
	COMPOSITE SB-33,34,35,36 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
Former Garage	COMPOSITE SB-37,38,39,40 (0-0.5)	5/11/2016	0-½	0.042	0.007	0.081	0.13	0.012	0.14	0.012	<0.002
	COMPOSITE SB-37,38,39,40 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
Former partial Shed	COMPOSITE SB-41,42,43 (0-0.5)		0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-41,42,43 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
	SB-41A (0-0.5)	7/27/2016	0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
Former Shed	COMPOSITE SB-44,45,46 (0-0.5)	5/11/2016	0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-44,45,46 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-47,48,49 (0-0.5)		0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-47,48,49 (2-2.5)		2-2½	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.039	<0.0019	<0.0019
Former Residence and Heating Oil out buidling	COMPOSITE SB-50,51,52,53 (0-0.5)		0-½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	COMPOSITE SB-50,51,52,53 (2-2.5)		2-2½	<0.002	<0.002	<0.002	<0.002	<0.002	<0.039	<0.002	<0.002
	SB-51 (0-0.5)-DUP		0-0½-DUP	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.039	<0.0019	<0.0019
	SB-52 (0-0.5)-DUP		0-0½-DUP	<0.002	<0.002	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002
RSL[1] (Residential)				2.3	2	1.9	NE	NE	1.7	NE	0.07
DTSC-SL[2] (Residential)				NE	NE	NE	NE	NE	0.43	NE	NE

1 Regional Screening Level (RSL), USEPA Region 9 - May 2016.
2 DTSC Recommended Screening Level (SL), HERO Note 3 - June 2016
< Not detected at or above laboratory reporting limit
NE Not Established
BOLD Concentration exceeds selected Environmental Screening Criteria

CORNERSTONE EARTH GROUP

Table 2. Analytical Results of Selected Soil Samples - PCBs
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260
Exterior Perimeter of Existing Apartment Building	SB-5 (0-0.5)	5/11/2016	0-½	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Exterior Perimeter of Existing Apartment Building	SB-6 (0-0.5)	5/11/2016	0-½	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Former Office	SB-35 (0-0.5)	5/9/2016	0-½	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Former Office	SB-36 (0-0.5)	5/9/2016	0-½	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Former Garage	SB-39 (0-0.5)	5/10/2016	0-½	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
Former Garage	SB-40 (0-0.5)	5/11/2016	0-½	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049	<0.049
RSL[1] (Residential)				4.1	0.2	0.17	0.23	0.23	0.24	0.24

1 Regional Screening Level (RSL), USEPA Region 9 - May 2016.
< Not detected at or above laboratory reporting limit

CORNERSTONE EARTH GROUP

Table 3. Analytical Results of Selected Soil Samples - Lead

(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Lead
Exterior Perimeter of Existing Apartment Building	SB-1 (0-0.5)	5/9/2016	0-½	7.2
	SB-2 (0-0.5)		0-½	29
	SB-3 (0-0.5)	5/11/2016	0-½	13
	SB-4 (0-0.5)	5/9/2016	0-½	11
	SB-5 (0-0.5)	5/11/2016	0-½	**300**
	SB-5A (1-1.5)	7/28/2016	1-1½	63
	SB-5A (2-2.5)		2-2½	13
	SB-6 (0-0.5)	5/11/2016	0-½	**260**
	SB-72 (0-0.5)	7/27/2016	0-½	**330**
	SB-73 (0-0.5)		0-½	**410**
Former Residence	SB-7 (0-0.5)	5/9/2016	0-½	17
	SB-7 (2-2.5)		2-2½	11
	SB-8 (0-0.5)		0-½	39
	SB-8 (2-2.5)		2-2½	8.3
	SB-9 (0-0.5)		0-½	74
	SB-9 (2-2.5)		2-2½	9.4
	SB-10 (0-0.5)		0-½	11
	SB-10 (2-2.5)		2-2½	6.2
	SB-11 (0-0.5)		0-½	14
	SB-11 (2-2.5)		2-2½	10
	SB-12 (0-0.5)		0-½	**260**
	SB-12A (1-1.5)	7/28/2016	1-1½	8.9
	SB-12 (2-2.5)	5/9/2016	2-2½	7.7
	SB-60 (0-0.5)	7/28/2016	0-½	14
	SB-61 (0-0.5)		0-½	11
Former Sheds and Outbuildings	SB-13 (0-0.5)	5/9/2016	0-½	15
	SB-13 (2-2.5)		2-2½	22
	SB-14 (0-0.5)		0-½	4
	SB-14 (2-2.5)		2-2½	56
	SB-15 (0-0.5)		0-½	61
	SB-15 (2-2.5)		2-2½	10
	SB-16 (0-0.5)		0-½	**1,500**
	SB-16A (1-1.5)	7/28/2016	1-1½	33
	SB-16 (2-2.5)	5/9/2016	2-2½	32
	SB-17 (0-0.5)		0-½	**180**
	SB-17 (2-2.5)		2-2½	7
	SB-18 (0-0.5)		0-½	**690**
	SB-18A (1-1.5)	7/28/2016	1-1½	**790**
	SB-18 (2-2.5)	5/9/2016	2-2½	**81**
	SB-62 (0-0.5)	7/28/2016	0-½	16
	SB-63 (0-0.5)		0-½	24
	SB-64 (0-0.5)		0-½	23
	SB-65 (0-0.5)		0-½	**640**
	SB-66 (0-0.5)	7/27/2016	0-½	57
	SB-67 (0-0.5)		0-½	**110**
	SB-68 (0-0.5)	7/28/2016	0-½	47
DTSC-SL (Residential)				80

Table 3. Analytical Results of Selected Soil Samples - Lead
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Lead
Former Shed, partial Office, and partial Residence	SB-19 (0-0.5)	5/10/2016	0-½	24
	SB-19 (2-2.5)		2-2½	8
	SB-20 (0-0.5)		0-½	**100**
	SB-20 (2-2.5)		2-2½	7.7
	SB-21 (0-0.5)		0-½	37
	SB-21 (2-2.5)		2-2½	9.8
	SB-22 (0-0.5)		0-½	**590**
	SB-22 (2-2.5)		2-2½	9.2
	SB-23 (0-0.5)		0-½	59
	SB-23 (2-2.5)		2-2½	10
	SB-24 (0-0.5)		0-½	**190**
	SB-24 (2-2.5)		2-2½	**110**
	SB-24A (2-2.5)	7/27/2016	2-2½	**1,500**
	SB-24A (3-3.5)		3-3½	**320**
	SB-25 (0-0.5)	5/10/2016	0-½	22
	SB-25 (2-2.5)		2-2½	11
	SB-26 (0-0.5)		0-½	**510**
	SB-26 (2-2.5)		2-2½	**110**
	SB-76 (0-0.5)	7/27/2016	0-½	**250**
	SB-77 (0-0.5)		0-½	**230**
	SB-78 (0-0.5)		0-½	30
	SB-79 (0-0.5)		0-½	**110**
DTSC-SL (Residential)				80

Table 3. Analytical Results of Selected Soil Samples - Lead
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Lead
Former Residence	SB-27 (0-0.5)	5/9/2016	0-½	35
	SB-27 (2-2.5)		2-2½	7.7
	SB-28 (0-0.5)		0-½	40
	SB-28 (2-2.5)		2-2½	7.4
	SB-29 (0-0.5)		0-½	12
	SB-29 (2-2.5)		2-2½	8.7
	SB-30 (0-0.5)		0-½	9.7
	SB-30 (2-2.5)		2-2½	6.3
	SB-31 (0-0.5)		0-½	**360**
	SB-31A (1-1.5)	7/27/2016	1-1½	9.6
	SB-31 (2-2.5)	5/9/2016	2-2½	18
	SB-32 (0-0.5)		0-½	16
	SB-32 (2-2.5)		2-2½	7.4
	SB-74 (0-0.5)	7/27/2016	0-½	24
	SB-75 (0-0.5)		0-½	10
Former Office	SB-33 (0-0.5)	5/9/2016	0-½	**260**
	SB-33 (2-2.5)		2-2½	8.3
	SB-34 (0-0.5)		0-½	8.8
	SB-34 (2-2.5)		2-2½	6.9
	SB-35 (0-0.5)		0-½	50
	SB-35 (2-2.5)		2-2½	42
	SB-36 (0-0.5)		0-½	9
	SB-36 (2-2.5)		2-2½	7.3
DTSC-SL (Residential)				80

CORNERSTONE EARTH GROUP

Table 3. Analytical Results of Selected Soil Samples - Lead
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Lead
Former Garage	SB-37 (0-0.5)	5/10/2016	0-½	7.9
	SB-37 (2-2.5)		2-2½	**99**
	SB-37A (2-2.5)	7/28/2016	2-2½	**340**
	SB-38 (0-0.5)	5/11/2016	0-½	**480**
	SB-38 (2-2.5)		2-2½	40
	SB-39 (0-0.5)	5/10/2016	0-½	8.4
	SB-39 (2-2.5)		2-2½	7.6
	SB-40 (0-0.5)	5/11/2016	0-½	**560**
	SB-40A (1-1.5)	7/28/2016	1-1½	13
	SB-40 (2-2.5)	5/11/2016	2-2½	8.5
	SB-69 (0-0.5)	7/28/2016	0-½	42
	SB-70 (0-0.5)	7/27/2016	0-½	19
Former partial Shed	SB-41 (0-0.5)	5/11/2016	0-½	8.6
	SB-41 (2-2.5)		2-2½	11
	SB-42 (0-0.5)		0-½	64
	SB-42 (2-2.5)		2-2½	9.6
	SB-43 (0-0.5)		0-½	48
	SB-43 (2-2.5)		2-2½	7.4
Former Shed	SB-44 (0-0.5)		0-½	12
	SB-44 (2-2.5)		2-2½	8
	SB-45 (0-0.5)		0-½	40
	SB-45 (2-2.5)		2-2½	7.8
	SB-46 (0-0.5)		0-½	32
	SB-46 (2-2.5)		2-2½	8.1
	SB-47 (0-0.5)		0-½	**100**
	SB-47 (2-2.5)		2-2½	7.1
	SB-48 (0-0.5)		0-½	48
	SB-48 (2-2.5)		2-2½	6.9
	SB-49 (0-0.5)	5/10/2016	0-½	64
	SB-49 (2-2.5)		2-2½	28
	SB-71 (0-0.5)	7/27/2016	0-0.5	8.2
DTSC-SL (Residential)				80

CORNERSTONE EARTH GROUP

Table 3. Analytical Results of Selected Soil Samples - Lead
(Concentrations in mg/kg)

Sample Location	Sample ID	Date	Depth (feet)	Lead
Former Residence and Heating Oil out building	SB-50 (0-0.5)	5/11/2016	0-½	8.8
	SB-50 (2-2.5)		2-2½	9.1
	SB-51 (0-0.5)		0-½	6.9
	SB-51 (0-0.5)-DUP		0-0½-DUP	7.5
	SB-51 (2-2.5)		2-2½	7.9
	SB-52 (0-0.5)		0-½	7.7
	SB-52 (0-0.5)-DUP		0-0½-DUP	43
	SB-52 (2-2.5)		2-2½	9.3
	SB-53 (0-0.5)		0-½	33
	SB-53 (2-2.5)		2-2½	8
DTSC-SL (Residential)				80

DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016

CORNERSTONE EARTH GROUP

Table 4. Analytical Results of Selected Soil Samples - Asbestos

Soil Type	Boring ID	Date	Depth (ft)	Asbestos - PLM[1] (%)	Asbestos - TEM[2] (%)
Native	EB-3	5/10/2016	0-0.5	<0.25	---
	EB-4	5/10/2016	1.5-2	<0.25	0.0047
			14-14.5	<0.25	---
	EB-5	5/10/2016	14-14.5	<0.25	---
	EB-1	12/7/2015	1.5	---	**0.13**
		12/7/2015	4	---	0.0057
	EB-2	12/7/2015	2	---	**0.017**
		12/7/2015	6	---	**0.10**
Fill	SB-45	5/10/2016	1.5-2	<0.25	**0.070**
	SB-47	5/10/2016	3-3.5	<0.25	**0.12**
	SB-50	5/10/2016	0-0.5	<0.25	**0.14**
	SB-53	5/10/2016	2-2.5	<0.25	**0.083**
Screening Criteria for School Sites [3]				0.01	0.01

1 California Air Resources Board (CARB) Test Method 435 by Polarized Light Microscopy (PLM), percent by structures
2 California Air Resources Board (CARB) Test Method 435 by Transmission Electron Microscopy
3 Department of Toxic Substances Control (DTSC) screening criteria for school sites - DTSC 2004.
--- Not Analyzed
< Not detected at or above laboratory reporting limit
BOLD Concentration exceeds DTSC screening criteria for school sites

CORNERSTONE EARTH GROUP

Table 5. Analytical Results of Selected Ground Water Samples - VOCs / Hydrocarbons
(Concentrations in µg/L)

Sample Location	Sample ID	Date	Chloroform	PCE	TPHd	TPHo
Up-Gradient Boundary	EB-3	5/10/2016	3.7	**8.6**	740	2,300
Near Possible Diesel Tank	EB-4	5/11/2016	2.3	**15**	[illegible]	[illegible]
Near Former Heating Oil Tank	EB-5	5/10/2016	[illegible]	**12**	[illegible]	[illegible]
MCL[1] - Drinking Water			NE	5	NE	NE

1 Maximum Contaminant Level (MCL),State Water Resources Control Board - September 2015.
< Not detected at or above laboratory reporting limit
NE Not Established
BOLD Concentrations exceeds MCL

CORNERSTONE EARTH GROUP

Table 6. Analytical Results of Selected Soil Vapor Samples - VOCs

(Concentrations in µg/m³)

Sample ID	Date	Probe Depth (ft)	Benzene	Toluene	Ethylbenzene	MTBE	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	2-Butanone (MEK)	4-Ethyl Toluene	4-Methyl-2-Pentanone (MIBK)	Acetone	Bromodichloromethane	Carbon Disulfide	Chloroform	Cyclohexane	Dichlorodifluoromethane	Isopropanol	n-Propylbenzene	o-xylene	PCE	TCE	Tetrahydrofuran	Ethanol
SV-1D5.0	7/29/2016	5	10	26					27			200		26							110			
SV-1D14.5	7/29/2016	14.5	7														8.5	24			**950**	27	<1.0	
SV-2D4.5	7/29/2016	4.5	29	50	17		53	20		23		54	11	110	10	44	14			29	**1,200**			
SV-2D14.5	7/29/2016	14.5	<1.8												47	28	48				**8,100**	33	<4.1	
SV-3D5.0	7/29/2016	5	12	15			13					130		60		12	34	40			**4,000**			
SV-3D14.5	7/29/2016	14.5	<1.8													61	40				**7,700**			
SV-4D5.1	7/29/2016	5.1	10	36	5.5							52		24	11			17		5.1	120			
SV-4D14.0	7/29/2016	14	8.4	32	9.8		20	6.9		14		43		16				14		14	91			
SV-5D5.0	7/29/2016	5	25	68	8.5	23	78	29	16	31	6	110		78		48	19		6.3	21	**1,300**			19
SV-5D14.5	7/29/2016	14.5	<1.8												30	20	33				**8,400**	52	<4.1	
SV-6D14.6	7/29/2016	14.6	<1.1									120				22	99				**6,400**			
Residential Screening Criteria [1]	Ambient Air		0.097	310	1.1 [3]	11 [3]	7.3 [3]	42	5200 [2]	NE	3100 [2]	32000 [2]	83	730 [2]	0.12 [2]	6,300 [2]	100 [2]	210 [2]	1,000 [2]	100 [2]	0.48	0.48 [2]	2,100 [2]	NE
	Soil Vapor		97	310,000	1,100 [2]	11,000 [2]	7,300 [2]	42,000	5,200,000 [2]	NE	3,100,000 [2]	32,000,000 [2]	83,000	730,000 [2]	120 [2]	6,300,000 [2]	100,000 [2]	210,000 [2]	1,000,000 [2]	100,000 [2]	480	480 [2]	2,100,000 [2]	NE

1 DTSC Recommended Screening Level (DTSC-SL) for Ambient Air (HERO Note 3) - June 2016

2 DTSC-SL not established, value shown is Residential Regional Screening Level (RSL) for Ambient Air - U.S. EPA, May 2016

3 Soil vapor screening levels are determined by diviing the ambient air screening level (DTSC-SL or RSL) by an attenuation factor. The DTSC recommended attenuation factor for new residential construction is 0.001 (DTSC, 2011)

< Not detected at or above laboratory reporting limit

NE Not Established

BOLD Concentration exceeds Environmental Screening Criteria

Table 7. Analytical Results of Selected Soil Vapor Samples - Fixed Gases
(Concentrations in %)

Sample ID	Date	Probe Depth (ft)	Carbon Dioxide	Methane	Oxygen
SV-1D5.0	7/29/2016	5	14	<0.00025	8.9
SV-1D14.5	7/29/2016	14.5	18	<0.00025	3.9
SV-2D4.5	7/29/2016	4.5	2.8	<0.00026	18
SV-2D14.5	7/29/2016	14.5	5.2	<0.00025	15
SV-3D5.0	7/29/2016	5	6.5	<0.00025	14
SV-3D14.5	7/29/2016	14.5	7.8	<0.00026	11
SV-4D5.1	7/29/2016	5.1	4.2	<0.00023	17
SV-4D14.0	7/29/2016	14	11	<0.00025	9.7
SV-5D5.0	7/29/2016	5	7.2	<0.00025	14
SV-5D14.5	7/29/2016	14.5	7.4	<0.00025	14
SV-6D14.6	7/29/2016	14.6	6.2	<0.00025	12

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APPENDIX A – DOCUMENTS FOR SUPPLEMENTAL SITE INVESTIGATION

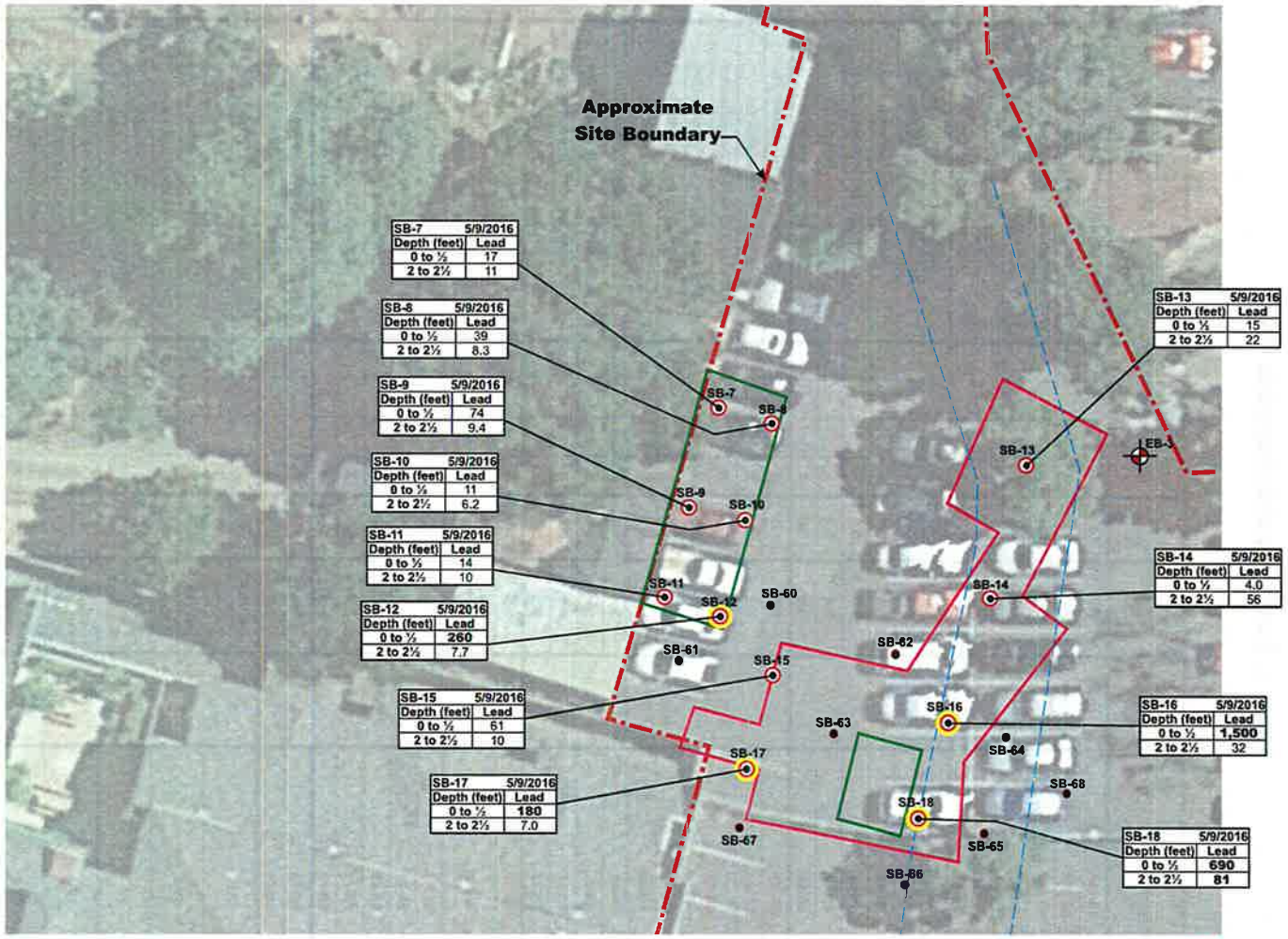
Table 1. Sampling and Analyses Plan

Boring/Sample ID	Sample Location	Media	Depth (feet)	Lead	OCPs	Asbestos TEM	VOCs	Rationale
SB-12A	Northwest Region	Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-16A		Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-18A		Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-60		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-61		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-62		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-63		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-64		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-65		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-66		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-67		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-68		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-37A	Northeast Region	Soil	2-2½	X				Confirm Reported Lead Concentration
SB-40A		Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-5A		Soil	1-1½	X	X			Delineate Lead and OCP-Impacted Soil
		Soil	2-2½	X	X			Delineate Lead and OCP-Impacted Soil
SB-41A		Soil	0-½		X			Delineate Pesticide-Impacted Soil
SB-69		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-70		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-71		Soil	0-½	X	X			Delineate Lead and OCP-Impacted Soil
SB-72		Soil	0-½	X	X			Delineate Lead and OCP-Impacted Soil
SB-73		Soil	0-½	X	X			Delineate Lead and OCP-Impacted Soil
SB-22A	Southeast Region	Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-24A		Soil	2-2½	X				Confirm Reported Lead Concentration
		Soil	3-3½	X				Delineate Lead-Impacted Soil
SB-31A		Soil	1-1½	X				Delineate Lead-Impacted Soil
SB-74		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-75		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-76		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-77		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-78		Soil	0-½	X				Delineate Lead-Impacted Soil
SB-79		Soil	0-½	X				Delineate Lead-Impacted Soil
SV-1	Planned Building	Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
SV-2		Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
SV-3		Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
SV-4		Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
SV-5		Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
SV-6		Soil Vapor	5				X	Evaluate Vapor Intrusion
		Soil Vapor	15				X	Evaluate Vapor Intrusion
Analyses Totals			Total	31	6	0	12	

Screening Level	DTSC-SL [1]
Lead	80 mg/kg

[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016

BOLD Concentration exceeds selected environmental screening criteria



Legend

- Approximate location of proposed step-out sample (SB)
- Approximate location of exploratory boring for soil and ground water sampling (EB)
- Approximate location of shallow soil sample (SB)
- Location with a soil sample that contains a lead concentration equal or greater than 80 mg/kg
- Approximate location of previous geotechnical boring (EB)
- Approximate location of Sausal Creek culvert
- Former structures - 1903 Sanborn Map
- Former structures - 1911 Sanborn Map
- Former structures - 1950 Sanborn Map *

* Note: The apartment building depicted on the 1950 Sanborn Map is still present.

N

0 20 40

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 5/11/2015

Lead Concentrations in Soil - Northwest

2956 International Boulevard
Oakland, CA

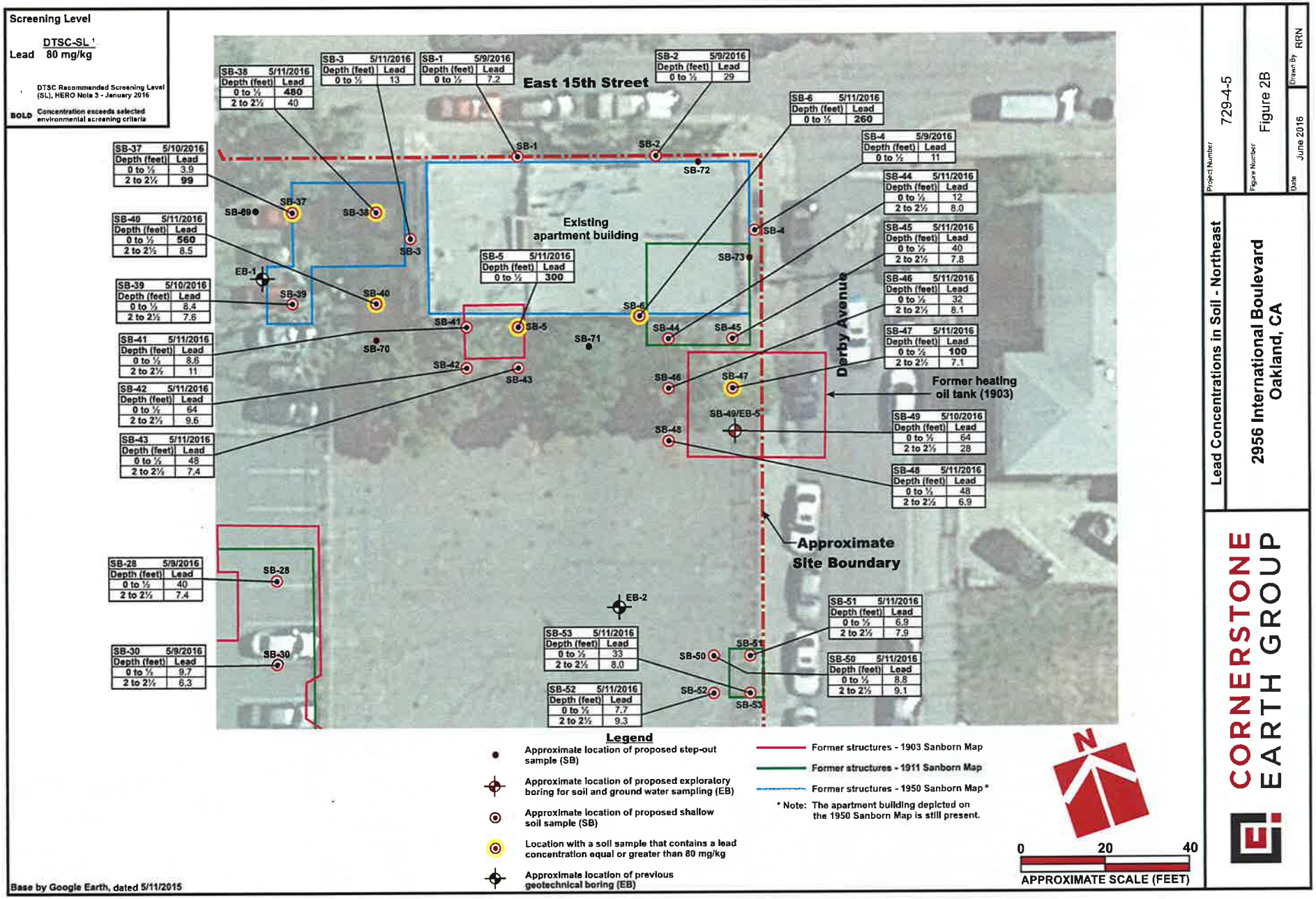
Project Number: 729-4-5

Figure Number: Figure 2A

Date: June 2016

Drawn By: RRN

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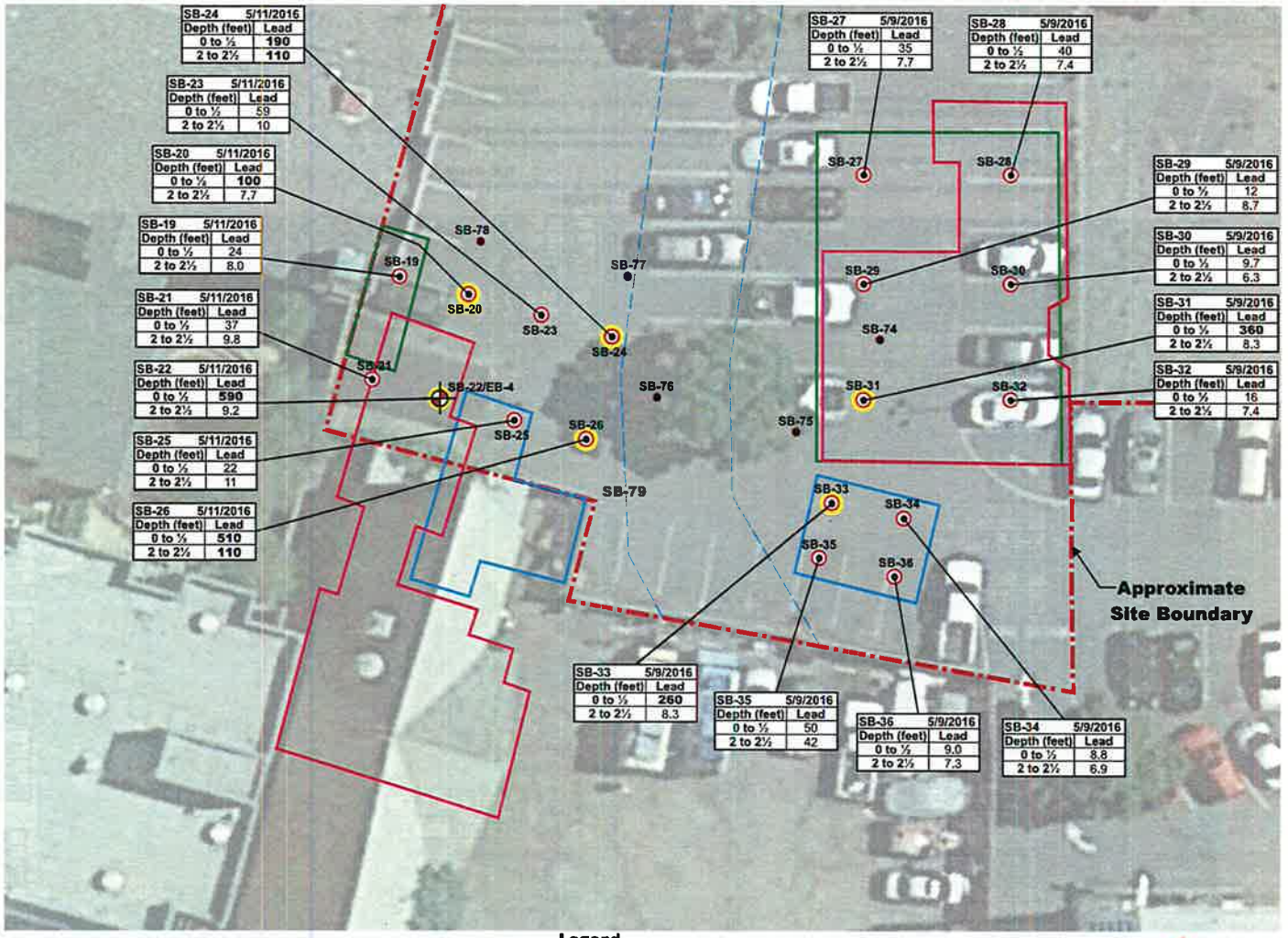

Screening Level
DTSC-SL [1]
Lead 80 mg/kg
[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016
BOLD Concentration exceeds selected environmental screening criteria
East 15th Street
Existing apartment building
Derby Avenue
Former heating oil tank (1903)
Approximate Site Boundary
SB-38 5/11/2016 Depth (feet) Lead 0 to ½ 480 2 to 2½ 40
SB-3 5/11/2016 Depth (feet) Lead 0 to ½ 13
SB-1 5/9/2016 Depth (feet) Lead 0 to ½ 7.2
SB-2 5/9/2016 Depth (feet) Lead 0 to ½ 29
SB-6 5/11/2016 Depth (feet) Lead 0 to ½ 260
SB-37 5/10/2016 Depth (feet) Lead 0 to ½ 3.9 2 to 2½ 99
SB-4 5/9/2016 Depth (feet) Lead 0 to ½ 11
SB-40 5/11/2016 Depth (feet) Lead 0 to ½ 560 2 to 2½ 8.5
SB-5 5/11/2016 Depth (feet) Lead 0 to ½ 300
SB-44 5/11/2016 Depth (feet) Lead 0 to ½ 12 2 to 2½ 8.0
SB-45 5/11/2016 Depth (feet) Lead 0 to ½ 40 2 to 2½ 7.8
SB-39 5/10/2016 Depth (feet) Lead 0 to ½ 8.4 2 to 2½ 7.6
SB-46 5/11/2016 Depth (feet) Lead 0 to ½ 32 2 to 2½ 8.1
SB-41 5/11/2016 Depth (feet) Lead 0 to ½ 8.6 2 to 2½ 11
SB-47 5/11/2016 Depth (feet) Lead 0 to ½ 100 2 to 2½ 7.1
SB-42 5/11/2016 Depth (feet) Lead 0 to ½ 64 2 to 2½ 9.6
SB-49 5/10/2016 Depth (feet) Lead 0 to ½ 64 2 to 2½ 28
SB-43 5/11/2016 Depth (feet) Lead 0 to ½ 48 2 to 2½ 7.4
SB-48 5/11/2016 Depth (feet) Lead 0 to ½ 48 2 to 2½ 6.9
SB-28 5/9/2016 Depth (feet) Lead 0 to ½ 40 2 to 2½ 7.4
SB-51 5/11/2016 Depth (feet) Lead 0 to ½ 6.9 2 to 2½ 7.9
SB-30 5/9/2016 Depth (feet) Lead 0 to ½ 9.7 2 to 2½ 6.3
SB-53 5/11/2016 Depth (feet) Lead 0 to ½ 33 2 to 2½ 8.0
SB-50 5/11/2016 Depth (feet) Lead 0 to ½ 8.8 2 to 2½ 9.1
SB-52 5/11/2016 Depth (feet) Lead 0 to ½ 7.7 2 to 2½ 9.3
Legend
Approximate location of proposed step-out sample (SB)
Approximate location of proposed exploratory boring for soil and ground water sampling (EB)
Approximate location of proposed shallow soil sample (SB)
Location with a soil sample that contains a lead concentration equal or greater than 80 mg/kg
Approximate location of previous geotechnical boring (EB)
Former structures - 1903 Sanborn Map
Former structures - 1911 Sanborn Map
Former structures - 1950 Sanborn Map *
* Note: The apartment building depicted on the 1950 Sanborn Map is still present.
N
0 20 40
APPROXIMATE SCALE (FEET)
Base by Google Earth, dated 5/11/2015
Project Number 729-4-5
Figure Number Figure 2B
Drawn By RRN
Date June 2016
Lead Concentrations in Soil - Northeast
2956 International Boulevard
Oakland, CA
CORNERSTONE EARTH GROUP

Screening Level

	DTSC-SL [1]
Lead	80 mg/kg

[1] DTSC Recommended Screening Level (SL), HERO Note 3 - January 2016

BOLD Concentration exceeds selected environmental screening criteria



Legend

- Approximate location of proposed step-out sample (SB)
- Approximate location of exploratory boring for soil and ground water sampling (EB)
- Approximate location of shallow soil sample (SB)
- Location with a soil sample that contains a lead concentration equal or greater than 80 mg/kg
- Approximate location of previous geotechnical boring (EB)
- Approximate location of Sausal Creek culvert
- Former structures - 1903 Sanborn Map
- Former structures - 1911 Sanborn Map
- Former structures - 1950 Sanborn Map *

* Note: The apartment building depicted on the 1950 Sanborn Map is still present.

N

0 20 40

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 5/11/2015

Lead Concentrations in Soil - Southwest

2956 International Boulevard
Oakland, CA

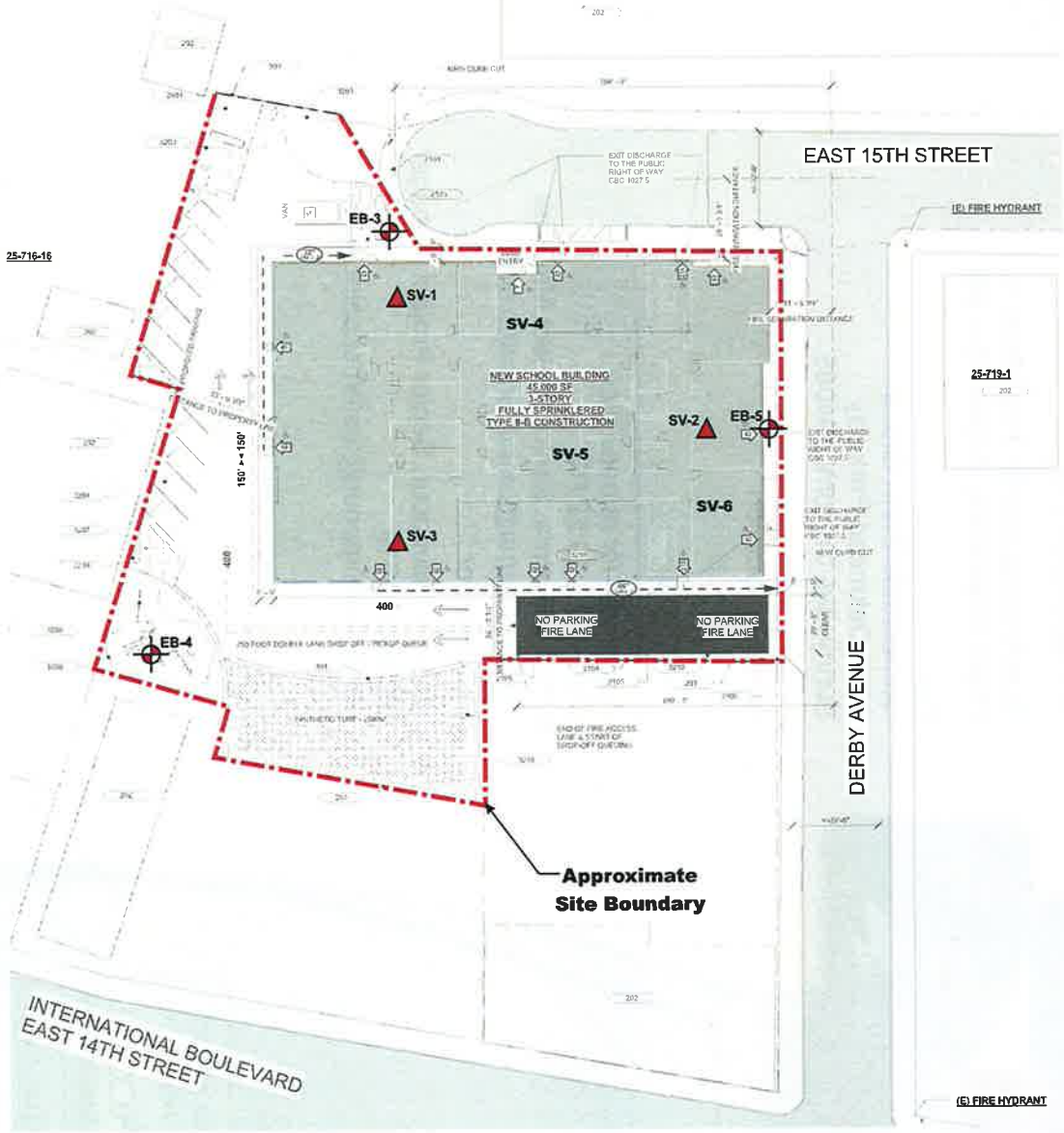
Project Number 729-4-5

Figure Number Figure 2C

Date June 2016

Drawn By RRN

CORNERSTONE EARTH GROUP



Approximate location of existing apartment complex.

Legend

- Approximate location of exploratory boring for soil and ground water sampling (EB)
- Approximate location of proposed soil vapor sample (SV)

N

0 40 80

APPROXIMATE SCALE (FEET)

Base by K2A Architecture, Site Egress - A0.04, dated 4/18/2016

Project Number 729-4-5

Figure Number Figure 3

Date June 2016

Drawn By RRN

Proposed Soil Vapor Sampling Locations

2956 International Boulevard
Oakland, CA

CORNERSTONE EARTH GROUP



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-73638-1
Client Project/Site: Aspire PEA SSI

For:
Cornerstone Earth Group
1259 Oakmead Parkway
Sunnyvale, California 94085

Attn: Kurt Soenen

Authorized for release by:
8/4/2016 2:39:22 PM
Dimple Sharma, Senior Project Manager
dimple.sharma@testamericainc.com

Designee for

Afsaneh Salimpour, Senior Project Manager
(925)484-1919
afsaneh.salimpour@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
D	Surrogate or matrix spike recoveries were not obtained because the extract was diluted for analysis; also compounds analyzed at a dilution may be flagged with a D.
X	Surrogate is outside control limits
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Job ID: 720-73638-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-73638-1

Comments
No additional comments.

Receipt
The samples were received on 7/28/2016 11:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C.

GC Semi VOA
Method 8081A: The continuing calibration verification (CCV) associated with batch 720-207017 recovered above the upper control limit for Chlordane (technical). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 8081A: The %RPD between the primary and confirmation column exceeded 40% for Heptachlor epoxide for the following samples: SB-72(0-0.5) (720-73638-6). The lower value has been reported and qualified in accordance with the laboratory's SOP.

Method 8081A: The %RPD between the primary and confirmation column exceeded 40% for 4,4'-DDD for the following samples: SB-73(0-0.5) (720-73638-7). The lower value has been reported and qualified in accordance with the laboratory's SOP.

Method 8081A: The following samples required a dilution due to the nature of the sample matrix: SB-72(0-0.5) (720-73638-6) and SB-73(0-0.5) (720-73638-7). Because of this dilution, the surrogate spike concentration in the sample was reduced to a level where the recovery calculation does not provide useful information.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-66(0-0.5) — Lab Sample ID: 720-73638-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	57		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-67(0-0.5) — Lab Sample ID: 720-73638-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	110		1.4		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-41A(0-0.5) — Lab Sample ID: 720-73638-3

No Detections.

Client Sample ID: SB-70(0-0.5) — Lab Sample ID: 720-73638-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	19		1.7		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-71(0-0.5) — Lab Sample ID: 720-73638-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.2		1.7		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-72(0-0.5) — Lab Sample ID: 720-73638-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Heptachlor epoxide	390	p	200		ug/Kg	100		8081A	Total/NA
Chlordane (technical)	18000		4000		ug/Kg	100		8081A	Total/NA
alpha-Chlordane	3400		200		ug/Kg	100		8081A	Total/NA
gamma-Chlordane	3100		200		ug/Kg	100		8081A	Total/NA
Lead	330		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-73(0-0.5) — Lab Sample ID: 720-73638-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Heptachlor epoxide	270		40		ug/Kg	20		8081A	Total/NA
4,4'-DDT	90		40		ug/Kg	20		8081A	Total/NA
4,4'-DDE	240		40		ug/Kg	20		8081A	Total/NA
4,4'-DDD	88	p	40		ug/Kg	20		8081A	Total/NA
Chlordane (technical)	8100		790		ug/Kg	20		8081A	Total/NA
alpha-Chlordane	1800		40		ug/Kg	20		8081A	Total/NA
gamma-Chlordane	1700		40		ug/Kg	20		8081A	Total/NA
Lead	410		1.8		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-24A(2-2.5) — Lab Sample ID: 720-73638-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	1500		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-24A(3-3.5) — Lab Sample ID: 720-73638-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	320		1.7		mg/Kg	4		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-31A(1-1.5) — Lab Sample ID: 720-73638-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	9.6		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-74(0-0.5) — Lab Sample ID: 720-73638-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	24		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-75(0-0.5) — Lab Sample ID: 720-73638-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	10		1.4		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-76(0-0.5) — Lab Sample ID: 720-73638-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	250		1.5		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-77(0-0.5) — Lab Sample ID: 720-73638-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	230		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-78(0-0.5) — Lab Sample ID: 720-73638-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	30		1.7		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-79(0-0.5) — Lab Sample ID: 720-73638-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	110		1.8		mg/Kg	4		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-66(0-0.5)
Date Collected: 07/27/16 10:55
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-1
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	67		1.6		mg/Kg		08/01/16 15:42	08/02/16 21:15	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-67(0-0.5)
Date Collected: 07/27/16 10:50
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-2
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	110		1.4		mg/Kg		08/01/16 15:42	08/02/16 21:20	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-41A(0-0.5)
Date Collected: 07/27/16 13:05
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-3
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
4,4'-DDD	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Toxaphene	ND		40		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
Chlordane (technical)	ND		40		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
alpha-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1
gamma-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*102*		*57 - 122*	*08/02/16 09:23*	*08/03/16 04:19*	*1*
DCB Decachlorobiphenyl	*101*		*21 - 136*	*08/02/16 09:23*	*08/03/16 04:19*	*1*

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-70(0-0.5)
Date Collected: 07/27/16 13:10
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-4
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	19		1.7		mg/Kg		08/01/16 15:42	08/02/16 21:26	4

Client Sample ID: SB-71(0-0.5)
Date Collected: 07/27/16 13:00
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-5
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
4,4'-DDD	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Toxaphene	ND		39		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
Chlordane (technical)	ND		39		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
alpha-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1
gamma-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 04:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*104*		*57 - 122*	*08/02/16 09:23*	*08/03/16 04:36*	*1*
DCB Decachlorobiphenyl	*96*		*21 - 136*	*08/02/16 09:23*	*08/03/16 04:36*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**8.2**		1.7		mg/Kg		08/01/16 15:42	08/02/16 21:31	4

Client Sample ID: SB-72(0-0.5)
Date Collected: 07/27/16 10:49
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-6
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Dieldrin	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endrin aldehyde	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endrin	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endrin ketone	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Heptachlor	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Heptachlor epoxide	**390**	**p**	200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
4,4'-DDT	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
4,4'-DDE	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
4,4'-DDD	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endosulfan I	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endosulfan II	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
alpha-BHC	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
beta-BHC	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
gamma-BHC (Lindane)	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
delta-BHC	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Endosulfan sulfate	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Methoxychlor	ND		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Toxaphene	ND		4000		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
Chlordane (technical)	**18000**		4000		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
alpha-Chlordane	**3400**		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100
gamma-Chlordane	**3100**		200		ug/Kg		08/02/16 09:23	08/04/16 09:10	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*0*	*X D*	*57 - 122*	*08/02/16 09:23*	*08/04/16 09:10*	*100*
DCB Decachlorobiphenyl	*0*	*X D*	*21 - 136*	*08/02/16 09:23*	*08/04/16 09:10*	*100*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**330**		1.6		mg/Kg		08/01/16 15:42	08/02/16 21:36	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-73(0-0.5)
Date Collected: 07/27/16 10:47
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-7
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Dieldrin	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endrin aldehyde	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endrin	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endrin ketone	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Heptachlor	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Heptachlor epoxide	**270**		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
4,4'-DDT	**90**		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
4,4'-DDE	**240**		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
4,4'-DDD	**88**	**p**	40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endosulfan I	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endosulfan II	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
alpha-BHC	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
beta-BHC	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
gamma-BHC (Lindane)	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
delta-BHC	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Endosulfan sulfate	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Methoxychlor	ND		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Toxaphene	ND		790		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
Chlordane (technical)	**8100**		790		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
alpha-Chlordane	**1800**		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20
gamma-Chlordane	**1700**		40		ug/Kg		08/02/16 09:23	08/04/16 09:28	20

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*0*	*X D*	*57 - 122*	*08/02/16 09:23*	*08/04/16 09:28*	*20*
DCB Decachlorobiphenyl	*0*	*X D*	*21 - 136*	*08/02/16 09:23*	*08/04/16 09:28*	*20*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**410**		1.8		mg/Kg		08/01/16 15:42	08/02/16 21:42	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-24A(2-2.5)
Date Collected: 07/27/16 09:04
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-9
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	1500		1.6		mg/Kg		08/01/16 15:42	08/02/16 21:47	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-24A(3-3.5)
Date Collected: 07/27/16 09:06
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-10
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	320		1.7		mg/Kg		08/01/16 15:42	08/02/16 21:53	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-31A(1-1.5)
Date Collected: 07/27/16 09:55
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-11
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	9.6		1.6		mg/Kg		08/01/16 15:42	08/02/16 22:09	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-74(0-0.5)
Date Collected: 07/27/16 09:50
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-12
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	24		1.6		mg/Kg		08/01/16 15:42	08/02/16 22:14	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-75(0-0.5)
Date Collected: 07/27/16 09:20
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-13
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	10		1.4		mg/Kg		08/01/16 15:42	08/02/16 22:20	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-76(0-0.5)
Date Collected: 07/27/16 09:10
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-14
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	250		1.5		mg/Kg		08/01/16 15:42	08/02/16 22:25	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-77(0-0.5)
Date Collected: 07/27/16 08:55
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-15
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	230		1.6		mg/Kg		08/01/16 16:40	08/03/16 22:36	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-78(0-0.5)
Date Collected: 07/27/16 09:45
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-16
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	30		1.7		mg/Kg		08/01/16 16:40	08/03/16 22:42	4

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-79(0-0.5)
Date Collected: 07/27/16 09:15
Date Received: 07/28/16 11:20

Lab Sample ID: 720-73638-17
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	110		1.8		mg/Kg		08/01/16 16:40	08/03/16 22:47	4

Surrogate Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX2	DCB1
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73638-3	SB-41A(0-0.5)	102	101

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCB2
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73638-5	SB-71(0-0.5)	104	96
720-73657-A-1-A MS	Matrix Spike	105	108

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCB1
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73638-6	SB-72(0-0.5)	0 X D	0 X D
720-73638-7	SB-73(0-0.5)	0 X D	0 X D
720-73657-A-1-B MSD	Matrix Spike Duplicate	105	111
LCS 720-206976/2-A	Lab Control Sample	99	107
MB 720-206976/1-A	Method Blank	93	107

Surrogate Legend

TCX = Tetrachloro-m-xylene

DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 720-206976/1-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206976

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDD	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Toxaphene	ND		40		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Chlordane (technical)	ND		40		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
alpha-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
gamma-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*93*		*57 - 122*	*08/02/16 09:23*	*08/03/16 02:39*	*1*
DCB Decachlorobiphenyl	*107*		*21 - 136*	*08/02/16 09:23*	*08/03/16 02:39*	*1*

Lab Sample ID: LCS 720-206976/2-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	16.7	16.1		ug/Kg		96	65 - 120
Dieldrin	16.7	18.2		ug/Kg		109	72 - 120
Endrin aldehyde	16.7	18.4		ug/Kg		111	68 - 120
Endrin	16.7	19.4		ug/Kg		116	68 - 120
Endrin ketone	16.7	20.3		ug/Kg		122	84 - 133
Heptachlor	16.7	17.6		ug/Kg		106	69 - 120
Heptachlor epoxide	16.7	18.8		ug/Kg		113	68 - 120
4,4'-DDT	16.7	19.4		ug/Kg		116	63 - 127
4,4'-DDE	16.7	19.3		ug/Kg		116	84 - 126
4,4'-DDD	16.7	20.9		ug/Kg		125	85 - 128
Endosulfan I	16.7	18.7		ug/Kg		112	62 - 120
Endosulfan II	16.7	18.7		ug/Kg		112	65 - 120
alpha-BHC	16.7	17.6		ug/Kg		106	62 - 120
beta-BHC	16.7	20.4		ug/Kg		122	74 - 124
gamma-BHC (Lindane)	16.7	17.7		ug/Kg		106	72 - 120
delta-BHC	16.7	17.5		ug/Kg		105	43 - 125

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 720-206976/2-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Endosulfan sulfate	16.7	19.0		ug/Kg		114	74 - 121
Methoxychlor	16.7	17.7		ug/Kg		106	71 - 132
alpha-Chlordane	16.7	18.3		ug/Kg		110	70 - 120
gamma-Chlordane	16.7	18.1		ug/Kg		109	68 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*57 - 122*
DCB Decachlorobiphenyl	*107*		*21 - 136*

Lab Sample ID: 720-73657-A-1-A MS
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	ND		16.0	18.2		ug/Kg		113	53 - 120
Dieldrin	ND		16.0	25.5	F1	ug/Kg		153	46 - 130
Endrin aldehyde	ND		16.0	17.7		ug/Kg		110	40 - 120
Endrin	ND	F2 F1	16.0	24.1	F1 p	ug/Kg		151	32 - 143
Endrin ketone	ND	F1	16.0	22.9	F1	ug/Kg		143	40 - 120
Heptachlor	ND		16.0	18.6		ug/Kg		116	52 - 120
Heptachlor epoxide	ND	F1	16.0	22.8	F1	ug/Kg		142	40 - 120
4,4'-DDT	5.3	F2 F1	16.0	36.3	F1	ug/Kg		194	17 - 144
4,4'-DDE	5.8	F1	16.0	28.8	F1	ug/Kg		144	40 - 120
4,4'-DDD	ND	F2 F1	16.0	26.2	F1	ug/Kg		164	40 - 120
Endosulfan I	ND		16.0	18.9		ug/Kg		118	40 - 120
Endosulfan II	ND		16.0	23.6	F1	ug/Kg		147	40 - 120
alpha-BHC	ND		16.0	18.3		ug/Kg		115	40 - 120
beta-BHC	ND	F1	16.0	20.4	F1	ug/Kg		127	40 - 120
gamma-BHC (Lindane)	ND		16.0	19.0		ug/Kg		118	58 - 120
delta-BHC	ND		16.0	16.8		ug/Kg		105	40 - 120
Endosulfan sulfate	ND		16.0	19.9	F1	ug/Kg		124	40 - 120
Methoxychlor	ND	F1	16.0	24.4	F1	ug/Kg		152	40 - 120
alpha-Chlordane	11	p	16.0	37.6	F1	ug/Kg		165	40 - 120
gamma-Chlordane	10	F2 F1	16.0	37.5	F1	ug/Kg		170	40 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*105*		*57 - 122*
DCB Decachlorobiphenyl	*108*		*21 - 136*

Lab Sample ID: 720-73657-A-1-B MSD
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin	ND		15.7	16.4		ug/Kg		104	53 - 120	10	20
Dieldrin	ND		15.7	19.2	F2	ug/Kg		116	46 - 130	28	20
Endrin aldehyde	ND		15.7	15.7		ug/Kg		100	40 - 120	12	20
Endrin	ND	F2 F1	15.7	20.3		ug/Kg		129	32 - 143	17	20

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 720-73657-A-1-B MSD
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endrin ketone	ND	F1	15.7	23.1	F1	ug/Kg		147	40 - 120	1	20
Heptachlor	ND		15.7	18.1		ug/Kg		115	52 - 120	3	20
Heptachlor epoxide	ND	F1	15.7	19.9	F1	ug/Kg		126	40 - 120	14	20
4,4'-DDT	5.3	F2 F1	15.7	26.3	F2	ug/Kg		133	17 - 144	32	20
4,4'-DDE	5.8	F1	15.7	26.7	F1	ug/Kg		133	40 - 120	7	20
4,4'-DDD	ND	F2 F1	15.7	19.4	F1 F2	ug/Kg		123	40 - 120	30	20
Endosulfan I	ND		15.7	17.7		ug/Kg		113	40 - 120	6	20
Endosulfan II	ND		15.7	20.7	F1	ug/Kg		132	40 - 120	13	30
alpha-BHC	ND		15.7	17.6		ug/Kg		112	40 - 120	4	20
beta-BHC	ND	F1	15.7	19.7	F1	ug/Kg		125	40 - 120	4	20
gamma-BHC (Lindane)	ND		15.7	18.4		ug/Kg		117	58 - 120	3	20
delta-BHC	ND		15.7	16.0		ug/Kg		102	40 - 120	5	20
Endosulfan sulfate	ND		15.7	19.0	F1	ug/Kg		121	40 - 120	5	20
Methoxychlor	ND	F1	15.7	22.0	F1	ug/Kg		140	40 - 120	10	20
alpha-Chlordane	11	p	15.7	40.3	F1	ug/Kg		185	40 - 120	7	20
gamma-Chlordane	10	F2 F1	15.7	39.1	F1	ug/Kg		184	40 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*105*		*57 - 122*
DCB Decachlorobiphenyl	*111*		*21 - 136*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-206929/1-A
Matrix: Solid
Analysis Batch: 207046

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206929

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		08/01/16 15:42	08/02/16 19:38	1

Lab Sample ID: LCS 720-206929/2-A
Matrix: Solid
Analysis Batch: 207046

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206929

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	46.5		mg/Kg		93	80 - 120

Lab Sample ID: LCSSRM 720-206929/3-A
Matrix: Solid
Analysis Batch: 207046

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206929

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	272		mg/Kg		90	62 - 113

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 720-73530-A-4-A MS
Matrix: Solid
Analysis Batch: 207046

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 206929

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	240		43.1	306	4	mg/Kg		162	75 - 125

Lab Sample ID: 720-73530-A-4-B MSD
Matrix: Solid
Analysis Batch: 207046

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206929

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	240		43.9	290	4	mg/Kg		121	75 - 125	6	20

Lab Sample ID: MB 720-206935/1-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206935

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		08/01/16 16:40	08/03/16 21:48	1

Lab Sample ID: LCS 720-206935/2-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	53.4		mg/Kg		107	80 - 120

Lab Sample ID: LCSSRM 720-206935/3-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	294		mg/Kg		97	62 - 113

Lab Sample ID: 720-73638-15 MS
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: SB-77(0-0.5)
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	230		39.1	258	4	mg/Kg		73	75 - 125

Lab Sample ID: 720-73638-15 MSD
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: SB-77(0-0.5)
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	230		40.0	237	4	mg/Kg		20	75 - 125	8	20

GC Semi VOA

Prep Batch: 206976

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-3	SB-41A(0-0.5)	Total/NA	Solid	3546	
720-73638-5	SB-71(0-0.5)	Total/NA	Solid	3546	
720-73638-6	SB-72(0-0.5)	Total/NA	Solid	3546	
720-73638-7	SB-73(0-0.5)	Total/NA	Solid	3546	
MB 720-206976/1-A	Method Blank	Total/NA	Solid	3546	
LCS 720-206976/2-A	Lab Control Sample	Total/NA	Solid	3546	
720-73657-A-1-A MS	Matrix Spike	Total/NA	Solid	3546	
720-73657-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	3546	

Analysis Batch: 207017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-3	SB-41A(0-0.5)	Total/NA	Solid	8081A	206976
720-73638-5	SB-71(0-0.5)	Total/NA	Solid	8081A	206976
MB 720-206976/1-A	Method Blank	Total/NA	Solid	8081A	206976
LCS 720-206976/2-A	Lab Control Sample	Total/NA	Solid	8081A	206976

Analysis Batch: 207106

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-6	SB-72(0-0.5)	Total/NA	Solid	8081A	206976
720-73638-7	SB-73(0-0.5)	Total/NA	Solid	8081A	206976
720-73657-A-1-A MS	Matrix Spike	Total/NA	Solid	8081A	206976
720-73657-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	8081A	206976

Metals

Prep Batch: 206929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-1	SB-66(0-0.5)	Total/NA	Solid	3050B	
720-73638-2	SB-67(0-0.5)	Total/NA	Solid	3050B	
720-73638-4	SB-70(0-0.5)	Total/NA	Solid	3050B	
720-73638-5	SB-71(0-0.5)	Total/NA	Solid	3050B	
720-73638-6	SB-72(0-0.5)	Total/NA	Solid	3050B	
720-73638-7	SB-73(0-0.5)	Total/NA	Solid	3050B	
720-73638-9	SB-24A(2-2.5)	Total/NA	Solid	3050B	
720-73638-10	SB-24A(3-3.5)	Total/NA	Solid	3050B	
720-73638-11	SB-31A(1-1.5)	Total/NA	Solid	3050B	
720-73638-12	SB-74(0-0.5)	Total/NA	Solid	3050B	
720-73638-13	SB-75(0-0.5)	Total/NA	Solid	3050B	
720-73638-14	SB-76(0-0.5)	Total/NA	Solid	3050B	
MB 720-206929/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 720-206929/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSSRM 720-206929/3-A	Lab Control Sample	Total/NA	Solid	3050B	
720-73530-A-4-A MS	Matrix Spike	Total/NA	Solid	3050B	
720-73530-A-4-B MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	

Prep Batch: 206935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-15	SB-77(0-0.5)	Total/NA	Solid	3050B	
720-73638-16	SB-78(0-0.5)	Total/NA	Solid	3050B	
720-73638-17	SB-79(0-0.5)	Total/NA	Solid	3050B	

Metals (Continued)

Prep Batch: 206935 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 720-206935/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 720-206935/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSSRM 720-206935/3-A	Lab Control Sample	Total/NA	Solid	3050B	
720-73638-15 MS	SB-77(0-0.5)	Total/NA	Solid	3050B	
720-73638-15 MSD	SB-77(0-0.5)	Total/NA	Solid	3050B	

Analysis Batch: 207046

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-1	SB-66(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-2	SB-67(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-4	SB-70(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-5	SB-71(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-6	SB-72(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-7	SB-73(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-9	SB-24A(2-2.5)	Total/NA	Solid	6010B	206929
720-73638-10	SB-24A(3-3.5)	Total/NA	Solid	6010B	206929
720-73638-11	SB-31A(1-1.5)	Total/NA	Solid	6010B	206929
720-73638-12	SB-74(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-13	SB-75(0-0.5)	Total/NA	Solid	6010B	206929
720-73638-14	SB-76(0-0.5)	Total/NA	Solid	6010B	206929
MB 720-206929/1-A	Method Blank	Total/NA	Solid	6010B	206929
LCS 720-206929/2-A	Lab Control Sample	Total/NA	Solid	6010B	206929
LCSSRM 720-206929/3-A	Lab Control Sample	Total/NA	Solid	6010B	206929
720-73530-A-4-A MS	Matrix Spike	Total/NA	Solid	6010B	206929
720-73530-A-4-B MSD	Matrix Spike Duplicate	Total/NA	Solid	6010B	206929

Analysis Batch: 207122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73638-15	SB-77(0-0.5)	Total/NA	Solid	6010B	206935
720-73638-16	SB-78(0-0.5)	Total/NA	Solid	6010B	206935
720-73638-17	SB-79(0-0.5)	Total/NA	Solid	6010B	206935
MB 720-206935/1-A	Method Blank	Total/NA	Solid	6010B	206935
LCS 720-206935/2-A	Lab Control Sample	Total/NA	Solid	6010B	206935
LCSSRM 720-206935/3-A	Lab Control Sample	Total/NA	Solid	6010B	206935
720-73638-15 MS	SB-77(0-0.5)	Total/NA	Solid	6010B	206935
720-73638-15 MSD	SB-77(0-0.5)	Total/NA	Solid	6010B	206935

Lab Chronicle

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Client Sample ID: SB-66(0-0.5)

Lab Sample ID: 720-73638-1
Matrix: Solid
Date Collected: 07/27/16 10:55
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:15	SLK	TAL PLS

Client Sample ID: SB-67(0-0.5)

Lab Sample ID: 720-73638-2
Matrix: Solid
Date Collected: 07/27/16 10:50
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:20	SLK	TAL PLS

Client Sample ID: SB-41A(0-0.5)

Lab Sample ID: 720-73638-3
Matrix: Solid
Date Collected: 07/27/16 13:05
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		1	207017	08/03/16 04:19	MQL	TAL PLS

Client Sample ID: SB-70(0-0.5)

Lab Sample ID: 720-73638-4
Matrix: Solid
Date Collected: 07/27/16 13:10
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:26	SLK	TAL PLS

Client Sample ID: SB-71(0-0.5)

Lab Sample ID: 720-73638-5
Matrix: Solid
Date Collected: 07/27/16 13:00
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		1	207017	08/03/16 04:36	MQL	TAL PLS
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:31	SLK	TAL PLS

Client Sample ID: SB-72(0-0.5) — **Lab Sample ID: 720-73638-6**
Date Collected: 07/27/16 10:49 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		100	207106	08/04/16 09:10	JZT	TAL PLS
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:36	SLK	TAL PLS

Client Sample ID: SB-73(0-0.5) — **Lab Sample ID: 720-73638-7**
Date Collected: 07/27/16 10:47 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		20	207106	08/04/16 09:28	JZT	TAL PLS
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:42	SLK	TAL PLS

Client Sample ID: SB-24A(2-2.5) — **Lab Sample ID: 720-73638-9**
Date Collected: 07/27/16 09:04 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:47	SLK	TAL PLS

Client Sample ID: SB-24A(3-3.5) — **Lab Sample ID: 720-73638-10**
Date Collected: 07/27/16 09:06 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 21:53	SLK	TAL PLS

Client Sample ID: SB-31A(1-1.5) — **Lab Sample ID: 720-73638-11**
Date Collected: 07/27/16 09:55 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 22:09	SLK	TAL PLS

Client Sample ID: SB-74(0-0.5) — **Lab Sample ID: 720-73638-12**
Date Collected: 07/27/16 09:50 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 22:14	SLK	TAL PLS

Client Sample ID: SB-75(0-0.5) — **Lab Sample ID: 720-73638-13**
Date Collected: 07/27/16 09:20 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 22:20	SLK	TAL PLS

Client Sample ID: SB-76(0-0.5) — **Lab Sample ID: 720-73638-14**
Date Collected: 07/27/16 09:10 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206929	08/01/16 15:42	OBI	TAL PLS
Total/NA	Analysis	6010B		4	207046	08/02/16 22:25	SLK	TAL PLS

Client Sample ID: SB-77(0-0.5) — **Lab Sample ID: 720-73638-15**
Date Collected: 07/27/16 08:55 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 22:36	ASB	TAL PLS

Client Sample ID: SB-78(0-0.5) — **Lab Sample ID: 720-73638-16**
Date Collected: 07/27/16 09:45 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 22:42	ASB	TAL PLS

Client Sample ID: SB-79(0-0.5) — **Lab Sample ID: 720-73638-17**
Date Collected: 07/27/16 09:15 — **Matrix: Solid**
Date Received: 07/28/16 11:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 22:47	ASB	TAL PLS

Lab Chronicle

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Laboratory: TestAmerica Pleasanton

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-18

Analysis Method	Prep Method	Matrix	Analyte

Method Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Method	Method Description	Protocol	Laboratory
8081A	Organochlorine Pesticides (GC)	SW846	TAL PLS
6010B	Metals (ICP)	SW846	TAL PLS

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: Cornerstone Earth Group
Project/Site: Aspire PEA SSI

TestAmerica Job ID: 720-73638-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-73638-1	SB-66(0-0.5)	Solid	07/27/16 10:55	07/28/16 11:20
720-73638-2	SB-67(0-0.5)	Solid	07/27/16 10:50	07/28/16 11:20
720-73638-3	SB-41A(0-0.5)	Solid	07/27/16 13:05	07/28/16 11:20
720-73638-4	SB-70(0-0.5)	Solid	07/27/16 13:10	07/28/16 11:20
720-73638-5	SB-71(0-0.5)	Solid	07/27/16 13:00	07/28/16 11:20
720-73638-6	SB-72(0-0.5)	Solid	07/27/16 10:49	07/28/16 11:20
720-73638-7	SB-73(0-0.5)	Solid	07/27/16 10:47	07/28/16 11:20
720-73638-9	SB-24A(2-2.5)	Solid	07/27/16 09:04	07/28/16 11:20
720-73638-10	SB-24A(3-3.5)	Solid	07/27/16 09:06	07/28/16 11:20
720-73638-11	SB-31A(1-1.5)	Solid	07/27/16 09:55	07/28/16 11:20
720-73638-12	SB-74(0-0.5)	Solid	07/27/16 09:50	07/28/16 11:20
720-73638-13	SB-75(0-0.5)	Solid	07/27/16 09:20	07/28/16 11:20
720-73638-14	SB-76(0-0.5)	Solid	07/27/16 09:10	07/28/16 11:20
720-73638-15	SB-77(0-0.5)	Solid	07/27/16 08:55	07/28/16 11:20
720-73638-16	SB-78(0-0.5)	Solid	07/27/16 09:45	07/28/16 11:20
720-73638-17	SB-79(0-0.5)	Solid	07/27/16 09:15	07/28/16 11:20

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720-73638

ref# 170091

CORNERSTONE EARTH GROUP

Chain of Custody Record

	Project Manager: Kurt Soenen	Site Sampler: SDK	Date: 7/27/16	COC No:
Cornerstone Earth Group, Inc.	Tel/Fax: 408-245-4600 ext. 101	Lab Contact: Afsaneh Salimpour	Lab: Test America	1 of 2 COCs
1259 Oakmead Pkwy	Analysis Turnaround Time			Laboratory's Job No.
Sunnyvale, California 94085				
(408) 245-4600 Phone	TAT if different from Below _____			
(408) 245-4620 FAX	☒ 1 week			
Project Name: Aspire PSA SSI	☐ 3 days			
Site: 2956 International Blvd	☐ 2 days			
Project Number: 729-4-5	☐ 1 day			

720-73638 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Lead EPA 6010	OCPs EPA 8081A	Laboratory's Sample Specific Notes:
SB-66 (0-0.5)	7/27/16	10:55	LINER	SOIL	1	X		
SB-67 (0-0.5)	"	10:50	"	"	1	X		
SB-41A (0-0.5)	"	13:05	"	"	"		X	
SB-70 (0-0.5)	"	13:16	"	"	"	X		
SB-71 (0-0.5)	"	13:00	"	"	"	X	X	
SB-72 (0-0.5)	"	10:49	"	"	"	X	X	
SB-73 (0-0.5)	"	10:47	"	"	"	X	X	
SB-22A (1-1.5)	"	9:45	"	"	"	X		
SB-24A (2-2.5)	"	9:09	"	"	"	X		
SB-24A (3-3.5)	"	9:06	"	"	"	X		
SB-31A (1-1.5)	"	9:55	"	"	"	X		
SB-74 (0-0.5)	↓	9:50	↓	↓	↓	X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments: If additional sample is needed, please use the liner.

email to skuehn@cornerstoneearth.com

	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Cornerstone Earth Group	7/28/16		TA	7/27/16 9:54
Relinquished by:	TA	7/28/16 1120			7/28/16 1120
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

10°C

8/4/2016

ref# 170092

CORNERSTONE EARTH GROUP

Chain of Custody Record

Cornerstone Earth Group, Inc.	Project Manager: Kurt Soenen	Site Sampler: SDK	Date: 7/27/16	COC No:	
1259 Oakmead Pkwy	Tel/Fax: 408-245-4600 ext. 101	Lab Contact: Afsaneh Salimpour	Lab: Test America	2 of 9 COCs	
Sunnyvale, California 94085	Analysis Turnaround Time			Laboratory's Job No.	
(408) 245-4600 Phone	TAT if different from Below ____				
(408) 245-4620 FAX	☒ 1 week				
Project Name: Aspire PGA SSI	☐ 3 days				
Site: 2956 International Blvd	☐ 2 days				
Project Number: 729-4-5	☐ 1 day				

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Samples	Lead EPA 6010	OCPs EPA 8081A	Laboratory's Sample Specific Notes:
SB-75 (0-0.5)	7/27/16	9:20	LINER	SOIL	1		X		
SB-76 (0-0.5)	"	9:10	"	"	"		X		
SB-77 (0-0.5)	"	8:55	"	"	"		X		
SB-78 (0-0.5)	"	8:45	"	"	"		X		
SB-79 (0-0.5)	↓	9:15	↓	↓	↓		X		

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments: If additional sample is needed, please use the liner.

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
	Cornerstone Earth Group	7/28/16		TA	7.27.16 9:54
	TA	7/28/16 11:00		TA	7/28/16 1120
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

1.0°C

8/4/2016

Login Sample Receipt Checklist

Client: Cornerstone Earth Group

Job Number: 720-73638-1

Login Number: 73638
List Number: 1
Creator: Arauz, Dennis

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Pleasanton
1220 Quarry Lane
Pleasanton, CA 94566
Tel: (925)484-1919

TestAmerica Job ID: 720-73653-1
Client Project/Site: ERES Academy SSI

For:
Cornerstone Earth Group
1259 Oakmead Parkway
Sunnyvale, California 94085

Attn: Kurt Soenen

Authorized for release by:
8/4/2016 5:29:47 PM
Dimple Sharma, Senior Project Manager
dimple.sharma@testamericainc.com

Designee for

Afsaneh Salimpour, Senior Project Manager
(925)484-1919
afsaneh.salimpour@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Qualifiers

GC Semi VOA

Qualifier	Qualifier Description
p	The %RPD between the primary and confirmation column/detector is >40%. The lower value has been reported.
F1	MS and/or MSD Recovery is outside acceptance limits.
F2	MS/MSD RPD exceeds control limits

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Job ID: 720-73653-1

Laboratory: TestAmerica Pleasanton

Narrative

Job Narrative
720-73653-1

Comments
No additional comments.

Receipt
The samples were received on 7/28/2016 5:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.1° C.

GC Semi VOA
Method 8081A: The continuing calibration verification (CCV) associated with batch 720-207017 recovered above the upper control limit for Chlordane (technical). The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported.

Method 8081A: The %RPD between the primary and confirmation column exceeded 40% for alpha-Chlordane for the following samples: SB-5A(2-2 1/2) (720-73653-13). The lower value has been reported and qualified in accordance with the laboratory's SOP.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-12A(1-1 1/2) — Lab Sample ID: 720-73653-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	8.9		1.8		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-16A(1-1 1/2) — Lab Sample ID: 720-73653-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	33		1.9		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-18A(1-1 1/2) — Lab Sample ID: 720-73653-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	790		1.7		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-61(0-1/2) — Lab Sample ID: 720-73653-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	11		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-62(0-1/2) — Lab Sample ID: 720-73653-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	16		1.1		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-63(0-1/2) — Lab Sample ID: 720-73653-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	24		1.3		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-64(0-1/2) — Lab Sample ID: 720-73653-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	23		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-65(0-1/2) — Lab Sample ID: 720-73653-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	640		1.9		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-69(0-1/2) — Lab Sample ID: 720-73653-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	42		1.4		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-37A(2-2 1/2) — Lab Sample ID: 720-73653-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	340		1.5		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-40A(1-1/2) — Lab Sample ID: 720-73653-11

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-40A(1-1/2) (Continued) — Lab Sample ID: 720-73653-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	13		1.6		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-5A(1-1 1/2) — Lab Sample ID: 720-73653-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
4,4'-DDD	4.6		2.0		ug/Kg	1		8081A	Total/NA
Lead	63		1.7		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-5A(2-2 1/2) — Lab Sample ID: 720-73653-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
alpha-Chlordane	6.5	p	2.0		ug/Kg	1		8081A	Total/NA
gamma-Chlordane	6.6		2.0		ug/Kg	1		8081A	Total/NA
Lead	13		1.8		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-60(0-1/2) — Lab Sample ID: 720-73653-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	14		1.4		mg/Kg	4		6010B	Total/NA

Client Sample ID: SB-68(0-1/2) — Lab Sample ID: 720-73653-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	47		1.7		mg/Kg	4		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-12A(1-1 1/2)
Date Collected: 07/28/16 09:38
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-1
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	8.9		1.8		mg/Kg		08/01/16 16:40	08/03/16 23:30	4

Client Sample Results

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-16A(1-1 1/2)
Date Collected: 07/28/16 09:04
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-2
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	33		1.9		mg/Kg		08/01/16 16:40	08/03/16 23:36	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-18A(1-1 1/2)
Date Collected: 07/28/16 09:17
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-3
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	790		1.7		mg/Kg		08/01/16 16:40	08/03/16 23:41	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-61(0-1/2)
Date Collected: 07/28/16 09:29
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-4
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	11		1.6		mg/Kg		08/01/16 16:40	08/03/16 23:47	4

Client Sample Results

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-62(0-1/2)
Date Collected: 07/28/16 10:00
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-5
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	16		1.1		mg/Kg		08/01/16 16:40	08/03/16 23:52	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-63(0-1/2)
Date Collected: 07/28/16 10:02
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-6
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	24		1.3		mg/Kg		08/01/16 16:40	08/03/16 23:58	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-64(0-1/2)
Date Collected: 07/28/16 08:56
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-7
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	23		1.6		mg/Kg		08/01/16 16:40	08/04/16 13:17	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-65(0-1/2)
Date Collected: 07/28/16 09:09
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-8
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	640		1.9		mg/Kg		08/01/16 16:40	08/04/16 13:23	4

Client Sample Results

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-69(0-1/2)
Date Collected: 07/28/16 08:42
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-9
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	42		1.4		mg/Kg		08/01/16 16:40	08/04/16 13:28	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-37A(2-2 1/2)
Date Collected: 07/28/16 08:27
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-10
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	340		1.5		mg/Kg		08/01/16 16:40	08/04/16 13:34	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-40A(1-1/2)
Date Collected: 07/28/16 10:17
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-11
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	13		1.6		mg/Kg		08/01/16 16:40	08/04/16 13:39	4

Client Sample ID: SB-5A(1-1 1/2)
Date Collected: 07/28/16 08:52
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-12
Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
4,4'-DDD	**4.6**		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Toxaphene	ND		40		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
Chlordane (technical)	ND		40		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
alpha-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1
gamma-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 05:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*88*	*p*	*57 - 122*	*08/02/16 09:23*	*08/03/16 05:43*	*1*
DCB Decachlorobiphenyl	*104*	*p*	*21 - 136*	*08/02/16 09:23*	*08/03/16 05:43*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**63**		1.7		mg/Kg		08/01/16 16:40	08/04/16 13:44	4

Client Sample ID: SB-5A(2-2 1/2)

Date Collected: 07/28/16 08:57
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-13

Matrix: Solid

Method: 8081A - Organochlorine Pesticides (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
4,4'-DDD	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Toxaphene	ND		39		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
Chlordane (technical)	ND		39		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
alpha-Chlordane	**6.5**	**p**	2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1
gamma-Chlordane	**6.6**		2.0		ug/Kg		08/02/16 09:23	08/04/16 06:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*85*		*57 - 122*	*08/02/16 09:23*	*08/04/16 06:50*	*1*
DCB Decachlorobiphenyl	*99*		*21 - 136*	*08/02/16 09:23*	*08/04/16 06:50*	*1*

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	**13**		1.8		mg/Kg		08/01/16 17:49	08/04/16 00:35	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-60(0-1/2)
Date Collected: 07/28/16 09:43
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-14
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	14		1.4		mg/Kg		08/01/16 17:49	08/04/16 00:40	4

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-68(0-1/2)
Date Collected: 07/28/16 08:52
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-15
Matrix: Solid

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	47		1.7		mg/Kg		08/01/16 17:49	08/04/16 00:45	4

Surrogate Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCB1
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73653-12	SB-5A(1-1 1/2)	88 p	104 p
720-73657-A-1-B MSD	Matrix Spike Duplicate	105	111
LCS 720-206976/2-A	Lab Control Sample	99	107
MB 720-206976/1-A	Method Blank	93	107

Surrogate Legend
TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX2	DCB1
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73653-13	SB-5A(2-2 1/2)	85	99

Surrogate Legend
TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
		TCX1	DCB2
Lab Sample ID	Client Sample ID	(57-122)	(21-136)
720-73657-A-1-A MS	Matrix Spike	105	108

Surrogate Legend
TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

Method: 8081A - Organochlorine Pesticides (GC)

Lab Sample ID: MB 720-206976/1-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206976

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Dieldrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin aldehyde	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endrin ketone	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Heptachlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Heptachlor epoxide	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDT	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDE	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
4,4'-DDD	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan I	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan II	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
alpha-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
beta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
gamma-BHC (Lindane)	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
delta-BHC	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Endosulfan sulfate	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Methoxychlor	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Toxaphene	ND		40		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
Chlordane (technical)	ND		40		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
alpha-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1
gamma-Chlordane	ND		2.0		ug/Kg		08/02/16 09:23	08/03/16 02:39	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*93*		*57 - 122*	*08/02/16 09:23*	*08/03/16 02:39*	*1*
DCB Decachlorobiphenyl	*107*		*21 - 136*	*08/02/16 09:23*	*08/03/16 02:39*	*1*

Lab Sample ID: LCS 720-206976/2-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	16.7	16.1		ug/Kg		96	65 - 120
Dieldrin	16.7	18.2		ug/Kg		109	72 - 120
Endrin aldehyde	16.7	18.4		ug/Kg		111	68 - 120
Endrin	16.7	19.4		ug/Kg		116	68 - 120
Endrin ketone	16.7	20.3		ug/Kg		122	84 - 133
Heptachlor	16.7	17.6		ug/Kg		106	69 - 120
Heptachlor epoxide	16.7	18.8		ug/Kg		113	68 - 120
4,4'-DDT	16.7	19.4		ug/Kg		116	63 - 127
4,4'-DDE	16.7	19.3		ug/Kg		116	84 - 126
4,4'-DDD	16.7	20.9		ug/Kg		125	85 - 128
Endosulfan I	16.7	18.7		ug/Kg		112	62 - 120
Endosulfan II	16.7	18.7		ug/Kg		112	65 - 120
alpha-BHC	16.7	17.6		ug/Kg		106	62 - 120
beta-BHC	16.7	20.4		ug/Kg		122	74 - 124
gamma-BHC (Lindane)	16.7	17.7		ug/Kg		106	72 - 120
delta-BHC	16.7	17.5		ug/Kg		105	43 - 125

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 720-206976/2-A
Matrix: Solid
Analysis Batch: 207017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Endosulfan sulfate	16.7	19.0		ug/Kg		114	74 - 121
Methoxychlor	16.7	17.7		ug/Kg		106	71 - 132
alpha-Chlordane	16.7	18.3		ug/Kg		110	70 - 120
gamma-Chlordane	16.7	18.1		ug/Kg		109	68 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*99*		*57 - 122*
DCB Decachlorobiphenyl	*107*		*21 - 136*

Lab Sample ID: 720-73657-A-1-A MS
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aldrin	ND		16.0	18.2		ug/Kg		113	53 - 120
Dieldrin	ND		16.0	25.5	F1	ug/Kg		153	46 - 130
Endrin aldehyde	ND		16.0	17.7		ug/Kg		110	40 - 120
Endrin	ND	F2 F1	16.0	24.1	F1 p	ug/Kg		151	32 - 143
Endrin ketone	ND	F1	16.0	22.9	F1	ug/Kg		143	40 - 120
Heptachlor	ND		16.0	18.6		ug/Kg		116	52 - 120
Heptachlor epoxide	ND	F1	16.0	22.8	F1	ug/Kg		142	40 - 120
4,4'-DDT	5.3	F2 F1	16.0	36.3	F1	ug/Kg		194	17 - 144
4,4'-DDE	5.8	F1	16.0	28.8	F1	ug/Kg		144	40 - 120
4,4'-DDD	ND	F2 F1	16.0	26.2	F1	ug/Kg		164	40 - 120
Endosulfan I	ND		16.0	18.9		ug/Kg		118	40 - 120
Endosulfan II	ND		16.0	23.6	F1	ug/Kg		147	40 - 120
alpha-BHC	ND		16.0	18.3		ug/Kg		115	40 - 120
beta-BHC	ND	F1	16.0	20.4	F1	ug/Kg		127	40 - 120
gamma-BHC (Lindane)	ND		16.0	19.0		ug/Kg		118	58 - 120
delta-BHC	ND		16.0	16.8		ug/Kg		105	40 - 120
Endosulfan sulfate	ND		16.0	19.9	F1	ug/Kg		124	40 - 120
Methoxychlor	ND	F1	16.0	24.4	F1	ug/Kg		152	40 - 120
alpha-Chlordane	11	p	16.0	37.6	F1	ug/Kg		165	40 - 120
gamma-Chlordane	10	F2 F1	16.0	37.5	F1	ug/Kg		170	40 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*105*		*57 - 122*
DCB Decachlorobiphenyl	*108*		*21 - 136*

Lab Sample ID: 720-73657-A-1-B MSD
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aldrin	ND		15.7	16.4		ug/Kg		104	53 - 120	10	20
Dieldrin	ND		15.7	19.2	F2	ug/Kg		116	46 - 130	28	20
Endrin aldehyde	ND		15.7	15.7		ug/Kg		100	40 - 120	12	20
Endrin	ND	F2 F1	15.7	20.3		ug/Kg		129	32 - 143	17	20

Method: 8081A - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 720-73657-A-1-B MSD
Matrix: Solid
Analysis Batch: 207106

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206976

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Endrin ketone	ND	F1	15.7	23.1	F1	ug/Kg		147	40 - 120	1	20
Heptachlor	ND		15.7	18.1		ug/Kg		115	52 - 120	3	20
Heptachlor epoxide	ND	F1	15.7	19.9	F1	ug/Kg		126	40 - 120	14	20
4,4'-DDT	5.3	F2 F1	15.7	26.3	F2	ug/Kg		133	17 - 144	32	20
4,4'-DDE	5.8	F1	15.7	26.7	F1	ug/Kg		133	40 - 120	7	20
4,4'-DDD	ND	F2 F1	15.7	19.4	F1 F2	ug/Kg		123	40 - 120	30	20
Endosulfan I	ND		15.7	17.7		ug/Kg		113	40 - 120	6	20
Endosulfan II	ND		15.7	20.7	F1	ug/Kg		132	40 - 120	13	30
alpha-BHC	ND		15.7	17.6		ug/Kg		112	40 - 120	4	20
beta-BHC	ND	F1	15.7	19.7	F1	ug/Kg		125	40 - 120	4	20
gamma-BHC (Lindane)	ND		15.7	18.4		ug/Kg		117	58 - 120	3	20
delta-BHC	ND		15.7	16.0		ug/Kg		102	40 - 120	5	20
Endosulfan sulfate	ND		15.7	19.0	F1	ug/Kg		121	40 - 120	5	20
Methoxychlor	ND	F1	15.7	22.0	F1	ug/Kg		140	40 - 120	10	20
alpha-Chlordane	11	p	15.7	40.3	F1	ug/Kg		185	40 - 120	7	20
gamma-Chlordane	10	F2 F1	15.7	39.1	F1	ug/Kg		184	40 - 120	4	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*105*		*57 - 122*
DCB Decachlorobiphenyl	*111*		*21 - 136*

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 720-206935/1-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206935

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		08/01/16 16:40	08/03/16 21:48	1

Lab Sample ID: LCS 720-206935/2-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	53.4		mg/Kg		107	80 - 120

Lab Sample ID: LCSSRM 720-206935/3-A
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	294		mg/Kg		97	62 - 113

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: 720-73638-A-15-A MS
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	230		39.1	258	4	mg/Kg		73	75 - 125

Lab Sample ID: 720-73638-A-15-B MSD
Matrix: Solid
Analysis Batch: 207122

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 206935

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	230		40.0	237	4	mg/Kg		20	75 - 125	8	20

Lab Sample ID: MB 720-206942/1-A
Matrix: Solid
Analysis Batch: 207133

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 206942

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.50		mg/Kg		08/01/16 17:49	08/03/16 23:51	1

Lab Sample ID: LCS 720-206942/2-A
Matrix: Solid
Analysis Batch: 207133

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206942

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	50.0	47.1		mg/Kg		94	80 - 120

Lab Sample ID: LCSSRM 720-206942/3-A
Matrix: Solid
Analysis Batch: 207133

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 206942

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	302	262		mg/Kg		87	62 - 113

Lab Sample ID: 720-73653-13 MS
Matrix: Solid
Analysis Batch: 207133

Client Sample ID: SB-5A(2-2 1/2)
Prep Type: Total/NA
Prep Batch: 206942

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Lead	13		44.6	55.8		mg/Kg		97	75 - 125

Lab Sample ID: 720-73653-13 MSD
Matrix: Solid
Analysis Batch: 207133

Client Sample ID: SB-5A(2-2 1/2)
Prep Type: Total/NA
Prep Batch: 206942

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Lead	13		47.2	55.6		mg/Kg		91	75 - 125	0	20

GC Semi VOA

Prep Batch: 206976

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-12	SB-5A(1-1 1/2)	Total/NA	Solid	3546	
720-73653-13	SB-5A(2-2 1/2)	Total/NA	Solid	3546	
MB 720-206976/1-A	Method Blank	Total/NA	Solid	3546	
LCS 720-206976/2-A	Lab Control Sample	Total/NA	Solid	3546	
720-73657-A-1-A MS	Matrix Spike	Total/NA	Solid	3546	
720-73657-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	3546	

Analysis Batch: 207017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-12	SB-5A(1-1 1/2)	Total/NA	Solid	8081A	206976
MB 720-206976/1-A	Method Blank	Total/NA	Solid	8081A	206976
LCS 720-206976/2-A	Lab Control Sample	Total/NA	Solid	8081A	206976

Analysis Batch: 207106

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-13	SB-5A(2-2 1/2)	Total/NA	Solid	8081A	206976
720-73657-A-1-A MS	Matrix Spike	Total/NA	Solid	8081A	206976
720-73657-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	8081A	206976

Metals

Prep Batch: 206935

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-1	SB-12A(1-1 1/2)	Total/NA	Solid	3050B	
720-73653-2	SB-16A(1-1 1/2)	Total/NA	Solid	3050B	
720-73653-3	SB-18A(1-1 1/2)	Total/NA	Solid	3050B	
720-73653-4	SB-61(0-1/2)	Total/NA	Solid	3050B	
720-73653-5	SB-62(0-1/2)	Total/NA	Solid	3050B	
720-73653-6	SB-63(0-1/2)	Total/NA	Solid	3050B	
720-73653-7	SB-64(0-1/2)	Total/NA	Solid	3050B	
720-73653-8	SB-65(0-1/2)	Total/NA	Solid	3050B	
720-73653-9	SB-69(0-1/2)	Total/NA	Solid	3050B	
720-73653-10	SB-37A(2-2 1/2)	Total/NA	Solid	3050B	
720-73653-11	SB-40A(1-1/2)	Total/NA	Solid	3050B	
720-73653-12	SB-5A(1-1 1/2)	Total/NA	Solid	3050B	
MB 720-206935/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 720-206935/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSSRM 720-206935/3-A	Lab Control Sample	Total/NA	Solid	3050B	
720-73638-A-15-A MS	Matrix Spike	Total/NA	Solid	3050B	
720-73638-A-15-B MSD	Matrix Spike Duplicate	Total/NA	Solid	3050B	

Prep Batch: 206942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-13	SB-5A(2-2 1/2)	Total/NA	Solid	3050B	
720-73653-14	SB-60(0-1/2)	Total/NA	Solid	3050B	
720-73653-15	SB-68(0-1/2)	Total/NA	Solid	3050B	
MB 720-206942/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 720-206942/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCSSRM 720-206942/3-A	Lab Control Sample	Total/NA	Solid	3050B	
720-73653-13 MS	SB-5A(2-2 1/2)	Total/NA	Solid	3050B	

Metals (Continued)

Prep Batch: 206942 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-13 MSD	SB-5A(2-2 1/2)	Total/NA	Solid	3050B	

Analysis Batch: 207122

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-1	SB-12A(1-1 1/2)	Total/NA	Solid	6010B	206935
720-73653-2	SB-16A(1-1 1/2)	Total/NA	Solid	6010B	206935
720-73653-3	SB-18A(1-1 1/2)	Total/NA	Solid	6010B	206935
720-73653-4	SB-61(0-1/2)	Total/NA	Solid	6010B	206935
720-73653-5	SB-62(0-1/2)	Total/NA	Solid	6010B	206935
720-73653-6	SB-63(0-1/2)	Total/NA	Solid	6010B	206935
MB 720-206935/1-A	Method Blank	Total/NA	Solid	6010B	206935
LCS 720-206935/2-A	Lab Control Sample	Total/NA	Solid	6010B	206935
LCSSRM 720-206935/3-A	Lab Control Sample	Total/NA	Solid	6010B	206935
720-73638-A-15-A MS	Matrix Spike	Total/NA	Solid	6010B	206935
720-73638-A-15-B MSD	Matrix Spike Duplicate	Total/NA	Solid	6010B	206935

Analysis Batch: 207133

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-13	SB-5A(2-2 1/2)	Total/NA	Solid	6010B	206942
720-73653-14	SB-60(0-1/2)	Total/NA	Solid	6010B	206942
720-73653-15	SB-68(0-1/2)	Total/NA	Solid	6010B	206942
MB 720-206942/1-A	Method Blank	Total/NA	Solid	6010B	206942
LCS 720-206942/2-A	Lab Control Sample	Total/NA	Solid	6010B	206942
LCSSRM 720-206942/3-A	Lab Control Sample	Total/NA	Solid	6010B	206942
720-73653-13 MS	SB-5A(2-2 1/2)	Total/NA	Solid	6010B	206942
720-73653-13 MSD	SB-5A(2-2 1/2)	Total/NA	Solid	6010B	206942

Analysis Batch: 207155

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
720-73653-7	SB-64(0-1/2)	Total/NA	Solid	6010B	206935
720-73653-8	SB-65(0-1/2)	Total/NA	Solid	6010B	206935
720-73653-9	SB-69(0-1/2)	Total/NA	Solid	6010B	206935
720-73653-10	SB-37A(2-2 1/2)	Total/NA	Solid	6010B	206935
720-73653-11	SB-40A(1-1/2)	Total/NA	Solid	6010B	206935
720-73653-12	SB-5A(1-1 1/2)	Total/NA	Solid	6010B	206935

Client Sample ID: SB-12A(1-1 1/2)

Date Collected: 07/28/16 09:38
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:30	ASB	TAL PLS

Client Sample ID: SB-16A(1-1 1/2)

Date Collected: 07/28/16 09:04
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:36	ASB	TAL PLS

Client Sample ID: SB-18A(1-1 1/2)

Date Collected: 07/28/16 09:17
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-3
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:41	ASB	TAL PLS

Client Sample ID: SB-61(0-1/2)

Date Collected: 07/28/16 09:29
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-4
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:47	ASB	TAL PLS

Client Sample ID: SB-62(0-1/2)

Date Collected: 07/28/16 10:00
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:52	ASB	TAL PLS

Client Sample ID: SB-63(0-1/2)

Date Collected: 07/28/16 10:02
Date Received: 07/28/16 17:00

Lab Sample ID: 720-73653-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207122	08/03/16 23:58	ASB	TAL PLS

Client Sample ID: SB-64(0-1/2) — **Lab Sample ID: 720-73653-7**
Date Collected: 07/28/16 08:56 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207155	08/04/16 13:17	SLK	TAL PLS

Client Sample ID: SB-65(0-1/2) — **Lab Sample ID: 720-73653-8**
Date Collected: 07/28/16 09:09 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207155	08/04/16 13:23	SLK	TAL PLS

Client Sample ID: SB-69(0-1/2) — **Lab Sample ID: 720-73653-9**
Date Collected: 07/28/16 08:42 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207155	08/04/16 13:28	SLK	TAL PLS

Client Sample ID: SB-37A(2-2 1/2) — **Lab Sample ID: 720-73653-10**
Date Collected: 07/28/16 08:27 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207155	08/04/16 13:34	SLK	TAL PLS

Client Sample ID: SB-40A(1-1/2) — **Lab Sample ID: 720-73653-11**
Date Collected: 07/28/16 10:17 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207155	08/04/16 13:39	SLK	TAL PLS

Client Sample ID: SB-5A(1-1 1/2) — **Lab Sample ID: 720-73653-12**
Date Collected: 07/28/16 08:52 — **Matrix: Solid**
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		1	207017	08/03/16 05:43	MQL	TAL PLS
Total/NA	Prep	3050B			206935	08/01/16 16:40	MJD	TAL PLS

Lab Chronicle

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Client Sample ID: SB-5A(1-1 1/2)

Lab Sample ID: 720-73653-12
Matrix: Solid
Date Collected: 07/28/16 08:52
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	6010B		4	207155	08/04/16 13:44	SLK	TAL PLS

Client Sample ID: SB-5A(2-2 1/2)

Lab Sample ID: 720-73653-13
Matrix: Solid
Date Collected: 07/28/16 08:57
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3546			206976	08/02/16 09:23	TTC	TAL PLS
Total/NA	Analysis	8081A		1	207106	08/04/16 06:50	JZT	TAL PLS
Total/NA	Prep	3050B			206942	08/01/16 17:49	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207133	08/04/16 00:35	ASB	TAL PLS

Client Sample ID: SB-60(0-1/2)

Lab Sample ID: 720-73653-14
Matrix: Solid
Date Collected: 07/28/16 09:43
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206942	08/01/16 17:49	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207133	08/04/16 00:40	ASB	TAL PLS

Client Sample ID: SB-68(0-1/2)

Lab Sample ID: 720-73653-15
Matrix: Solid
Date Collected: 07/28/16 08:52
Date Received: 07/28/16 17:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			206942	08/01/16 17:49	MJD	TAL PLS
Total/NA	Analysis	6010B		4	207133	08/04/16 00:45	ASB	TAL PLS

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Certification Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Laboratory: TestAmerica Pleasanton

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	State Program	9	2496	01-31-18

Analysis Method	Prep Method	Matrix	Analyte

Method Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Method	Method Description	Protocol	Laboratory
8081A	Organochlorine Pesticides (GC)	SW846	TAL PLS
6010B	Metals (ICP)	SW846	TAL PLS

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PLS = TestAmerica Pleasanton, 1220 Quarry Lane, Pleasanton, CA 94566, TEL (925)484-1919

Sample Summary

Client: Cornerstone Earth Group
Project/Site: ERES Academy SSI

TestAmerica Job ID: 720-73653-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
720-73653-1	SB-12A(1-1 1/2)	Solid	07/28/16 09:38	07/28/16 17:00
720-73653-2	SB-16A(1-1 1/2)	Solid	07/28/16 09:04	07/28/16 17:00
720-73653-3	SB-18A(1-1 1/2)	Solid	07/28/16 09:17	07/28/16 17:00
720-73653-4	SB-61(0-1/2)	Solid	07/28/16 09:29	07/28/16 17:00
720-73653-5	SB-62(0-1/2)	Solid	07/28/16 10:00	07/28/16 17:00
720-73653-6	SB-63(0-1/2)	Solid	07/28/16 10:02	07/28/16 17:00
720-73653-7	SB-64(0-1/2)	Solid	07/28/16 08:56	07/28/16 17:00
720-73653-8	SB-65(0-1/2)	Solid	07/28/16 09:09	07/28/16 17:00
720-73653-9	SB-69(0-1/2)	Solid	07/28/16 08:42	07/28/16 17:00
720-73653-10	SB-37A(2-2 1/2)	Solid	07/28/16 08:27	07/28/16 17:00
720-73653-11	SB-40A(1-1/2)	Solid	07/28/16 10:17	07/28/16 17:00
720-73653-12	SB-5A(1-1 1/2)	Solid	07/28/16 08:52	07/28/16 17:00
720-73653-13	SB-5A(2-2 1/2)	Solid	07/28/16 08:57	07/28/16 17:00
720-73653-14	SB-60(0-1/2)	Solid	07/28/16 09:43	07/28/16 17:00
720-73653-15	SB-68(0-1/2)	Solid	07/28/16 08:52	07/28/16 17:00

14

720-73653

Chain of Custody Record

ref# 170108

CORNERSTONE EARTH GROUP

	Project Manager: Kurt Soenen	Site Sampler: Randall Bleichner	Date:	COC No:
Cornerstone Earth Group, Inc.	Tel/Fax:	Lab Contact: Afsaneh Salimpour	Lab: Test America	____ of ____ COCs
1259 Oakmead Pkwy	Analysis Turnaround Time			Laboratory's Job No.
Sunnyvale, California 94085				
(408) 245-4600 Phone	TAT if different from Below ____			
(408) 245-4620 FAX	■ 1 week			
Project Name: ERES Academy SSI	☐ 3 days			
Site: Oakland	☐ 2 days			
Project Number: 729-4-5	☐ 1 day			

720-73653 Chain of Custody

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	OCPS (8081)	Lead (6010)	Laboratory's Sample Specific Notes:
SB-12A (1-1½)	7/28/16	938	LINER	SOIL	1		X	
SB-16A (1-1½)		904					X	
SB-18A (1-1½)		917					X	
SB-61 (0-½)		929					X	
SB-62 (0-½)		1000					X	
SB-63 (0-½)		1007					X	
SB-64 (0-½)		856					X	
SB-65 (0-½)		909					X	
SB-69 (0-½)		842					X	
SB-37A (2-2½)		827					X	
SB-40A (1-1½)		1017					X	
SB-5A (1-1½)	↓	852	↓	↓	↓	X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Special Instructions/QC Requirements & Comments:

	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Cornerstone Earth Group	7/28/16 1519		TA	7-28-16 1518
Relinquished by:	TA	7/28/16 1700		TA	7/28/16 1700
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

1.1 °C

8/4/2016

Page 35 of 37

CORNERSTONE EARTH GROUP

Chain of Custody Record

170108

	Project Manager: Kurt Soenen	Site Sampler: Randall Bleichner	Date:
Cornerstone Earth Group, Inc.	Tel/Fax:	Lab Contact: Afsaneh Salimpour	Lab: Test America
1259 Oakmead Pkwy	Analysis Turnaround Time		
Sunnyvale, California 94085			
(408) 245-4600 Phone	TAT if different from Below _____		
(408) 245-4620 FAX	■ 1 week		
Project Name: ERES Academy SSI	☐ 3 days		
Site: Oakland	☐ 2 days		
Project Number: 729-4-5	☐ 1 day		

COC No: _____ of _____ COCs

Laboratory's Job No.

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	OCPS (8081)	Lead (6010)	Laboratory's Sample Specific Notes:
SB-5A (2-2½)	7/28/16	857	LIVER	SOIL	1	X	X	
SB-60 (0-½)		943					X	
SB-68 0-½		852					X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Special Instructions/QC Requirements & Comments:

1.1°C

	Company:	Date/Time:		Company:	Date/Time:
Relinquished by:	Cornerstone Earth Group	7/28/16 1519	Received by:	TA	7-28-16 1518
Relinquished by:	TA	7-28-16 1700	Received by:	TA	7/28/16 1700
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

Login Sample Receipt Checklist

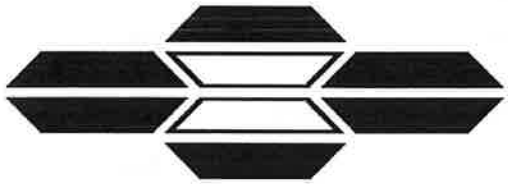
Client: Cornerstone Earth Group

Job Number: 720-73653-1

Login Number: 73653
List Number: 1
Creator: Arauz, Dennis

List Source: TestAmerica Pleasanton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ASBESTOS TEM LABORATORIES, INC.

EPA Quantitative Bulk Test Method
Transmission Electron Microscopy
Analytical Report

Laboratory Report # 342389

600 Bancroft Way, Ste. A
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429
www.asbestostemlabs.com

ASBESTOS TEM LABORATORIES, INC

Jul/18/2016

Ryan McKee
Cornerstone Earth Group, Inc.
1259 Oakmead Parkway
Sunnyvale, CA 94085

RE: LABORATORY REPORT #342389
Transmission electron microscopy analytical results for 3 bulk material sample(s).
Job Site: Aspire Schools
Job No.: 729-4-4

Please find below the results for the TEM analysis of one or more bulk material samples. The analytical procedures were performed according to the EPA Test Method For the Determination of Asbestos in Bulk Building Materials - TEM method (EPA 600/R-93/116) modified for quantitative bulk soil sample analysis. Prior to analysis, each sample was logged-in and all pertinent data was recorded. Each sample was checked for damage and disruption of any chain-of-custody seals. A unique laboratory number was assigned to each sample. A hard copy Log-In sheet was generated. This, and all other relevant paper work was kept with the sample throughout the analytical procedures to assure proper analysis.

Sample preparation followed a standard CARB 435 prep method. The entire sample was dried at 135-150 C and then crushed to ~3/8" gravel size. If the submitted sample was >1 pint, the sample was split using a 1/2" riffle splitter following ASTM Method C-702-98 to obtain a 1 pint aliquot. The entire 1 pint aliquot, or entire original sample, was then pulverized in a Bico Braun disc pulverizer calibrated to produce a nominal 200 mesh final product. A representative ~100 mg aliquot of material was weighed out, and then placed into solution in a 500 ml beaker filled with distilled water. A known volume of the liquid suspension was filtered onto a 0.2 micron pore size Millipore mixed cellulose ester filter. The filter was then dried in HEPA filtered, Class 100 air on a clean bench. The filter was placed onto a glass microscope slide, sectioned, and collapsed in acetone. The collapsed filter was plasma-etched to remove 10% of the filter surface and then carbon coated. The carbon coated filter was sectioned and the sections placed onto 200-mesh copper TEM sample grids in dimethyl sulfoxide and acetone wick washers. After sufficient time to dissolve the filter material, the TEM sample grids were removed from the baths and placed into labeled sample containers.

TEM analysis was performed on a Philips CM-12 or JEOL 1200 transmission electron microscope operating at 80 or 100 kV. The sample was placed into the microscope where it was first scanned at low magnification to confirm that the distribution of material was reasonably homogeneous. High magnification analysis was performed using a two tier approach: 1) A relatively large area of several TEM grid openings for large asbestos fibers or fiber bundles, and 2) a relatively small area of a number of fields of view for individual asbestos fibers (fibrous particles exhibiting an aspect ratio greater than or equal to 3 to 1, and a length greater than or equal to .5 um). Detected asbestiform structures were subjected to detailed morphological and/or selected area diffraction analysis. If necessary, energy dispersive X-ray analysis was also performed. The length and width of each asbestos fiber was measured. From this data, a total volume and mass of asbestos observed in the scanned area is calculated, and extrapolated to a total weight percent asbestos for each sample.

Sincerely Yours,

Laboratory Manager

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**342389**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Jul-18-16
		Date Received:	Jul-07-16
Job Site / No.	Aspire Schools 729-4-4	Total Samples Analyzed:	3

Client Sample # SB-45 (1.5-2)

Laboratory Sample # 1206-00101-001

SAMPLE DESCRIPTION

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	60.3	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
4	NSD	10	1

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.0011	0.069	0.070

COMMENTS

Chrysotile and Actinolite Asbestos Detected.
Non-Regulated Amphibole (2 Glaucophane, 4 Winchite) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.0094	Bundle Scan Area (sq.mm)	0.188
Grid Op. # Scanned For Small Fibers & Bundles	5	Grid Area (sq.mm)	0.0094	Fiber Scan Area (sq.mm)	0.047
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Hu Meisheng
Analyst Signature

Crystal Keplogle
Lab QC Reviewer Signature

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com

600 BANCROFT WAY, STE. A, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**342389**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Jul-18-16
		Date Received:	Jul-07-16
Job Site / No.	Aspire Schools 729-4-4	Total Samples Analyzed:	3

Client Sample # SB-50 (0-0.5)

Laboratory Sample # 1206-00101-002

SAMPLE DESCRIPTION

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	60.3	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
16	1	3	1

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.084	0.054	0.14

COMMENTS

Chrysotile Asbestos Detected.
Non-Regulated Amphibole (4 Glaucophane) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

# Scanned For Large Fibers & Bundles	20	Area (sq.mm)	0.0094	Bundle Scan Area (sq.mm)	0.188
# Scanned For Small Fibers & Bundles	5	Area (sq.mm)	0.0094	Fiber Scan Area (sq.mm)	0.047
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Analyst Signature

Lab QC Reviewer Signature

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com

600 BANCROFT WAY, STE. A, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**342389**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Jul-18-16
		Date Received:	Jul-07-16
Job Site / No.	Aspire Schools 729-4-4	Total Samples Analyzed:	3

Client Sample # SB-53 (2-2.5)

Laboratory Sample # 1206-00101-003

SAMPLE DESCRIPTION

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	61.5	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
5	2	6	NSD

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.013	0.070	0.083

COMMENTS

Chrysotile and Actinolite Asbestos Detected.
Non-Regulated Amphibole (4 Glaucophane, 1 Winchite) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.0094	Bundle Scan Area (sq.mm)	0.188
Grid Op. # Scanned For Small Fibers & Bundles	5	Grid Area (sq.mm)	0.0094	Fiber Scan Area (sq.mm)	0.047
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Analyst Signature

Crystal Keplogle

Lab QC Reviewer Signature

ASBESTOS TEM LABORATORIES, INC.
www.asbestostemlabs.com
600 BANCROFT WAY, STE. A, BERKELEY, CA 94710 (510) 704-8930
With Offices in Reno, NV (775) 359-3377

Job # 1206-00096

ASBESTOS TEM LABORATORIES CHAIN OF CUSTODY – www.asbestostemlabs.com

CALIFORNIA: 630 Bancroft Way, Berkeley, CA 94710 Phone (510) 704-8930 Fax (510) 704-8429
NEVADA: 1350 Freeport Blvd. #104, Sparks, NV 89431 Phone (775) 359-3577 Fax (775) 359-2798

Please print and send completed CoC with your samples. If you wish to email CoC, send the form as an attachment to Berkeley <coc@asbestostemlabs.com> or Reno <sehrlich@asbestostemlabs.com>.

Company: Cornerstone Earth Group	Contact: Ryan McKee	Phone/Fax: 408-956-0238	Email: rmckee@cornerstoneearth.com	
Address: 1259 Oakmead Parkway	City: Sunnyvale	State: CA Zip: 94085	Country: United States	
Job Site: Aspire Schools		Job No: 729-4-4	P.O. No:	

Reporting	☐ Fax	☐ Phone	■ Email	☐ Mail	☐ FTP	☐ EDD/State Form	☐ Verbal	☐ Pickup	Billing	☐ Fax	■ Email	☐ Mail	☐ Pre-Paid	☐ 3rd Party
Results Due*	☐ 2 hr	☐ 4 hr	☐ 6 hr	☐ 8 hr	☐ 24 hr	☐ 48 hr	☐ 3 day	☐ 4 day	☐ 5 day	■ 10 day	☐ Time due:		* Contact lab to confirm TAT	
Asbestos Air	☐ PCM (NIOSH 7400A	☐ TEM AHERA	☐ TEM CARB Mod. AHERA	☐ TEM EPA Yamate Level	☐ TEM NIOSH 7402, Issue 2	☐ ISO 10312	☐ ISO 13794							
Asbestos Bulk	☐ PLM Standard (EPA 600/R-93-1	☐ PLM 400 PC	☐ PLM 3000 PC	☐ PLM 400 PC Grav. Red.	☐ PLM 1000 PC Grav. Red.	☐ TEM EPA Qualitative	☐ TEM EPA Quantitative							
	☐ TEM Chatfield's (Semi Quant)	☐ PLM Vermiculite Attic Insulation	☐ Custom Analysis: Type:											
Asbestos Soils	☐ CARB 435 Prep Only	☐ CARB 435 PLM 400 PC	☐ CARB 435 PLM 1000 PC	☐ EPA Soil Screening Qualitative	■ TEM EPA/CARB Quantitative									
Asbestos Dust	☐ ASTM D-5755 Fiber Count	☐ ASTM D-5756 Wt. %	☐ ASTM D-5756 Mass	☐ ASTM D 6480-99 Dust Wipe	☐ Total Particulates (Grav.)									
Asbestos Water	☐ 100.2 Potable Drinking Water	☐ 100.1 Non Potable Water												
Lead	☐ Paint Chips	☐ Dust Wipe	☐ Air Cassette	☐ Soil	Lead Waste Characterization:	☐ TTLC	☐ STLC	☐ TCLP						
Sample Storage	*☐ No Test, Hold Sample Until: _____	*☐ Post Test, Hold Sample Until: _____												
Custom Order	☐ Reanalysis by: _____	☐ Sensitivity: _____	☐ Composite	☐ Other:										

Sample #	Sample Type	Date Collected	Time On	Time Off	Total Time (min)	Flow Rate (lpm) On	Flow Rate (lpm) Off	Flow Rate (lpm) Average	Volume or Area Sampled	8 Hour TWA Requested	Description
SB-45 (1.5-2)	Soil									☐	
SB-47 (2-2.5)	Soil									☐	
SB-50 (0-0.5)	Soil									☐	
SB-53 (2-2.5)	Soil									☐	
										☐	
										☐	
										☐	
										☐	
										☐	
										☐	
										☐	
										☐	
										☐	

Please analyze SB-45 (1.5-2), SB-50 (0-0.5), & SB-53 (2-2.5) by TEM. RAM 070716

Submitted By Ryan McKee	Ryan McKee	Received By	Adam (ATEM)
Date/Time Submitted	5/25/16 / 13:30	Date/Time Received	
Submitted By		Received By	Adam (ATEM)
Date/Time Submitted		Date/Time Received	7/2 9:00 AM Brandy S

*All samples will be held for 3 months from the date of receipt at ATEM. Additional sample storage time may be obtained through ATEM Customer Service



ASBESTOS TEM LABORATORIES, INC.

EPA Quantitative Bulk Test Method
Transmission Electron Microscopy
Analytical Report

Laboratory Report # 345758

600 Bancroft Way, Ste. A
Berkeley, CA 94710
(510) 704-8930
FAX (510) 704-8429
www.asbestostemlabs.com

ASBESTOS TEM LABORATORIES, INC

Dec/01/2016

Ryan McKee
Cornerstone Earth Group, Inc.
1259 Oakmead Parkway
Sunnyvale, CA 94085

RE: LABORATORY REPORT #345758
Transmission electron microscopy analytical results for 4 bulk material sample(s).
Job Site: Aspire
Job No.: 729-4-5

Please find below the results for the TEM analysis of one or more bulk material samples. The analytical procedures were performed according to the EPA Test Method For the Determination of Asbestos in Bulk Building Materials - TEM method (EPA 600/R-93/116) modified for quantitative bulk soil sample analysis. Prior to analysis, each sample was logged-in and all pertinent data was recorded. Each sample was checked for damage and disruption of any chain-of-custody seals. A unique laboratory number was assigned to each sample. A hard copy Log-In sheet was generated. This, and all other relevant paper work was kept with the sample throughout the analytical procedures to assure proper analysis.

Sample preparation followed a standard CARB 435 prep method. The entire sample was dried at 135-150 C and then crushed to ~3/8" gravel size. If the submitted sample was >1 pint, the sample was split using a 1/2" riffle splitter following ASTM Method C-702-98 to obtain a 1 pint aliquot. The entire 1 pint aliquot, or entire original sample, was then pulverized in a Bico Braun disc pulverizer calibrated to produce a nominal 200 mesh final product. A representative ~100 mg aliquot of material was weighed out, and then placed into solution in a 500 ml beaker filled with distilled water. A known volume of the liquid suspension was filtered onto a 0.2 micron pore size Millipore mixed cellulose ester filter. The filter was then dried in HEPA filtered, Class 100 air on a clean bench. The filter was placed onto a glass microscope slide, sectioned, and collapsed in acetone. The collapsed filter was plasma-etched to remove 10% of the filter surface and then carbon coated. The carbon coated filter was sectioned and the sections placed onto 200-mesh copper TEM sample grids in dimethyl sulfoxide and acetone wick washers. After sufficient time to dissolve the filter material, the TEM sample grids were removed from the baths and placed into labeled sample containers.

TEM analysis was performed on a Philips CM-12 or JEOL 1200 transmission electron microscope operating at 80 or 100 kV. The sample was placed into the microscope where it was first scanned at low magnification to confirm that the distribution of material was reasonably homogeneous. High magnification analysis was performed using a two tier approach: 1) A relatively large area of several TEM grid openings for large asbestos fibers or fiber bundles, and 2) a relatively small area of a number of fields of view for individual asbestos fibers (fibrous particles exhibiting an aspect ratio greater than or equal to 3 to 1, and a length greater than or equal to .5 um). Detected asbestiform structures were subjected to detailed morphological and/or selected area diffraction analysis. If necessary, energy dispersive X-ray analysis was also performed. The length and width of each asbestos fiber was measured. From this data, a total volume and mass of asbestos observed in the scanned area is calculated, and extrapolated to a total weight percent asbestos for each sample.

Sincerely Yours,

Laboratory Manager

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**345758**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Dec-01-16
		Date Received:	Nov-16-16
Job Site / No.	Aspire 729-4-5	Total Samples Analyzed:	4

Client Sample # EB-1

Laboratory Sample # 1206-00109-001

SAMPLE DESCRIPTION

1.5

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	60.8	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
25	1	5	5

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.033	0.10	0.13

COMMENTS

Chrysotile and Actinolite Asbestos Detected.
Non-Regulated Amphibole (Glaucophane) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.009	Bundle Scan Area (sq.mm)	0.18
Grid Op. # Scanned For Small Fibers & Bundles	10	Grid Area (sq.mm)	0.009	Fiber Scan Area (sq.mm)	0.09
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Analyst Signature

Lab QC Reviewer Signature

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With Offices in Reno, NV (775) 359-3377

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**345758**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Dec-01-16
		Date Received:	Nov-16-16
Job Site / No.	Aspire 729-4-5	Total Samples Analyzed:	4

Client Sample # EB-1

Laboratory Sample # 1206-00109-002

SAMPLE DESCRIPTION

4

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	60.64	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
2	NSD	1	NSD

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.0009	0.0048	0.0057

COMMENTS

Chrysotile Asbestos Detected.
Non-Regulated Amphibole (Glaucophane) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.009	Bundle Scan Area (sq.mm)	0.18
Grid Op. # Scanned For Small Fibers & Bundles	5	Grid Area (sq.mm)	0.009	Fiber Scan Area (sq.mm)	0.045
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Analyst Signature

Crystal Keplogle

Lab QC Reviewer Signature

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www.asbestostemlabs.com

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With Offices in Reno, NV (775) 359-3377

TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**345758**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Dec-01-16
		Date Received:	Nov-16-16
Job Site / No.	Aspire 729-4-5	Total Samples Analyzed:	4

Client Sample # EB-2

Laboratory Sample # 1206-00109-003

SAMPLE DESCRIPTION

2

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	62.5	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
3	NSD	3	NSD

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
0.0001	0.017	0.017

COMMENTS

Chrysotile Asbestos Detected.
Non-Regulated Amphibole (Glaucophane) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.009	Bundle Scan Area (sq.mm)	0.18
Grid Op. # Scanned For Small Fibers & Bundles	5	Grid Area (sq.mm)	0.009	Fiber Scan Area (sq.mm)	0.045
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

1 um = 1 micron = 0.001 mm
1 mm = 1 millimeter
1 sq.mm = 1 square millimeter
1 cc = 1 cubic centimeter

Crystal Keplogle
Analyst Signature

Crystal Keplogle
Lab QC Reviewer Signature

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TRANSMISSION ELECTRON MICROSCOPY
ANALYTICAL REPORT

Contact:	Ryan McKee	**REPORT NO.**	**345758**
Address:	Cornerstone Earth Group, Inc. 1259 Oakmead Parkway Sunnyvale, CA 94085	Date:	Dec-01-16
		Date Received:	Nov-16-16
Job Site / No.	Aspire 729-4-5	Total Samples Analyzed:	4

Client Sample # EB-2

Laboratory Sample # 1206-00109-004

SAMPLE DESCRIPTION

6

SAMPLE PREPARATION PARAMETERS

Weight of Material Suspended (mg):	62.5	Filter Type & Pore Size	MCE0.22um
Volume of Suspension Water (ml):	500	Effective Filter Area (sq.mm)	346
Volume of Suspension Filtered (ml):	0.5		

ASBESTOS DETECTED IN SCAN AREA

CHRYSOTILE		AMPHIBOLE	
< 5 µm	≥ 5 µm	< 5 µm	≥ 5 µm
NSD	NSD	1	1

CALCULATED ASBESTOS CONCENTRATION (WEIGHT %)

CHRYSOTILE	AMPHIBOLE	TOTAL
<0.0001	0.10	0.10

COMMENTS

Actinolite Asbestos Detected.
Non-Regulated Amphibole (Glaucophane) Observed.

Filter Loading: Moderate

SAED Photo ID Nos.

TEM / ANALYTICAL PARAMETERS

Grid Op. # Scanned For Large Fibers & Bundles	20	Grid Area (sq.mm)	0.009	Bundle Scan Area (sq.mm)	0.18
Grid Op. # Scanned For Small Fibers & Bundles	5	Grid Area (sq.mm)	0.009	Fiber Scan Area (sq.mm)	0.045
		Magnification:	15,000X		

NOTATION KEY

Chrys. - Chrysotile Asbestos
Amph. - Amphibole Asbestos
NSD - No Structures Detected
Non-Asb. - Non-Asbestos

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Analyst Signature

Crystal Keplogle

Lab QC Reviewer Signature

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#345758

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Please print and send completed CoC with your samples. If you wish to email CoC, send the form as an attachment to Berkeley <coc@asbestostemlabs.com > or Reno <sahrlich@asbestostemlabs.com>.

Company: Cornerstone Earth Group	*Contact:* Ryan McKee	*Phone/Fax:* 408-966-0238	*Email:* rmckee@cornerstoneearth.com
Address: 1259 Oakmead Parkway	*City:* Sunnyvale	*State:* CA *Zip:* 94085	*Country:* United States
Job Site: Aspire		*Job No:* 729-4[illegible]5	*P.O. No:*

Reporting	☐ Fax	☐ Phone	■ Email	☐ Mail	☐ FTP	☐ EDD/State Form	☐ Verbal	☐ Pickup	**Billing**	☐ Fax	■ Email	☐ Mail	☐ Pre-Paid	☐ 3rd Party

Results Due:*	☐ 2 hr ☐ 4 hr ☐ 6 hr ☐ 8 hr ☐ 24 hr ☐ 48 hr ☐ 3 day ☐ 4 day ☐ 5 day ■ 10 day ☐ Time due:____ * Contact lab to confirm TAT
Asbestos Air	☐ PCM (NIOSH 7400A ☐ TEM AHERA ☐ TEM CARB Mod. AHERA ☐ TEM EPA Yamate Level ☐ TEM NIOSH 7402, Issue 2 ☐ ISO 10312 ☐ ISO 13794
Asbestos Bulk	☐ PLM Standard (EPA 600/R-93-1 ☐ PLM 400 PC ☐ PLM 1000 PC ☐ PLM 400 PC Grav. Red. ☐ PLM 1000 PC Grav. Red. ☐ TEM EPA Qualitative ☐ TEM EPA Quantitative ☐ TEM Chatfield (Semi-Quant) ☐ PLM Vermiculite Attic Insulation ☐ Custom Analysis: Type:
Asbestos Soils	☐ CARB 435 Prep Only ☐ CARB 435 PLM 400 PC ☐ CARB 435 PLM 1000 PC ☐ EPA Soil Screening Qualitative ■ TEM EPA/CARB Quantitative
Asbestos Dust	☐ ASTM D-5755 Fiber Count ☐ ASTM D-5756 Wt. % ☐ ASTM D-5756 Mass ☐ ASTM D-6480-99 Dust Wipe ☐ Total Particulates (Grav.)
Asbestos Water	☐ 100.2 Potable Drinking Water ☐ 100.1 Non Potable Water
Lead	☐ Paint Chips ☐ Dust Wipe ☐ Air Cassette ☐ Soil **Lead Waste Characterization:** ☐ TTLC ☐ STLC ☐ TCLP
Sample Storage	*☐ No Test, Hold Sample Until: _____ *☐ Post Test, Hold Sample Until:_____
Custom Order	☐ Reanalysis by:_____ ☐ Sensitivity: _____ ☐ Composite ☐ Other:

Sample #	Sample Type	Date Collected	Time On	Time Off	Total Time (min)	Flow Rate (lpm) On	Flow Rate (lpm) Off	Flow Rate (lpm) Average	Volume or Area Sampled	8 Hour TWA Requested	Description
EB-1 (1.5)	Soil									☐	
EB-1 (4.0)	Soil									☐	
EB-2 (2.0)	Soil									☐	
EB-2 (6.0)	Soil									☐	
										☐	
										☐	
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Submitted By Ryan McKee	Ryan A. McKee	**Received By**	
Date/Time Submitted 11/15/2016	15:00	**Date/Time Received**	
Submitted By		**Received By**	
Date/Time Submitted		**Date/Time Received**	

*All samples will be held for 3 months from the date of receipt at ATEM. Additional sample storage time may be obtained through ATEM Customer Service

eurofins | Air Toxics

8/12/2016
Mr. Ryan McKee
Cornerstone Earth Group
1259 Oakmead Parkway

Sunnyvale CA 94085

Project Name: 2956 International Blvd Oakland
Project #: 729-4-5
Workorder #: 1608045A

Dear Mr. Ryan McKee

The following report includes the data for the above referenced project for sample(s) received on 8/1/2016 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott
Project Manager

eurofins | Air Toxics

WORK ORDER #: 1608045A

Work Order Summary

CLIENT:	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085	**BILL TO:**	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085
PHONE:	408-245-4600	**P.O. #**	
FAX:	408-245-4620	**PROJECT #**	729-4-5 2956 International Blvd Oakland
DATE RECEIVED:	08/01/2016	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/12/2016		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-2D14.5	TO-15	5.7 "Hg	14.9 psi
02A	SV-2D4.5	TO-15	6.1 "Hg	15.2 psi
03A	SV-6D14.6	TO-15	5.9 "Hg	14.8 psi
04A	SV-5D14.5	TO-15	5.5 "Hg	15 psi
05A	SV-5D5.0	TO-15	5.7 "Hg	15.2 psi
06A	SV-3D14.5	TO-15	6.1 "Hg	15.3 psi
07A	SV-3D5.0	TO-15	5.9 "Hg	15 psi
08A	SV-1D14.5	TO-15	6.1 "Hg	14.9 psi
09A	SV-1D5.0	TO-15	6.1 "Hg	15 psi
10A	SV-4D5.1	TO-15	3.9 "Hg	14.9 psi
11A	SV-4D14.0	TO-15	5.9 "Hg	14.9 psi
12A	Lab Blank	TO-15	NA	NA
13A	CCV	TO-15	NA	NA
14A	LCS	TO-15	NA	NA
14AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Rogers DATE: 08/12/16

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Cornerstone Earth Group
Workorder# 1608045A

Eleven 1 Liter Summa Canister samples were received on August 01, 2016. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples SV-2D14.5, SV-6D14.6, SV-5D14.5, SV-3D14.5, and SV-3D5.0 due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-2D14.5

Lab ID#: 1608045A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	9.8	24	48
Chloroform	5.0	9.7	24	47
Cyclohexane	5.0	8.1	17	28
Trichloroethene	5.0	6.1	27	33
Tetrachloroethene	5.0	1200	34	8100

Client Sample ID: SV-2D4.5

Lab ID#: 1608045A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.3	2.7	6.3	14
Acetone	13	23	30	54
Carbon Disulfide	5.1	35	16	110
Tetrahydrofuran	1.3	1.3	3.8	3.8
Chloroform	1.3	2.2	6.2	10
Cyclohexane	1.3	13	4.4	44
Benzene	1.3	9.0	4.1	29
Bromodichloromethane	1.3	1.7	8.5	11
Toluene	1.3	13	4.8	50
Tetrachloroethene	1.3	180	8.6	1200
Ethyl Benzene	1.3	3.9	5.5	17
m,p-Xylene	1.3	15	5.5	66
o-Xylene	1.3	6.7	5.5	29
4-Ethyltoluene	1.3	4.6	6.3	23
1,3,5-Trimethylbenzene	1.3	4.1	6.3	20
1,2,4-Trimethylbenzene	1.3	11	6.3	53

Client Sample ID: SV-6D14.6

Lab ID#: 1608045A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.1	20	15	99
Acetone	31	51	74	120

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-6D14.6

Lab ID#: 1608045A-03A

Cyclohexane	3.1	6.3	11	22
Tetrachloroethene	3.1	940	21	6400
m,p-Xylene	3.1	6.7	14	29

Client Sample ID: SV-5D14.5

Lab ID#: 1608045A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	6.6	24	33
Chloroform	5.0	6.1	24	30
Cyclohexane	5.0	5.8	17	20
Trichloroethene	5.0	9.8	27	52
Tetrachloroethene	5.0	1200	34	8400

Client Sample ID: SV-5D5.0

Lab ID#: 1608045A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	3.8	6.2	19
Ethanol	5.0	10	9.4	19
Acetone	12	45	30	110
Carbon Disulfide	5.0	25	16	78
Methyl tert-butyl ether	5.0	6.5	18	23
2-Butanone (Methyl Ethyl Ketone)	5.0	5.4	15	16
Cyclohexane	1.2	14	4.3	48
Benzene	1.2	7.7	4.0	25
4-Methyl-2-pentanone	1.2	1.5	5.1	6.0
Toluene	1.2	18	4.7	68
Tetrachloroethene	1.2	200	8.5	1300
Ethyl Benzene	1.2	2.0	5.4	8.5
m,p-Xylene	1.2	6.8	5.4	29
o-Xylene	1.2	4.9	5.4	21
Propylbenzene	1.2	1.3	6.2	6.3
4-Ethyltoluene	1.2	6.3	6.2	31

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-5D5.0

Lab ID#: 1608045A-05A

1,3,5-Trimethylbenzene	1.2	5.9	6.2	29
1,2,4-Trimethylbenzene	1.2	16	6.2	78

Client Sample ID: SV-3D14.5

Lab ID#: 1608045A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.1	8.1	25	40
Cyclohexane	5.1	18	18	61
Tetrachloroethene	5.1	1100	34	7700

Client Sample ID: SV-3D5.0

Lab ID#: 1608045A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.5	6.9	12	34
Acetone	25	53	60	130
2-Propanol	10	16	25	40
Carbon Disulfide	10	19	31	60
Cyclohexane	2.5	3.5	8.6	12
Benzene	2.5	3.9	8.0	12
Toluene	2.5	4.1	9.5	15
Tetrachloroethene	2.5	590	17	4000
m,p-Xylene	2.5	2.8	11	12
1,2,4-Trimethylbenzene	2.5	2.6	12	13

Client Sample ID: SV-1D14.5

Lab ID#: 1608045A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.3	1.7	6.2	8.5
2-Propanol	5.1	9.7	12	24
Benzene	1.3	2.2	4.0	7.0
Trichloroethene	1.3	5.1	6.8	27

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-1D14.5

Lab ID#: 1608045A-08A

Tetrachloroethene	1.3	140	8.6	950
m,p-Xylene	1.3	2.1	5.5	9.0

Client Sample ID: SV-1D5.0

Lab ID#: 1608045A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	13	82	30	200
Carbon Disulfide	5.1	8.5	16	26
2-Butanone (Methyl Ethyl Ketone)	5.1	9.3	15	27
Tetrahydrofuran	1.3	1.7	3.7	5.1
Benzene	1.3	3.1	4.0	10
Toluene	1.3	6.9	4.8	26
Tetrachloroethene	1.3	16	8.6	110
m,p-Xylene	1.3	3.5	5.5	15

Client Sample ID: SV-4D5.1

Lab ID#: 1608045A-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	12	22	27	52
2-Propanol	4.6	7.0	11	17
Carbon Disulfide	4.6	7.6	14	24
Tetrahydrofuran	1.2	1.8	3.4	5.4
Chloroform	1.2	2.2	5.6	11
Benzene	1.2	3.2	3.7	10
Toluene	1.2	9.6	4.4	36
Tetrachloroethene	1.2	18	7.8	120
Ethyl Benzene	1.2	1.3	5.0	5.5
m,p-Xylene	1.2	3.5	5.0	15
o-Xylene	1.2	1.2	5.0	5.1

Client Sample ID: SV-4D14.0

Lab ID#: 1608045A-11A

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-4D14.0

Lab ID#: 1608045A-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	12	18	30	43
2-Propanol	5.0	5.8	12	14
Carbon Disulfide	5.0	5.3	16	16
Benzene	1.2	2.6	4.0	8.4
Toluene	1.2	8.4	4.7	32
Tetrachloroethene	1.2	13	8.5	91
Ethyl Benzene	1.2	2.3	5.4	9.8
m,p-Xylene	1.2	6.2	5.4	27
o-Xylene	1.2	3.1	5.4	14
4-Ethyltoluene	1.2	2.9	6.2	14
1,3,5-Trimethylbenzene	1.2	1.4	6.2	6.9
1,2,4-Trimethylbenzene	1.2	4.0	6.2	20

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Client Sample ID: SV-2D14.5

Lab ID#: 1608045A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080914**	**Date of Collection:**	**7/29/16 10:59:00 AM**
Dil. Factor:	**9.94**	**Date of Analysis:**	**8/9/16 08:33 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	9.8	24	48
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	50	Not Detected	100	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	50	Not Detected	190	Not Detected
Chloroethane	20	Not Detected	52	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	37	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	50	Not Detected	120	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	62	Not Detected
Methylene Chloride	50	Not Detected	170	Not Detected
Methyl tert-butyl ether	20	Not Detected	72	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	9.7	24	47
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	8.1	17	28
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	6.1	27	33
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	33	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	22	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	22	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	1200	34	8100
2-Hexanone	20	Not Detected	81	Not Detected

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Client Sample ID: SV-2D14.5

Lab ID#: 1608045A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080914**	**Date of Collection:**	**7/29/16 10:59:00 AM**
Dil. Factor:	**9.94**	**Date of Analysis:**	**8/9/16 08:33 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	51	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: SV-2D4.5

Lab ID#: 1608045A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080911**	**Date of Collection:**	**7/29/16 11:31:00 AM**
Dil. Factor:	**2.55**	**Date of Analysis:**	**8/9/16 05:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.3	2.7	6.3	14
Freon 114	1.3	Not Detected	8.9	Not Detected
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
1,3-Butadiene	1.3	Not Detected	2.8	Not Detected
Bromomethane	13	Not Detected	50	Not Detected
Chloroethane	5.1	Not Detected	13	Not Detected
Freon 11	1.3	Not Detected	7.2	Not Detected
Ethanol	5.1	Not Detected	9.6	Not Detected
Freon 113	1.3	Not Detected	9.8	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Acetone	13	23	30	54
2-Propanol	5.1	Not Detected	12	Not Detected
Carbon Disulfide	5.1	35	16	110
3-Chloropropene	5.1	Not Detected	16	Not Detected
Methylene Chloride	13	Not Detected	44	Not Detected
Methyl tert-butyl ether	5.1	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Hexane	1.3	Not Detected	4.5	Not Detected
1,1-Dichloroethane	1.3	Not Detected	5.2	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.1	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.3	1.3	3.8	3.8
Chloroform	1.3	2.2	6.2	10
1,1,1-Trichloroethane	1.3	Not Detected	7.0	Not Detected
Cyclohexane	1.3	13	4.4	44
Carbon Tetrachloride	1.3	Not Detected	8.0	Not Detected
2,2,4-Trimethylpentane	1.3	Not Detected	6.0	Not Detected
Benzene	1.3	9.0	4.1	29
1,2-Dichloroethane	1.3	Not Detected	5.2	Not Detected
Heptane	1.3	Not Detected	5.2	Not Detected
Trichloroethene	1.3	Not Detected	6.8	Not Detected
1,2-Dichloropropane	1.3	Not Detected	5.9	Not Detected
1,4-Dioxane	5.1	Not Detected	18	Not Detected
Bromodichloromethane	1.3	1.7	8.5	11
cis-1,3-Dichloropropene	1.3	Not Detected	5.8	Not Detected
4-Methyl-2-pentanone	1.3	Not Detected	5.2	Not Detected
Toluene	1.3	13	4.8	50
trans-1,3-Dichloropropene	1.3	Not Detected	5.8	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	7.0	Not Detected
Tetrachloroethene	1.3	180	8.6	1200
2-Hexanone	5.1	Not Detected	21	Not Detected

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Client Sample ID: SV-2D4.5

Lab ID#: 1608045A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080911**	**Date of Collection:**	**7/29/16 11:31:00 AM**
Dil. Factor:	**2.55**	**Date of Analysis:**	**8/9/16 05:38 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.3	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.3	Not Detected	9.8	Not Detected
Chlorobenzene	1.3	Not Detected	5.9	Not Detected
Ethyl Benzene	1.3	3.9	5.5	17
m,p-Xylene	1.3	15	5.5	66
o-Xylene	1.3	6.7	5.5	29
Styrene	1.3	Not Detected	5.4	Not Detected
Bromoform	1.3	Not Detected	13	Not Detected
Cumene	1.3	Not Detected	6.3	Not Detected
1,1,2,2-Tetrachloroethane	1.3	Not Detected	8.8	Not Detected
Propylbenzene	1.3	Not Detected	6.3	Not Detected
4-Ethyltoluene	1.3	4.6	6.3	23
1,3,5-Trimethylbenzene	1.3	4.1	6.3	20
1,2,4-Trimethylbenzene	1.3	11	6.3	53
1,3-Dichlorobenzene	1.3	Not Detected	7.7	Not Detected
1,4-Dichlorobenzene	1.3	Not Detected	7.7	Not Detected
alpha-Chlorotoluene	1.3	Not Detected	6.6	Not Detected
1,2-Dichlorobenzene	1.3	Not Detected	7.7	Not Detected
1,2,4-Trichlorobenzene	5.1	Not Detected	38	Not Detected
Hexachlorobutadiene	5.1	Not Detected	54	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: SV-6D14.6

Lab ID#: 1608045A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080913**	**Date of Collection:**	**7/29/16 12:07:00 PM**
Dil. Factor:	**6.24**	**Date of Analysis:**	**8/9/16 06:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	3.1	20	15	99
Freon 114	3.1	Not Detected	22	Not Detected
Chloromethane	31	Not Detected	64	Not Detected
Vinyl Chloride	3.1	Not Detected	8.0	Not Detected
1,3-Butadiene	3.1	Not Detected	6.9	Not Detected
Bromomethane	31	Not Detected	120	Not Detected
Chloroethane	12	Not Detected	33	Not Detected
Freon 11	3.1	Not Detected	18	Not Detected
Ethanol	12	Not Detected	24	Not Detected
Freon 113	3.1	Not Detected	24	Not Detected
1,1-Dichloroethene	3.1	Not Detected	12	Not Detected
Acetone	31	51	74	120
2-Propanol	12	Not Detected	31	Not Detected
Carbon Disulfide	12	Not Detected	39	Not Detected
3-Chloropropene	12	Not Detected	39	Not Detected
Methylene Chloride	31	Not Detected	110	Not Detected
Methyl tert-butyl ether	12	Not Detected	45	Not Detected
trans-1,2-Dichloroethene	3.1	Not Detected	12	Not Detected
Hexane	3.1	Not Detected	11	Not Detected
1,1-Dichloroethane	3.1	Not Detected	13	Not Detected
2-Butanone (Methyl Ethyl Ketone)	12	Not Detected	37	Not Detected
cis-1,2-Dichloroethene	3.1	Not Detected	12	Not Detected
Tetrahydrofuran	3.1	Not Detected	9.2	Not Detected
Chloroform	3.1	Not Detected	15	Not Detected
1,1,1-Trichloroethane	3.1	Not Detected	17	Not Detected
Cyclohexane	3.1	6.3	11	22
Carbon Tetrachloride	3.1	Not Detected	20	Not Detected
2,2,4-Trimethylpentane	3.1	Not Detected	14	Not Detected
Benzene	3.1	Not Detected	10	Not Detected
1,2-Dichloroethane	3.1	Not Detected	13	Not Detected
Heptane	3.1	Not Detected	13	Not Detected
Trichloroethene	3.1	Not Detected	17	Not Detected
1,2-Dichloropropane	3.1	Not Detected	14	Not Detected
1,4-Dioxane	12	Not Detected	45	Not Detected
Bromodichloromethane	3.1	Not Detected	21	Not Detected
cis-1,3-Dichloropropene	3.1	Not Detected	14	Not Detected
4-Methyl-2-pentanone	3.1	Not Detected	13	Not Detected
Toluene	3.1	Not Detected	12	Not Detected
trans-1,3-Dichloropropene	3.1	Not Detected	14	Not Detected
1,1,2-Trichloroethane	3.1	Not Detected	17	Not Detected
Tetrachloroethene	3.1	940	21	6400
2-Hexanone	12	Not Detected	51	Not Detected

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Client Sample ID: SV-6D14.6

Lab ID#: 1608045A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080913**	**Date of Collection:**	**7/29/16 12:07:00 PM**
Dil. Factor:	**6.24**	**Date of Analysis:**	**8/9/16 06:30 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	3.1	Not Detected	26	Not Detected
1,2-Dibromoethane (EDB)	3.1	Not Detected	24	Not Detected
Chlorobenzene	3.1	Not Detected	14	Not Detected
Ethyl Benzene	3.1	Not Detected	14	Not Detected
m,p-Xylene	3.1	6.7	14	29
o-Xylene	3.1	Not Detected	14	Not Detected
Styrene	3.1	Not Detected	13	Not Detected
Bromoform	3.1	Not Detected	32	Not Detected
Cumene	3.1	Not Detected	15	Not Detected
1,1,2,2-Tetrachloroethane	3.1	Not Detected	21	Not Detected
Propylbenzene	3.1	Not Detected	15	Not Detected
4-Ethyltoluene	3.1	Not Detected	15	Not Detected
1,3,5-Trimethylbenzene	3.1	Not Detected	15	Not Detected
1,2,4-Trimethylbenzene	3.1	Not Detected	15	Not Detected
1,3-Dichlorobenzene	3.1	Not Detected	19	Not Detected
1,4-Dichlorobenzene	3.1	Not Detected	19	Not Detected
alpha-Chlorotoluene	3.1	Not Detected	16	Not Detected
1,2-Dichlorobenzene	3.1	Not Detected	19	Not Detected
1,2,4-Trichlorobenzene	12	Not Detected	93	Not Detected
Hexachlorobutadiene	12	Not Detected	130	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SV-5D14.5

Lab ID#: 1608045A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080915**	**Date of Collection:**	**7/29/16 1:40:00 PM**
Dil. Factor:	**9.90**	**Date of Analysis:**	**8/9/16 08:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	6.6	24	33
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	50	Not Detected	100	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	50	Not Detected	190	Not Detected
Chloroethane	20	Not Detected	52	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	37	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	50	Not Detected	120	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	62	Not Detected
Methylene Chloride	50	Not Detected	170	Not Detected
Methyl tert-butyl ether	20	Not Detected	71	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	17	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	58	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	14	Not Detected
Chloroform	5.0	6.1	24	30
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	5.8	17	20
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	9.8	27	52
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	71	Not Detected
Bromodichloromethane	5.0	Not Detected	33	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	22	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	22	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	1200	34	8400
2-Hexanone	20	Not Detected	81	Not Detected

eurofins | Air Toxics

Client Sample ID: SV-5D14.5

Lab ID#: 1608045A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080915**	**Date of Collection:**	**7/29/16 1:40:00 PM**
Dil. Factor:	**9.90**	**Date of Analysis:**	**8/9/16 08:58 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	21	Not Detected
m,p-Xylene	5.0	Not Detected	21	Not Detected
o-Xylene	5.0	Not Detected	21	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	51	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SV-5D5.0

Lab ID#: 1608045A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080910**	**Date of Collection:**	**7/29/16 2:10:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/9/16 05:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	3.8	6.2	19
Freon 114	1.2	Not Detected	8.8	Not Detected
Chloromethane	12	Not Detected	26	Not Detected
Vinyl Chloride	1.2	Not Detected	3.2	Not Detected
1,3-Butadiene	1.2	Not Detected	2.8	Not Detected
Bromomethane	12	Not Detected	49	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	7.0	Not Detected
Ethanol	5.0	10	9.4	19
Freon 113	1.2	Not Detected	9.6	Not Detected
1,1-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Acetone	12	45	30	110
2-Propanol	5.0	Not Detected	12	Not Detected
Carbon Disulfide	5.0	25	16	78
3-Chloropropene	5.0	Not Detected	16	Not Detected
Methylene Chloride	12	Not Detected	44	Not Detected
Methyl tert-butyl ether	5.0	6.5	18	23
trans-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Hexane	1.2	Not Detected	4.4	Not Detected
1,1-Dichloroethane	1.2	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	5.4	15	16
cis-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.7	Not Detected
Chloroform	1.2	Not Detected	6.1	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Cyclohexane	1.2	14	4.3	48
Carbon Tetrachloride	1.2	Not Detected	7.9	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.9	Not Detected
Benzene	1.2	7.7	4.0	25
1,2-Dichloroethane	1.2	Not Detected	5.1	Not Detected
Heptane	1.2	Not Detected	5.1	Not Detected
Trichloroethene	1.2	Not Detected	6.7	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.8	Not Detected
1,4-Dioxane	5.0	Not Detected	18	Not Detected
Bromodichloromethane	1.2	Not Detected	8.4	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
4-Methyl-2-pentanone	1.2	1.5	5.1	6.0
Toluene	1.2	18	4.7	68
trans-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Tetrachloroethene	1.2	200	8.5	1300
2-Hexanone	5.0	Not Detected	20	Not Detected

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Client Sample ID: SV-5D5.0

Lab ID#: 1608045A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080910**	**Date of Collection:**	**7/29/16 2:10:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/9/16 05:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.6	Not Detected
Chlorobenzene	1.2	Not Detected	5.8	Not Detected
Ethyl Benzene	1.2	2.0	5.4	8.5
m,p-Xylene	1.2	6.8	5.4	29
o-Xylene	1.2	4.9	5.4	21
Styrene	1.2	Not Detected	5.3	Not Detected
Bromoform	1.2	Not Detected	13	Not Detected
Cumene	1.2	Not Detected	6.2	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.6	Not Detected
Propylbenzene	1.2	1.3	6.2	6.3
4-Ethyltoluene	1.2	6.3	6.2	31
1,3,5-Trimethylbenzene	1.2	5.9	6.2	29
1,2,4-Trimethylbenzene	1.2	16	6.2	78
1,3-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.5	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,2,4-Trichlorobenzene	5.0	Not Detected	37	Not Detected
Hexachlorobutadiene	5.0	Not Detected	54	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: SV-3D14.5

Lab ID#: 1608045A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080916**	**Date of Collection:**	**7/29/16 3:17:00 PM**
Dil. Factor:	**10.2**	**Date of Analysis:**	**8/9/16 09:23 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.1	8.1	25	40
Freon 114	5.1	Not Detected	36	Not Detected
Chloromethane	51	Not Detected	100	Not Detected
Vinyl Chloride	5.1	Not Detected	13	Not Detected
1,3-Butadiene	5.1	Not Detected	11	Not Detected
Bromomethane	51	Not Detected	200	Not Detected
Chloroethane	20	Not Detected	54	Not Detected
Freon 11	5.1	Not Detected	29	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.1	Not Detected	39	Not Detected
1,1-Dichloroethene	5.1	Not Detected	20	Not Detected
Acetone	51	Not Detected	120	Not Detected
2-Propanol	20	Not Detected	50	Not Detected
Carbon Disulfide	20	Not Detected	64	Not Detected
3-Chloropropene	20	Not Detected	64	Not Detected
Methylene Chloride	51	Not Detected	180	Not Detected
Methyl tert-butyl ether	20	Not Detected	74	Not Detected
trans-1,2-Dichloroethene	5.1	Not Detected	20	Not Detected
Hexane	5.1	Not Detected	18	Not Detected
1,1-Dichloroethane	5.1	Not Detected	21	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	60	Not Detected
cis-1,2-Dichloroethene	5.1	Not Detected	20	Not Detected
Tetrahydrofuran	5.1	Not Detected	15	Not Detected
Chloroform	5.1	Not Detected	25	Not Detected
1,1,1-Trichloroethane	5.1	Not Detected	28	Not Detected
Cyclohexane	5.1	18	18	61
Carbon Tetrachloride	5.1	Not Detected	32	Not Detected
2,2,4-Trimethylpentane	5.1	Not Detected	24	Not Detected
Benzene	5.1	Not Detected	16	Not Detected
1,2-Dichloroethane	5.1	Not Detected	21	Not Detected
Heptane	5.1	Not Detected	21	Not Detected
Trichloroethene	5.1	Not Detected	27	Not Detected
1,2-Dichloropropane	5.1	Not Detected	24	Not Detected
1,4-Dioxane	20	Not Detected	74	Not Detected
Bromodichloromethane	5.1	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.1	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.1	Not Detected	21	Not Detected
Toluene	5.1	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.1	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.1	Not Detected	28	Not Detected
Tetrachloroethene	5.1	1100	34	7700
2-Hexanone	20	Not Detected	84	Not Detected

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Client Sample ID: SV-3D14.5

Lab ID#: 1608045A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080916**	**Date of Collection:**	**7/29/16 3:17:00 PM**
Dil. Factor:	**10.2**	**Date of Analysis:**	**8/9/16 09:23 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.1	Not Detected	43	Not Detected
1,2-Dibromoethane (EDB)	5.1	Not Detected	39	Not Detected
Chlorobenzene	5.1	Not Detected	23	Not Detected
Ethyl Benzene	5.1	Not Detected	22	Not Detected
m,p-Xylene	5.1	Not Detected	22	Not Detected
o-Xylene	5.1	Not Detected	22	Not Detected
Styrene	5.1	Not Detected	22	Not Detected
Bromoform	5.1	Not Detected	53	Not Detected
Cumene	5.1	Not Detected	25	Not Detected
1,1,2,2-Tetrachloroethane	5.1	Not Detected	35	Not Detected
Propylbenzene	5.1	Not Detected	25	Not Detected
4-Ethyltoluene	5.1	Not Detected	25	Not Detected
1,3,5-Trimethylbenzene	5.1	Not Detected	25	Not Detected
1,2,4-Trimethylbenzene	5.1	Not Detected	25	Not Detected
1,3-Dichlorobenzene	5.1	Not Detected	31	Not Detected
1,4-Dichlorobenzene	5.1	Not Detected	31	Not Detected
alpha-Chlorotoluene	5.1	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.1	Not Detected	31	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	220	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: SV-3D5.0

Lab ID#: 1608045A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080912**	**Date of Collection:**	**7/29/16 3:46:00 PM**
Dil. Factor:	**5.03**	**Date of Analysis:**	**8/9/16 06:04 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	2.5	6.9	12	34
Freon 114	2.5	Not Detected	18	Not Detected
Chloromethane	25	Not Detected	52	Not Detected
Vinyl Chloride	2.5	Not Detected	6.4	Not Detected
1,3-Butadiene	2.5	Not Detected	5.6	Not Detected
Bromomethane	25	Not Detected	98	Not Detected
Chloroethane	10	Not Detected	26	Not Detected
Freon 11	2.5	Not Detected	14	Not Detected
Ethanol	10	Not Detected	19	Not Detected
Freon 113	2.5	Not Detected	19	Not Detected
1,1-Dichloroethene	2.5	Not Detected	10	Not Detected
Acetone	25	53	60	130
2-Propanol	10	16	25	40
Carbon Disulfide	10	19	31	60
3-Chloropropene	10	Not Detected	31	Not Detected
Methylene Chloride	25	Not Detected	87	Not Detected
Methyl tert-butyl ether	10	Not Detected	36	Not Detected
trans-1,2-Dichloroethene	2.5	Not Detected	10	Not Detected
Hexane	2.5	Not Detected	8.9	Not Detected
1,1-Dichloroethane	2.5	Not Detected	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	10	Not Detected	30	Not Detected
cis-1,2-Dichloroethene	2.5	Not Detected	10	Not Detected
Tetrahydrofuran	2.5	Not Detected	7.4	Not Detected
Chloroform	2.5	Not Detected	12	Not Detected
1,1,1-Trichloroethane	2.5	Not Detected	14	Not Detected
Cyclohexane	2.5	3.5	8.6	12
Carbon Tetrachloride	2.5	Not Detected	16	Not Detected
2,2,4-Trimethylpentane	2.5	Not Detected	12	Not Detected
Benzene	2.5	3.9	8.0	12
1,2-Dichloroethane	2.5	Not Detected	10	Not Detected
Heptane	2.5	Not Detected	10	Not Detected
Trichloroethene	2.5	Not Detected	14	Not Detected
1,2-Dichloropropane	2.5	Not Detected	12	Not Detected
1,4-Dioxane	10	Not Detected	36	Not Detected
Bromodichloromethane	2.5	Not Detected	17	Not Detected
cis-1,3-Dichloropropene	2.5	Not Detected	11	Not Detected
4-Methyl-2-pentanone	2.5	Not Detected	10	Not Detected
Toluene	2.5	4.1	9.5	15
trans-1,3-Dichloropropene	2.5	Not Detected	11	Not Detected
1,1,2-Trichloroethane	2.5	Not Detected	14	Not Detected
Tetrachloroethene	2.5	590	17	4000
2-Hexanone	10	Not Detected	41	Not Detected

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Client Sample ID: SV-3D5.0

Lab ID#: 1608045A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080912**	**Date of Collection: 7/29/16 3:46:00 PM**	
Dil. Factor:	**5.03**	**Date of Analysis: 8/9/16 06:04 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	2.5	Not Detected	21	Not Detected
1,2-Dibromoethane (EDB)	2.5	Not Detected	19	Not Detected
Chlorobenzene	2.5	Not Detected	12	Not Detected
Ethyl Benzene	2.5	Not Detected	11	Not Detected
m,p-Xylene	2.5	2.8	11	12
o-Xylene	2.5	Not Detected	11	Not Detected
Styrene	2.5	Not Detected	11	Not Detected
Bromoform	2.5	Not Detected	26	Not Detected
Cumene	2.5	Not Detected	12	Not Detected
1,1,2,2-Tetrachloroethane	2.5	Not Detected	17	Not Detected
Propylbenzene	2.5	Not Detected	12	Not Detected
4-Ethyltoluene	2.5	Not Detected	12	Not Detected
1,3,5-Trimethylbenzene	2.5	Not Detected	12	Not Detected
1,2,4-Trimethylbenzene	2.5	2.6	12	13
1,3-Dichlorobenzene	2.5	Not Detected	15	Not Detected
1,4-Dichlorobenzene	2.5	Not Detected	15	Not Detected
alpha-Chlorotoluene	2.5	Not Detected	13	Not Detected
1,2-Dichlorobenzene	2.5	Not Detected	15	Not Detected
1,2,4-Trichlorobenzene	10	Not Detected	75	Not Detected
Hexachlorobutadiene	10	Not Detected	110	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: SV-1D14.5

Lab ID#: 1608045A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080909**	**Date of Collection:**	**7/29/16 4:30:00 PM**
Dil. Factor:	**2.53**	**Date of Analysis:**	**8/9/16 04:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.3	1.7	6.2	8.5
Freon 114	1.3	Not Detected	8.8	Not Detected
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
1,3-Butadiene	1.3	Not Detected	2.8	Not Detected
Bromomethane	13	Not Detected	49	Not Detected
Chloroethane	5.1	Not Detected	13	Not Detected
Freon 11	1.3	Not Detected	7.1	Not Detected
Ethanol	5.1	Not Detected	9.5	Not Detected
Freon 113	1.3	Not Detected	9.7	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Acetone	13	Not Detected	30	Not Detected
2-Propanol	5.1	9.7	12	24
Carbon Disulfide	5.1	Not Detected	16	Not Detected
3-Chloropropene	5.1	Not Detected	16	Not Detected
Methylene Chloride	13	Not Detected	44	Not Detected
Methyl tert-butyl ether	5.1	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Hexane	1.3	Not Detected	4.4	Not Detected
1,1-Dichloroethane	1.3	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.1	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.3	Not Detected	3.7	Not Detected
Chloroform	1.3	Not Detected	6.2	Not Detected
1,1,1-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Cyclohexane	1.3	Not Detected	4.4	Not Detected
Carbon Tetrachloride	1.3	Not Detected	8.0	Not Detected
2,2,4-Trimethylpentane	1.3	Not Detected	5.9	Not Detected
Benzene	1.3	2.2	4.0	7.0
1,2-Dichloroethane	1.3	Not Detected	5.1	Not Detected
Heptane	1.3	Not Detected	5.2	Not Detected
Trichloroethene	1.3	5.1	6.8	27
1,2-Dichloropropane	1.3	Not Detected	5.8	Not Detected
1,4-Dioxane	5.1	Not Detected	18	Not Detected
Bromodichloromethane	1.3	Not Detected	8.5	Not Detected
cis-1,3-Dichloropropene	1.3	Not Detected	5.7	Not Detected
4-Methyl-2-pentanone	1.3	Not Detected	5.2	Not Detected
Toluene	1.3	Not Detected	4.8	Not Detected
trans-1,3-Dichloropropene	1.3	Not Detected	5.7	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Tetrachloroethene	1.3	140	8.6	950
2-Hexanone	5.1	Not Detected	21	Not Detected

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Client Sample ID: SV-1D14.5

Lab ID#: 1608045A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080909**	**Date of Collection:**	**7/29/16 4:30:00 PM**
Dil. Factor:	**2.53**	**Date of Analysis:**	**8/9/16 04:45 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.3	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.3	Not Detected	9.7	Not Detected
Chlorobenzene	1.3	Not Detected	5.8	Not Detected
Ethyl Benzene	1.3	Not Detected	5.5	Not Detected
m,p-Xylene	1.3	2.1	5.5	9.0
o-Xylene	1.3	Not Detected	5.5	Not Detected
Styrene	1.3	Not Detected	5.4	Not Detected
Bromoform	1.3	Not Detected	13	Not Detected
Cumene	1.3	Not Detected	6.2	Not Detected
1,1,2,2-Tetrachloroethane	1.3	Not Detected	8.7	Not Detected
Propylbenzene	1.3	Not Detected	6.2	Not Detected
4-Ethyltoluene	1.3	Not Detected	6.2	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
1,3-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
1,4-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
alpha-Chlorotoluene	1.3	Not Detected	6.5	Not Detected
1,2-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
1,2,4-Trichlorobenzene	5.1	Not Detected	38	Not Detected
Hexachlorobutadiene	5.1	Not Detected	54	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: SV-1D5.0

Lab ID#: 1608045A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080908**	**Date of Collection:**	**7/29/16 4:58:00 PM**
Dil. Factor:	**2.54**	**Date of Analysis:**	**8/9/16 04:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.3	Not Detected	6.3	Not Detected
Freon 114	1.3	Not Detected	8.9	Not Detected
Chloromethane	13	Not Detected	26	Not Detected
Vinyl Chloride	1.3	Not Detected	3.2	Not Detected
1,3-Butadiene	1.3	Not Detected	2.8	Not Detected
Bromomethane	13	Not Detected	49	Not Detected
Chloroethane	5.1	Not Detected	13	Not Detected
Freon 11	1.3	Not Detected	7.1	Not Detected
Ethanol	5.1	Not Detected	9.6	Not Detected
Freon 113	1.3	Not Detected	9.7	Not Detected
1,1-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Acetone	13	82	30	200
2-Propanol	5.1	Not Detected	12	Not Detected
Carbon Disulfide	5.1	8.5	16	26
3-Chloropropene	5.1	Not Detected	16	Not Detected
Methylene Chloride	13	Not Detected	44	Not Detected
Methyl tert-butyl ether	5.1	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Hexane	1.3	Not Detected	4.5	Not Detected
1,1-Dichloroethane	1.3	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.1	9.3	15	27
cis-1,2-Dichloroethene	1.3	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.3	1.7	3.7	5.1
Chloroform	1.3	Not Detected	6.2	Not Detected
1,1,1-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Cyclohexane	1.3	Not Detected	4.4	Not Detected
Carbon Tetrachloride	1.3	Not Detected	8.0	Not Detected
2,2,4-Trimethylpentane	1.3	Not Detected	5.9	Not Detected
Benzene	1.3	3.1	4.0	10
1,2-Dichloroethane	1.3	Not Detected	5.1	Not Detected
Heptane	1.3	Not Detected	5.2	Not Detected
Trichloroethene	1.3	Not Detected	6.8	Not Detected
1,2-Dichloropropane	1.3	Not Detected	5.9	Not Detected
1,4-Dioxane	5.1	Not Detected	18	Not Detected
Bromodichloromethane	1.3	Not Detected	8.5	Not Detected
cis-1,3-Dichloropropene	1.3	Not Detected	5.8	Not Detected
4-Methyl-2-pentanone	1.3	Not Detected	5.2	Not Detected
Toluene	1.3	6.9	4.8	26
trans-1,3-Dichloropropene	1.3	Not Detected	5.8	Not Detected
1,1,2-Trichloroethane	1.3	Not Detected	6.9	Not Detected
Tetrachloroethene	1.3	16	8.6	110
2-Hexanone	5.1	Not Detected	21	Not Detected

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Client Sample ID: SV-1D5.0

Lab ID#: 1608045A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080908**	**Date of Collection:**	**7/29/16 4:58:00 PM**
Dil. Factor:	**2.54**	**Date of Analysis:**	**8/9/16 04:19 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.3	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.3	Not Detected	9.8	Not Detected
Chlorobenzene	1.3	Not Detected	5.8	Not Detected
Ethyl Benzene	1.3	Not Detected	5.5	Not Detected
m,p-Xylene	1.3	3.5	5.5	15
o-Xylene	1.3	Not Detected	5.5	Not Detected
Styrene	1.3	Not Detected	5.4	Not Detected
Bromoform	1.3	Not Detected	13	Not Detected
Cumene	1.3	Not Detected	6.2	Not Detected
1,1,2,2-Tetrachloroethane	1.3	Not Detected	8.7	Not Detected
Propylbenzene	1.3	Not Detected	6.2	Not Detected
4-Ethyltoluene	1.3	Not Detected	6.2	Not Detected
1,3,5-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
1,2,4-Trimethylbenzene	1.3	Not Detected	6.2	Not Detected
1,3-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
1,4-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
alpha-Chlorotoluene	1.3	Not Detected	6.6	Not Detected
1,2-Dichlorobenzene	1.3	Not Detected	7.6	Not Detected
1,2,4-Trichlorobenzene	5.1	Not Detected	38	Not Detected
Hexachlorobutadiene	5.1	Not Detected	54	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	96	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: SV-4D5.1

Lab ID#: 1608045A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080907**	**Date of Collection:**	**7/29/16 5:44:00 PM**
Dil. Factor:	**2.31**	**Date of Analysis:**	**8/9/16 03:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	5.7	Not Detected
Freon 114	1.2	Not Detected	8.1	Not Detected
Chloromethane	12	Not Detected	24	Not Detected
Vinyl Chloride	1.2	Not Detected	3.0	Not Detected
1,3-Butadiene	1.2	Not Detected	2.6	Not Detected
Bromomethane	12	Not Detected	45	Not Detected
Chloroethane	4.6	Not Detected	12	Not Detected
Freon 11	1.2	Not Detected	6.5	Not Detected
Ethanol	4.6	Not Detected	8.7	Not Detected
Freon 113	1.2	Not Detected	8.8	Not Detected
1,1-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Acetone	12	22	27	52
2-Propanol	4.6	7.0	11	17
Carbon Disulfide	4.6	7.6	14	24
3-Chloropropene	4.6	Not Detected	14	Not Detected
Methylene Chloride	12	Not Detected	40	Not Detected
Methyl tert-butyl ether	4.6	Not Detected	17	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Hexane	1.2	Not Detected	4.1	Not Detected
1,1-Dichloroethane	1.2	Not Detected	4.7	Not Detected
2-Butanone (Methyl Ethyl Ketone)	4.6	Not Detected	14	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	4.6	Not Detected
Tetrahydrofuran	1.2	1.8	3.4	5.4
Chloroform	1.2	2.2	5.6	11
1,1,1-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Cyclohexane	1.2	Not Detected	4.0	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.3	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.4	Not Detected
Benzene	1.2	3.2	3.7	10
1,2-Dichloroethane	1.2	Not Detected	4.7	Not Detected
Heptane	1.2	Not Detected	4.7	Not Detected
Trichloroethene	1.2	Not Detected	6.2	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.3	Not Detected
1,4-Dioxane	4.6	Not Detected	17	Not Detected
Bromodichloromethane	1.2	Not Detected	7.7	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	4.7	Not Detected
Toluene	1.2	9.6	4.4	36
trans-1,3-Dichloropropene	1.2	Not Detected	5.2	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.3	Not Detected
Tetrachloroethene	1.2	18	7.8	120
2-Hexanone	4.6	Not Detected	19	Not Detected

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Client Sample ID: SV-4D5.1

Lab ID#: 1608045A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080907**	**Date of Collection:**	**7/29/16 5:44:00 PM**
Dil. Factor:	**2.31**	**Date of Analysis:**	**8/9/16 03:52 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	9.8	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	8.9	Not Detected
Chlorobenzene	1.2	Not Detected	5.3	Not Detected
Ethyl Benzene	1.2	1.3	5.0	5.5
m,p-Xylene	1.2	3.5	5.0	15
o-Xylene	1.2	1.2	5.0	5.1
Styrene	1.2	Not Detected	4.9	Not Detected
Bromoform	1.2	Not Detected	12	Not Detected
Cumene	1.2	Not Detected	5.7	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	7.9	Not Detected
Propylbenzene	1.2	Not Detected	5.7	Not Detected
4-Ethyltoluene	1.2	Not Detected	5.7	Not Detected
1,3,5-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,2,4-Trimethylbenzene	1.2	Not Detected	5.7	Not Detected
1,3-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.0	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	6.9	Not Detected
1,2,4-Trichlorobenzene	4.6	Not Detected	34	Not Detected
Hexachlorobutadiene	4.6	Not Detected	49	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: SV-4D14.0

Lab ID#: 1608045A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080906**	**Date of Collection:**	**7/29/16 6:42:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/9/16 03:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	1.2	Not Detected	6.2	Not Detected
Freon 114	1.2	Not Detected	8.8	Not Detected
Chloromethane	12	Not Detected	26	Not Detected
Vinyl Chloride	1.2	Not Detected	3.2	Not Detected
1,3-Butadiene	1.2	Not Detected	2.8	Not Detected
Bromomethane	12	Not Detected	49	Not Detected
Chloroethane	5.0	Not Detected	13	Not Detected
Freon 11	1.2	Not Detected	7.0	Not Detected
Ethanol	5.0	Not Detected	9.4	Not Detected
Freon 113	1.2	Not Detected	9.6	Not Detected
1,1-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Acetone	12	18	30	43
2-Propanol	5.0	5.8	12	14
Carbon Disulfide	5.0	5.3	16	16
3-Chloropropene	5.0	Not Detected	16	Not Detected
Methylene Chloride	12	Not Detected	44	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Hexane	1.2	Not Detected	4.4	Not Detected
1,1-Dichloroethane	1.2	Not Detected	5.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	5.0	Not Detected	15	Not Detected
cis-1,2-Dichloroethene	1.2	Not Detected	5.0	Not Detected
Tetrahydrofuran	1.2	Not Detected	3.7	Not Detected
Chloroform	1.2	Not Detected	6.1	Not Detected
1,1,1-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Cyclohexane	1.2	Not Detected	4.3	Not Detected
Carbon Tetrachloride	1.2	Not Detected	7.9	Not Detected
2,2,4-Trimethylpentane	1.2	Not Detected	5.9	Not Detected
Benzene	1.2	2.6	4.0	8.4
1,2-Dichloroethane	1.2	Not Detected	5.1	Not Detected
Heptane	1.2	Not Detected	5.1	Not Detected
Trichloroethene	1.2	Not Detected	6.7	Not Detected
1,2-Dichloropropane	1.2	Not Detected	5.8	Not Detected
1,4-Dioxane	5.0	Not Detected	18	Not Detected
Bromodichloromethane	1.2	Not Detected	8.4	Not Detected
cis-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
4-Methyl-2-pentanone	1.2	Not Detected	5.1	Not Detected
Toluene	1.2	8.4	4.7	32
trans-1,3-Dichloropropene	1.2	Not Detected	5.7	Not Detected
1,1,2-Trichloroethane	1.2	Not Detected	6.8	Not Detected
Tetrachloroethene	1.2	13	8.5	91
2-Hexanone	5.0	Not Detected	20	Not Detected

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Client Sample ID: SV-4D14.0

Lab ID#: 1608045A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080906**	**Date of Collection:**	**7/29/16 6:42:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/9/16 03:26 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	1.2	Not Detected	11	Not Detected
1,2-Dibromoethane (EDB)	1.2	Not Detected	9.6	Not Detected
Chlorobenzene	1.2	Not Detected	5.8	Not Detected
Ethyl Benzene	1.2	2.3	5.4	9.8
m,p-Xylene	1.2	6.2	5.4	27
o-Xylene	1.2	3.1	5.4	14
Styrene	1.2	Not Detected	5.3	Not Detected
Bromoform	1.2	Not Detected	13	Not Detected
Cumene	1.2	Not Detected	6.2	Not Detected
1,1,2,2-Tetrachloroethane	1.2	Not Detected	8.6	Not Detected
Propylbenzene	1.2	Not Detected	6.2	Not Detected
4-Ethyltoluene	1.2	2.9	6.2	14
1,3,5-Trimethylbenzene	1.2	1.4	6.2	6.9
1,2,4-Trimethylbenzene	1.2	4.0	6.2	20
1,3-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,4-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
alpha-Chlorotoluene	1.2	Not Detected	6.5	Not Detected
1,2-Dichlorobenzene	1.2	Not Detected	7.5	Not Detected
1,2,4-Trichlorobenzene	5.0	Not Detected	37	Not Detected
Hexachlorobutadiene	5.0	Not Detected	54	Not Detected

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	99	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1608045A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 12:46 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1608045A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 12:46 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	97	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: CCV

Lab ID#: 1608045A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 10:44 AM**	

Compound	%Recovery
Freon 12	105
Freon 114	105
Chloromethane	110
Vinyl Chloride	98
1,3-Butadiene	92
Bromomethane	102
Chloroethane	94
Freon 11	102
Ethanol	93
Freon 113	99
1,1-Dichloroethene	98
Acetone	92
2-Propanol	95
Carbon Disulfide	95
3-Chloropropene	91
Methylene Chloride	96
Methyl tert-butyl ether	95
trans-1,2-Dichloroethene	99
Hexane	92
1,1-Dichloroethane	95
2-Butanone (Methyl Ethyl Ketone)	95
cis-1,2-Dichloroethene	99
Tetrahydrofuran	92
Chloroform	101
1,1,1-Trichloroethane	101
Cyclohexane	94
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	95
Benzene	97
1,2-Dichloroethane	105
Heptane	100
Trichloroethene	100
1,2-Dichloropropane	95
1,4-Dioxane	98
Bromodichloromethane	102
cis-1,3-Dichloropropene	98
4-Methyl-2-pentanone	95
Toluene	100
trans-1,3-Dichloropropene	102
1,1,2-Trichloroethane	106
Tetrachloroethene	106
2-Hexanone	100

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Client Sample ID: CCV

Lab ID#: 1608045A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 10:44 AM**	

Compound	%Recovery
Dibromochloromethane	111
1,2-Dibromoethane (EDB)	106
Chlorobenzene	103
Ethyl Benzene	105
m,p-Xylene	107
o-Xylene	107
Styrene	112
Bromoform	114
Cumene	105
1,1,2,2-Tetrachloroethane	102
Propylbenzene	102
4-Ethyltoluene	112
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	104
1,3-Dichlorobenzene	106
1,4-Dichlorobenzene	107
alpha-Chlorotoluene	106
1,2-Dichlorobenzene	106
1,2,4-Trichlorobenzene	84
Hexachlorobutadiene	90

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	102	70-130
1,2-Dichloroethane-d4	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1608045A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 11:24 AM**	

Compound	%Recovery	Method Limits
Freon 12	113	70-130
Freon 114	113	70-130
Chloromethane	107	70-130
Vinyl Chloride	104	70-130
1,3-Butadiene	95	70-130
Bromomethane	110	70-130
Chloroethane	101	70-130
Freon 11	109	70-130
Ethanol	103	70-130
Freon 113	102	70-130
1,1-Dichloroethene	101	70-130
Acetone	94	70-130
2-Propanol	105	70-130
Carbon Disulfide	86	70-130
3-Chloropropene	89	70-130
Methylene Chloride	98	70-130
Methyl tert-butyl ether	98	70-130
trans-1,2-Dichloroethene	104	70-130
Hexane	98	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	97	70-130
cis-1,2-Dichloroethene	100	70-130
Tetrahydrofuran	96	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	107	70-130
Cyclohexane	101	70-130
Carbon Tetrachloride	110	70-130
2,2,4-Trimethylpentane	101	70-130
Benzene	101	70-130
1,2-Dichloroethane	107	70-130
Heptane	106	70-130
Trichloroethene	104	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	107	70-130
cis-1,3-Dichloropropene	97	70-130
4-Methyl-2-pentanone	99	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	107	70-130
1,1,2-Trichloroethane	109	70-130
Tetrachloroethene	110	70-130
2-Hexanone	103	70-130

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Client Sample ID: LCS

Lab ID#: 1608045A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 11:24 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	114	70-130
1,2-Dibromoethane (EDB)	110	70-130
Chlorobenzene	105	70-130
Ethyl Benzene	111	70-130
m,p-Xylene	110	70-130
o-Xylene	116	70-130
Styrene	120	70-130
Bromoform	119	70-130
Cumene	112	70-130
1,1,2,2-Tetrachloroethane	107	70-130
Propylbenzene	111	70-130
4-Ethyltoluene	119	70-130
1,3,5-Trimethylbenzene	116	70-130
1,2,4-Trimethylbenzene	114	70-130
1,3-Dichlorobenzene	112	70-130
1,4-Dichlorobenzene	112	70-130
alpha-Chlorotoluene	115	70-130
1,2-Dichlorobenzene	112	70-130
1,2,4-Trichlorobenzene	103	70-130
Hexachlorobutadiene	109	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	101	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1608045A-14AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 11:48 AM**	

Compound	%Recovery	Method Limits
Freon 12	112	70-130
Freon 114	112	70-130
Chloromethane	110	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	96	70-130
Bromomethane	110	70-130
Chloroethane	101	70-130
Freon 11	108	70-130
Ethanol	105	70-130
Freon 113	103	70-130
1,1-Dichloroethene	100	70-130
Acetone	94	70-130
2-Propanol	106	70-130
Carbon Disulfide	87	70-130
3-Chloropropene	89	70-130
Methylene Chloride	98	70-130
Methyl tert-butyl ether	98	70-130
trans-1,2-Dichloroethene	104	70-130
Hexane	98	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	99	70-130
cis-1,2-Dichloroethene	100	70-130
Tetrahydrofuran	97	70-130
Chloroform	104	70-130
1,1,1-Trichloroethane	108	70-130
Cyclohexane	103	70-130
Carbon Tetrachloride	112	70-130
2,2,4-Trimethylpentane	102	70-130
Benzene	99	70-130
1,2-Dichloroethane	106	70-130
Heptane	106	70-130
Trichloroethene	102	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	108	70-130
cis-1,3-Dichloropropene	97	70-130
4-Methyl-2-pentanone	99	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	106	70-130
1,1,2-Trichloroethane	108	70-130
Tetrachloroethene	109	70-130
2-Hexanone	104	70-130

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Client Sample ID: LCSD

Lab ID#: 1608045A-14AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17080904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/9/16 11:48 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	114	70-130
1,2-Dibromoethane (EDB)	109	70-130
Chlorobenzene	104	70-130
Ethyl Benzene	110	70-130
m,p-Xylene	112	70-130
o-Xylene	116	70-130
Styrene	120	70-130
Bromoform	118	70-130
Cumene	111	70-130
1,1,2,2-Tetrachloroethane	107	70-130
Propylbenzene	111	70-130
4-Ethyltoluene	120	70-130
1,3,5-Trimethylbenzene	114	70-130
1,2,4-Trimethylbenzene	114	70-130
1,3-Dichlorobenzene	112	70-130
1,4-Dichlorobenzene	114	70-130
alpha-Chlorotoluene	114	70-130
1,2-Dichlorobenzene	113	70-130
1,2,4-Trichlorobenzene	109	70-130
Hexachlorobutadiene	115	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	103	70-130
4-Bromofluorobenzene	102	70-130

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8/13/2016
Mr. Ryan McKee
Cornerstone Earth Group
1259 Oakmead Parkway

Sunnyvale CA 94085

Project Name: 2956 International Blvd Oakland
Project #: 729-4-5
Workorder #: 1608045B

Dear Mr. Ryan McKee

The following report includes the data for the above referenced project for sample(s) received on 8/1/2016 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott
Project Manager

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WORK ORDER #: 1608045B

Work Order Summary

CLIENT:	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085	**BILL TO:**	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085
PHONE:	408-245-4600	**P.O. #**	
FAX:	408-245-4620	**PROJECT #**	729-4-5 2956 International Blvd Oakland
DATE RECEIVED:	08/01/2016	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/13/2016		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-2D14.5	Modified ASTM D-1946	5.7 "Hg	14.9 psi
02A	SV-2D4.5	Modified ASTM D-1946	6.1 "Hg	15.2 psi
03A	SV-6D14.6	Modified ASTM D-1946	5.9 "Hg	14.8 psi
04A	SV-5D14.5	Modified ASTM D-1946	5.5 "Hg	15 psi
05A	SV-5D5.0	Modified ASTM D-1946	5.7 "Hg	15.2 psi
06A	SV-3D14.5	Modified ASTM D-1946	6.1 "Hg	15.3 psi
07A	SV-3D5.0	Modified ASTM D-1946	5.9 "Hg	15 psi
08A	SV-1D14.5	Modified ASTM D-1946	6.1 "Hg	14.9 psi
09A	SV-1D5.0	Modified ASTM D-1946	6.1 "Hg	15 psi
10A	SV-4D5.1	Modified ASTM D-1946	3.9 "Hg	14.9 psi
11A	SV-4D14.0	Modified ASTM D-1946	5.9 "Hg	14.9 psi
12A	Lab Blank	Modified ASTM D-1946	NA	NA
13A	LCS	Modified ASTM D-1946	NA	NA
13AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Rayos DATE: 08/13/16

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Cornerstone Earth Group
Workorder# 1608045B

Eleven 1 Liter Summa Canister samples were received on August 01, 2016. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*ASTM D-1946*	*ATL Modifications*
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

Client Sample ID: SV-2D14.5

Lab ID#: 1608045B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	15
Carbon Dioxide	0.025	5.2

Client Sample ID: SV-2D4.5

Lab ID#: 1608045B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	18
Carbon Dioxide	0.026	2.8

Client Sample ID: SV-6D14.6

Lab ID#: 1608045B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	12
Carbon Dioxide	0.025	6.2

Client Sample ID: SV-5D14.5

Lab ID#: 1608045B-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Carbon Dioxide	0.025	7.4

Client Sample ID: SV-5D5.0

Lab ID#: 1608045B-05A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Carbon Dioxide	0.025	7.2

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Summary of Detected Compounds
MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

Client Sample ID: SV-3D14.5

Lab ID#: 1608045B-06A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	11
Carbon Dioxide	0.026	7.8

Client Sample ID: SV-3D5.0

Lab ID#: 1608045B-07A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Carbon Dioxide	0.025	6.5

Client Sample ID: SV-1D14.5

Lab ID#: 1608045B-08A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	3.9
Carbon Dioxide	0.025	18

Client Sample ID: SV-1D5.0

Lab ID#: 1608045B-09A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	8.9
Carbon Dioxide	0.025	14

Client Sample ID: SV-4D5.1

Lab ID#: 1608045B-10A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	17
Carbon Dioxide	0.023	4.2

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Summary of Detected Compounds
MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

Client Sample ID: SV-4D14.0

Lab ID#: 1608045B-11A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	9.7
Carbon Dioxide	0.025	11

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Client Sample ID: SV-2D14.5

Lab ID#: 1608045B-01A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081206**	**Date of Collection: 7/29/16 10:59:00 AM**	
Dil. Factor:	**2.49**	**Date of Analysis: 8/12/16 11:34 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	15
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	5.2

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-2D4.5

Lab ID#: 1608045B-02A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081207**	**Date of Collection:**	**7/29/16 11:31:00 AM**
Dil. Factor:	**2.56**	**Date of Analysis:**	**8/12/16 11:58 AM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	18
Methane	0.00026	Not Detected
Carbon Dioxide	0.026	2.8

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-6D14.6

Lab ID#: 1608045B-03A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081208**	**Date of Collection:**	**7/29/16 12:07:00 PM**
Dil. Factor:	**2.50**	**Date of Analysis:**	**8/12/16 12:29 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	12
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	6.2

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-5D14.5

Lab ID#: 1608045B-04A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081209**	**Date of Collection:**	**7/29/16 1:40:00 PM**
Dil. Factor:	**2.48**	**Date of Analysis:**	**8/12/16 12:53 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	7.4

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-5D5.0

Lab ID#: 1608045B-05A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081210**	**Date of Collection:**	**7/29/16 2:10:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/12/16 01:20 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	7.2

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-3D14.5

Lab ID#: 1608045B-06A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081211**	**Date of Collection:**	**7/29/16 3:17:00 PM**
Dil. Factor:	**2.56**	**Date of Analysis:**	**8/12/16 01:58 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.26	11
Methane	0.00026	Not Detected
Carbon Dioxide	0.026	7.8

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-3D5.0

Lab ID#: 1608045B-07A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081212**	**Date of Collection:**	**7/29/16 3:46:00 PM**
Dil. Factor:	**2.52**	**Date of Analysis:**	**8/12/16 02:31 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	14
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	6.5

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-1D14.5

Lab ID#: 1608045B-08A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081213**	**Date of Collection:**	**7/29/16 4:30:00 PM**
Dil. Factor:	**2.53**	**Date of Analysis:**	**8/12/16 02:54 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	3.9
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	18

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-1D5.0

Lab ID#: 1608045B-09A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081214**	**Date of Collection: 7/29/16 4:58:00 PM**	
Dil. Factor:	**2.54**	**Date of Analysis: 8/12/16 03:19 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	8.9
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	14

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-4D5.1

Lab ID#: 1608045B-10A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081215**	**Date of Collection:**	**7/29/16 5:44:00 PM**
Dil. Factor:	**2.31**	**Date of Analysis:**	**8/12/16 03:42 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	17
Methane	0.00023	Not Detected
Carbon Dioxide	0.023	4.2

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-4D14.0

Lab ID#: 1608045B-11A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081216**	**Date of Collection:**	**7/29/16 6:42:00 PM**
Dil. Factor:	**2.51**	**Date of Analysis:**	**8/12/16 04:04 PM**

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.25	9.7
Methane	0.00025	Not Detected
Carbon Dioxide	0.025	11

Container Type: 1 Liter Summa Canister

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1608045B-12A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/12/16 10:15 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1608045B-13A

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/12/16 09:00 AM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Methane	100	85-115
Carbon Dioxide	102	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1608045B-13AA

MODIFIED NATURAL GAS ANALYSIS BY ASTM D-1946

File Name:	**10081227**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/12/16 08:34 PM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Methane	102	85-115
Carbon Dioxide	101	85-115

Container Type: NA - Not Applicable

eurofins | Air Toxics

8/12/2016
Mr. Ryan McKee
Cornerstone Earth Group
1259 Oakmead Parkway

Sunnyvale CA 94085

Project Name: 2956 International Blvd Oakland
Project #: 729-4-5
Workorder #: 1608045C

Dear Mr. Ryan McKee

The following report includes the data for the above referenced project for sample(s) received on 8/1/2016 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 (5&20 ppbv) are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott
Project Manager

eurofins | Air Toxics

WORK ORDER #: 1608045C

Work Order Summary

CLIENT:	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085	**BILL TO:**	Mr. Ryan McKee Cornerstone Earth Group 1259 Oakmead Parkway Sunnyvale, CA 94085
PHONE:	408-245-4600	**P.O. #**	
FAX:	408-245-4620	**PROJECT #**	729-4-5 2956 International Blvd Oakland
DATE RECEIVED:	08/01/2016	**CONTACT:**	Ausha Scott
DATE COMPLETED:	08/12/2016		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
12A	SV-4D5.1 (IPA)	Modified TO-15 (5&20 ppbv)	4.0 "Hg	15 psi
13A	Lab Blank	Modified TO-15 (5&20 ppbv)	NA	NA
14A	CCV	Modified TO-15 (5&20 ppbv)	NA	NA
15A	LCS	Modified TO-15 (5&20 ppbv)	NA	NA
15AA	LCSD	Modified TO-15 (5&20 ppbv)	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 08/12/16

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15 Soil Gas
Cornerstone Earth Group
Workorder# 1608045C

One PAC250 Canister sample was received on August 01, 2016. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode. The method involves concentrating up to 50 mLs of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on sample SV-4D5.1 (IPA) due to the presence of high level target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: SV-4D5.1 (IPA)

Lab ID#: 1608045C-12A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4700	15000	11000	38000

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Client Sample ID: SV-4D5.1 (IPA)

Lab ID#: 1608045C-12A

EPA METHOD TO-15 GC/MS

File Name:	**14h00041**	**Date of Collection: 7/29/16 5:41:00 PM**	
Dil. Factor:	**233**	**Date of Analysis: 8/5/16 12:39 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4700	15000	11000	38000

Container Type: PAC250 Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1608045C-13A

EPA METHOD TO-15 GC/MS

File Name:	**14h00037d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/5/16 11:03 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	20	Not Detected	49	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1608045C-14A

EPA METHOD TO-15 GC/MS

File Name:	**14h00034d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/5/16 09:41 AM**	

Compound	**%Recovery**
2-Propanol	98

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1608045C-15A

EPA METHOD TO-15 GC/MS

File Name:	**14h00035d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/5/16 10:08 AM**	

Compound	%Recovery	Method Limits
2-Propanol	103	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1608045C-15AA

EPA METHOD TO-15 GC/MS

File Name:	**14h00036d**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/5/16 10:36 AM**	

Compound	%Recovery	Method Limits
2-Propanol	105	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

CORNERSTONE EARTH GROUP

APPENDIX B – OPINION OF ESTIMATED REMEDIAL COSTS

Alternative 2: OCP/Lead Impaced Soil Capping and Vapor Mitigation System

Area of Consolidation Cell	1600	square feet
Depth of Cell	5	feet
Volume of Cell	296	cubic yards
Volume of Impacted Soil	294	cubic yards

Task	Unit Cost	Unit	Quantity	Total
Excavate Consildation Cell and Stockpile	$ 5	per cubic yard	296	$ 1,481
Excavate and Place Impacted Soil	$ 5	per cubic yard	296	$ 1,481
Excavate and Place "Clean" Soil	$ 5	per cubic yard	296	$ 1,481
				$ 4,444
			with 20 percent contingency	$ 5,333

Other Costs	
Professional Services such as Observation, Sampling, Monitoring, and Reporting	$ 75,000
Installation of Passive Vapor Mitigation System	$ 180,000
Geotextile Fabric	$ 10,000
DTSC Oversight (30 year timeframe)	$ 105,000
O/M, 5-year review, 30 year timeframe	$ 75,000
Deed Restriction	$ 10,000
Sub-Total	$ 460,333

TOTAL ESTIMATE $ 465,667

Alternative 3: Soil Off-Haul and Vapor Mitigation System

	Area			Depth			In-place Volume	
	5,060	square feet	x	1.0	feet	=	5,060	cubic feet
	811	square feet	x	1.5	feet	=	1,216	cubic feet
	309	square feet	x	3.0	feet	=	926	
	184	square feet	x	4.0	feet	=	734	
							7,935	cubic feet
							294	cubic yards

In-Place Volume of Impacted Soil	294	cubic yards
Soil bulk density	1.8	tons per cubic yard
Total Tonnage	529	tons
Percent Class I	0.20	---
Percent Class II	0.80	---
Class I tonnage	106	tons
Class II tonnage	423	tons

Task	Unit Cost	Unit	Quantity	Total	
Class I (excavate, haul, and dispose)	$ 150	per ton	106	$	15,871
Class II (excavate, haul, and dispose)	$ 65	per ton	423	$	27,509
Clean Fill (import, place, compact)	$ 15	per ton	529	$	7,935
				$	51,315
		with 20 percent Contingency		$	61,578

Other Costs		
Professional Services such as Observation, Sampling, Monitoring, and Reporting	$	75,000
BOE Class Disposal Tax		$4,395
Installation of Passive Vapor Mitigation System	$	180,000
DTSC Oversight (30 year timeframe)	$	105,000
O/M, 5-year review, 30 year timeframe	$	75,000
Sub-Total	$	439,395

TOTAL ESTIMATE $ 500,973

CORNERSTONE EARTH GROUP

APPENDIX C – HEALTH AND SAFETY PLAN

SITE SPECIFIC HEALTH AND SAFETY PLAN

Aspire ERES Academy

CORNERSTONE EARTH GROUP

Sampling and Earthwork in Impacted Soils
2956 International Boulevard
Oakland, California

***Plan Prepared For*:**

Cornerstone Earth Group
1259 Oakmead Parkway
Sunnyvale, CA 94085
(408) 245-4600

***Prepared By*:**
Earth Safety Dynamics
70 Rockrose Street
Livermore, CA 94551
(925) 455-6601

(Revision 3)

January 19th, 2016

Limitations

Services provided by Earth Safety Dynamics, Inc. and its subcontractors have been provided in accordance with generally accepted professional practices for the nature and conditions of similar work completed in the same or similar localities, at the time the work was performed. The scope of work for the project was conducted within the limitations prescribed by the client. This Health and Safety Plan reflects conditions as reported to Earth Safety Dynamics at the time of production, and is not meant to represent a legal opinion. This Plan is provided as a framework and may be adopted by tiered subcontractors, or they may develop their own equally protective Plan. No other warranty, expressed or implied, is made. This Plan was prepared for the sole use of Cornerstone Earth Group and their designees and may not be duplicated or used by any other party without the expressed consent of the client.



Kevin R. Braun, CIH
Certified Industrial Hygienist

ABIH Certification # 7029

January 19th, 2016

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Appendices

Appendix A - Changes to This Health and Safety Plan

Appendix B - Safety Inspection Reports

Appendix C - Employee Exposure Monitoring Records

Appendix D - OSHA Log 300 Summary

Appendix E - Employee Medical Surveillance Records

Appendix F - Employee Respirator Fit-Test Records

Appendix G - Employee Training Records

Appendix H - Safety Meeting Forms

Appendix I - Incident Reports

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List of Abbreviations and Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
AHERA	Asbestos Hazard Emergency Response Act
A.L.	Action Level
A.P.R.	Air Purifying Respirator
ATCM	Airborne Toxic Control Measure
C	Ceiling Limit (8 CCR 5155)
COPC	Contaminant Of Potential Concern
c.y.	Cubic Yard
bgs	Below Ground Surface
Cal/OSHA	California Department of Labor; Division of Occupational Safety and Health
CARB	California Air Resources Board
CHHSL	California Health Hazard Screening Level
C.I.H.	Certified Industrial Hygienist (American Board of Industrial Hygiene)
dBA	Decibels; A-Weighted Range
ESL	Environmental Screening Level
ESLI	End of Service Life Indicator
GFCI	Ground Fault Circuit Interrupter
IDLH	Immediately Dangerous to Life or Health
LEL	Lower Explosive Limit
MSHA	Mine Safety and Health Administration
M.U.C.	Maximum Use Concentration
NIOSH	National Institute for Occupational Safety and Health
NEA	Negative Exposure Assessment
NOA	Naturally Occurring Asbestos
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PEL	Permissible Exposure Limit (8 CCR 5155)
PID	Photoionization Detector
PNAs	Polynuclear (or Polycyclic) Aromatic Hydrocarbons
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation & Recovery Act
REL	Recommended Exposure Limit; NIOSH
SAR	Supplied Air Respirator
SSO	Site Safety Officer
STLC	Solubility Threshold Limit Concentration
TCLP	Toxicity Characteristic Leaching Procedure
TPH	Total Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentration
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WET	Waste Extraction Test

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SECTION 1
INTRODUCTION

Cornerstone Earth Group, Inc. (Cornerstone) has developed this site Health And Safety Plan (HASP) to inform personnel of potential hazards associated with soil sampling, demolition of existing structures and subsurface encumbrances (including existing utilities and potentially storage tanks), excavation, stockpile, and disposal of contaminated soils, trenching for utilities, and excavation and grading for foundation structures and a vapor mitigation system for construction of a school building at 2956 International Boulevard in Oakland, California. Individual contractors performing soil-intrusive activities will be required to prepare their own Plans that are equally or more protective than this HASP. Each contractor is responsible for designating a medical provider and own safety and emergency response personnel and is responsible for the health and safety of their own employees.

This work will involve disturbance of soils contaminated with inorganic lead, solvents (primarily PCE), organochlorine pesticides (primarily chlordane), and naturally occurring asbestos (NOA) over a span of approximately 8 months. Due to the presence of NOA in native and fill soil, the entire site will be treated as if contaminated with each COPC at the highest detected concentration. Soils contaminated with organochlorine pesticides and lead will be excavated, stockpiled, sampled, and manifested to disposal at a site or sites appropriate to each waste profile.

Client and contract EH&S personnel will be contacted by the contractor immediately before work in areas of identified contamination is performed, or if any indications of additional (unforeseen) contamination are encountered, including but not limited to:

- Stained or discolored soil
- Characteristic or unidentified odor
- Visible unidentified residues
- Underground Storage Tank(s)
- Drums or other unidentified containers

This HASP is intended to supplement Cornerstone's corporate safety policies and establishes the site-specific policies and procedures that protect workers and the public from potential hazards posed by work with these materials at this site. Cornerstone considers safety (both worker and environmental) its highest priority, especially during work at a site containing potentially hazardous materials, and has established a policy of maintaining all exposures as low as reasonably achievable, which is in force on all projects. All work performed by Cornerstone and the client's contractors will be executed in a manner that minimizes the probability of injury, accident, or incident.

This HASP is written and all site activities will be conducted in accordance with all applicable Federal OSHA and California Division of Occupational Safety and Health requirements contained respectively in 29 CFR 1910.120 and 1926, and California Title 8, § 1529, and 1500 – 1938, and 5192.

1) United States Department of Labor, OSHA Standards, specifically:

- Title 29 CFR Part 1910.120 - Hazardous Waste Site Operations and Emergency Response
- Title 29 CFR Part 1926 - Safety and Health Regulations for Construction

2) California Occupational Safety and Health Regulations, specifically:

- Title 8 CCR §1529 – Asbestos
- Title 8 CCR §1532.1 – Lead in Construction

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- Title 8 CCR §5192 - Hazardous Waste Operations and Emergency Response
- Title 8 CCR §5194 - Hazard Communication
- Title 8 CCR §5095-5100 - Hearing Conservation
- Title 8 CCR Chapter 4, Subchapter 4 - Construction Safety Orders
- Title 8 CCR §3203 and §1509 - Injury and Illness Prevention Programs

3) USEPA Standard Operating Safety Guides, July 1988.

4) NIOSH/OSHA/USCG/USEPA: *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, October 1985

SECTION 2
PROJECT DESCRIPTION

A new elementary school currently is planned for the site that will consist of 24 classrooms housing approximately 600 students. The planned building will be a three story steel-frame structure built at grade, with a footprint of approximately 17,950 square feet. Also included on the 0.8 acre site will be appurtenant parking, dropoff/pickup areas, a play area, and landscaping and other improvements necessary for site development. The maximum anticipated excavation (for planned subsurface utilities) is approximately 15 feet below ground surface (bgs).

The project site is located at 2956 International Boulevard in Oakland, California. It is comprised of three parcels currently occupied by a two-story apartment building, paved parking areas, and landscaping. Sausal Creek bisects the western portion of the site in a closed culvert. The site is bounded by 15th Street to the north, Derby Avenue to the east, mixed-use development to the west and beyond International Boulevard to the south.

Environmental Site Assessments (Cornerstone Earth Group; July 2016 and previous) indicate hazardous material residues in excess of residential (but not industrial) environmental screening levels and/or Site-specific cleanup goals exist in soils to be excavated, including lead, organochlorine pesticides (primarily chlordane™), PCE, and NOA. Some soils profiled *in situ* will be loaded directly to end dumps for disposal. Others will be segregated into stockpiles for sampling and manifested disposal appropriate to results.

The potential for direct contact with hazardous soils and exposure to particulate and particulate-bound contaminants and NOA exists during all demolition and disposal of existing pavement, structures, and subsurface encumbrances as well as all excavation and stockpile or placement of spoils. Normal dust control and decontamination and personal hygiene during site activities are expected to prevent exposure to these substances. Site personnel involved in operations covered by the Hazardous Waste Operations and Emergency Response standard (as defined in 29 CFR 1910.120 and 8 CCR 5192) are bound to satisfy all Cal-OSHA requirements for work in those areas, and they will be trained in accordance with that standard. All others working on site will be trained in accordance with the Asbestos, Lead in Construction, and Hazard Communication Standards (8 CCR 1529, 1532.1, and 5144). Dust control and other engineering control measures will be strictly enforced to maintain exposures as low as reasonably achievable on site and at neighboring properties.

Contractor tasks affected by this HASP may include exploratory excavation, demolition and disposal of buildings, pavement and various subsurface obstruction (tanks abandoned in place, utilities, foundations, etc.), foundation excavation, trenching, grading, and placement and compaction of soils.

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SECTION 3
ORGANIZATION AND RESPONSIBILITIES

Cornerstone maintains a policy of providing its employees, with information and procedures in accordance with the requirements of the California OSHA Hazard Communication Standard in order to protect them and the adjacent community from any adverse effects that might result from work at a job site involving potentially hazardous substances. All personnel working on this project will follow the health and safety procedures set forth in their HASP. Visitors will not be allowed entry unless they have read and agreed to comply with this plan. The HASP acknowledgment will be signed by all Cornerstone employees who actively participate at this project.

The Cornerstone Earth Group, Inc. Staff Organizational Chart is presented in Figure 1. The responsibilities and authorities for key personnel are discussed below.

3.1 INDUSTRIAL HYGIENIST

Cornerstone Earth Group, Inc. (Cornerstone) has designated Earth Safety Dynamics to provide industrial hygiene support.

Kevin Braun of Earth Safety Dynamics has been designated as the Project Certified Industrial Hygienist (CIH) and shall have the following responsibilities:

- Health surveillance of all Cornerstone's site employees
- Assuring that safety procedures in effect for Cornerstone's activities are in compliance with all appropriate federal, state, and local regulations
- Maintaining personnel exposure air monitoring records (if performed) for Cornerstone's site employees
- Ensuring that appropriate personal protective equipment is used by Cornerstone's site employees

The C.I.H. will maintain a safety log (in the Appendices), which will be kept for Cornerstone's site activities. This log will include safety meeting topics, training records, air monitoring information, and any incidents related to employee health and safety. The C.I.H. has responsibility for implementing and enforcing all aspects of this HASP for Cornerstone's site employees. He will oversee any personnel monitoring and will decide when action levels have been reached which require work stoppage. The C.I.H. establishes and enforces the protective equipment to be used by Cornerstone's site personnel for Cornerstone's site activities.

3.2 SITE SAFETY OFFICER (SSO)

Mr. Kurt Soenen will function as Cornerstone's Site Safety Officer. The prime contractor also will designate a Site Safety Officer, and he or she shall assume the responsibilities outlined in Section 3.1 when the CIH is not on site, and will determine when a change in conditions warrants consultation with or the additional presence of the CIH. The SSO or designated alternate shall be on site during the execution of work in known contaminated areas.

3.3 EMPLOYEE SAFETY RESPONSIBILITY

Although the employer is responsible for providing a safe and healthful workplace, each employee is responsible for his/her own safety as well as the safety of those around him/her. All Cornerstone personnel are aware that they are responsible for ensuring that all unsafe conditions and actions are isolated and corrected, either by direct action (fix it themselves) or by alerting their respective supervisors after isolating the problem. All employees shall use provided equipment in a

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safe and responsible manner as directed by his supervisor.

3.3.1 Buddy System

No work will be performed in any designated exclusion zone (e.g., areas of pesticide-impacted or NOA-containing soils) without benefit of the "buddy system". Workers will be paired in buddy teams at the start of each shift for any and all hazardous waste operations or emergency response work to be undertaken during the day. Buddy teams will remain in communication for the duration of the shift.

3.4 LOGS, REPORTS, AND RECORD KEEPING

Recordkeeping is a crucial component of any effective health and safety program. Safety records for Cornerstone's activities shall therefore be updated daily. The following logs, reports, and records shall be maintained in the appendices of this HASP:

- Safety meetings;
- Training logs - site specific and visitors;
- Weekly safety inspection logs;
- Employee/visitor sign-in;
- Ambient and personal air monitoring results; and

SECTION 4
JOB HAZARD ANALYSIS

This section discusses chemical, physical, and environmental hazards to workers on the site.

4.1 CHEMICAL HAZARDS

The chemicals listed in Table 4.1 are believed or suspected to be present on this site. This table is based on information summarized in the Site Investigation prepared by Cornerstone.

In addition to concrete dust inherent in demolition and processing, inorganic lead, pesticides, and NOA (Naturally Occurring Asbestos) are expected to be the primary contaminants of potential concern (COPC) on site. These include:

INORGANIC COMPOUNDS

Crystalline Silica

Crystalline silica is a basic component of concrete. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica, but are not expected on this job site. All three forms may form respirable dusts during all phases of concrete demolition and loading of debris.

Acute Effects: Acute silicosis occurs after a few months or as long as 2 years following exposures to extremely high concentrations of respirable crystalline silica. Symptoms of acute silicosis include severe disabling shortness of breath, weakness, and weight loss, which often leads to death.

Chronic / Classic Effects: Crystalline silica has been classified as a human lung carcinogen. Additionally, breathing crystalline silica dust can cause silicosis, which in severe cases can be disabling, or even fatal. Respirable silica dust enters the lungs and causes the formation of scar tissue, reducing the lungs' gas exchange capacity. Silicosis also increases susceptibility to lung infections. Smoking exacerbates these effects.

Symptoms: Silicosis is classified into three types: Chronic/classic, accelerated, and acute. Chronic/classic silicosis, the most common, occurs after 15–20 years of moderate to low exposures to respirable crystalline silica. Symptoms associated with chronic silicosis may or may not be obvious; therefore, workers need to have a chest x-ray to determine if there is lung damage. As the disease progresses, the worker may experience shortness of breath upon exercising and have clinical signs of poor oxygen/carbon dioxide exchange. (Cyanosis, clubbed fingers.)

Cancer Risk: Classified as probable human carcinogen.

METALS, INORGANIC COMPOUNDS

Inorganic contaminants known or suspected on site include on site include:

- Inorganic Lead
- Asbestos
- Crystalline Silica

Inorganic Lead

Lead is a ductile, soft, grey heavy metal used extensively in paint products. Lead has been used historically in a number of surface coatings as well as motor fuel additives (most notably TEL) that could result in aerial deposition of lead fume with combustion products, and may be present along the former rail spur due to its use in herbicides. Lead poisoning can cause weakness, lassitude, constipation and abdominal distress, anemia, peripheral neuropathy, and kidney damage. External signs include partial wrist paralysis and visible gingival lines. Secondary exposure of children to lead contamination brought from work place is a significant cause of childhood lead poisoning. Lead is also a fetotoxin and at higher doses can also cause gastrointestinal disturbances and anemia.

Asbestos

Naturally occurring asbestos at the site has been reported in both native and fill soils originating from decomposed native serpentine rock (a jade-like mineral) in soil. It is usually found as white or greenish, fibrous inclusions in greenish rock. Exposure to airborne asbestos can cause fibrotic lung disease (asbestosis), lung cancer, and mesothelioma. Swallowing of asbestos-laden mucus (deposited in the digestive tract by the mucociliary escalator) has been linked to a variety of digestive cancers. Creation of high concentrations of airborne dust could result in exposures approaching project action levels.

Potential for release of asbestos fibers is expected to occur during all soil-disturbing activities conducted in the areas of imported fill soils.

Crystalline Silica

Crystalline silica is a basic component of the existing concrete and some of the native rock to be excavated. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica, but are not expected on this job site. Quartz may form respirable dusts during demolition of existing pavement and foundations and other subsurface encumbratnces as well as during excavation.

Acute Effects: Acute silicosis occurs after a few months or as long as 2 years following exposures to extremely high concentrations of respirable crystalline silica. Symptoms of acute silicosis include severe disabling shortness of breath, weakness, and weight loss, which often leads to death.

Chronic / Classic Effects: Crystalline silica has been classified as a human lung carcinogen. Additionally, breathing crystalline silica dust can cause silicosis, which in severe cases can be disabling, or even fatal. Respirable silica dust enters the lungs and causes the formation of scar tissue, reducing the lungs' gas exchange capacity. Silicosis also increases susceptibility to lung infections. Smoking exacerbates these effects.

Symptoms: Silicosis is classified into three types: Chronic/classic, accelerated, and acute. Chronic/classic silicosis, the most common, occurs after 15–20 years of moderate to low exposures to respirable crystalline silica. Symptoms associated with chronic silicosis may or may not be obvious; therefore, workers need to have a chest x-ray to determine if there is lung damage. As the disease progresses, the worker may experience shortness of breath upon exercising and have clinical signs of poor oxygen/carbon dioxide exchange. (Cyanosis, clubbed fingers.)

Cancer Risk: Classified as probable human carcinogen.

ORGANIC COMPOUNDS

Volatile Organic Compounds (VOCs):

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Solvents (primarily PCE, or dry cleaning fluid) are the primary organic contaminants identified as possibly existing on site that present potential exposure.

Hazardous components and subcomponents of these wastes are expected to include:

- Tetrachloroethylene (PCE)

Tetrachloroethylene (Perchloroethylene; PCE)

Tetrachloroethylene is widely used for dry-cleaning fabrics and metal degreasing operations. Effects resulting from acute (short term) high-level inhalation exposure of humans to tetrachloroethylene include irritation of the upper respiratory tract and eyes, kidney dysfunction, and neurological effects such as reversible mood and behavioral changes, impairment of coordination, dizziness, headache, sleepiness, and unconsciousness. The primary effects from chronic (long term) inhalation exposure are neurological, including impaired cognitive and motor neurobehavioral performance. Tetrachloroethylene exposure may also cause adverse effects in the kidney, liver, immune system and hematologic system, and on development and reproduction. Studies of people exposed in the workplace have found associations with several types of cancer including bladder cancer, non-Hodgkin lymphoma, multiple myeloma. EPA has classified tetrachloroethylene as likely to be carcinogenic to humans.

PESTICIDES

Organochlorine Pesticides

Organochlorine pesticides are a class of pesticide including Chlordane, DDT, DDE, etc. that persist in the environment and have a number of health effects. OCPs on site include:

- Chlordane

Chlordane

Chlordane in a pure form is a viscous liquid ranging in color from colorless to amber. It has a mild, slightly irritating chemical odor. Exposure to moderate levels of chlordane for a long time causes headaches, dizziness, irritability, vomiting, or uncontrollable muscle movements. Some changes in liver function have been reported in workers exposed over a long period of time. The International Agency for Research on Cancer has determined that chlordane is not classifiable as to its carcinogenicity to humans. Based on studies in animals, the EPA has determined that chlordane is a possible human carcinogen (liver).

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TABLE 4.1
MAJOR CONTAMINANTS OF CONCERN ON-SITE

Compound or Class; maximum []	Description	Exposure Limits	Exposure Routes	Exposure Signs and Symptoms
Inorganic Lead $[\ ]_{max}$= 1500 mg/kg (soil)	Grey, lustrous ductile metal.	PEL = 50 µg/m^3 AL = 30 µg/m^3 *	Inhalation Ingestion	Gingival lines, peripheral neuropathy evidenced in wrist drop, cognitive impairment / learning disabilities. Known fetotoxin.
Crystalline Silica * (Quartz,); Total $[\ ]_{max}$= 30% (concrete)	Fine dust generated by demolition and processing activities	PEL = 300 µg/m^3	Inhalation	Respiratory irritation; Impaired pulmonary function (silicosis); lung cancer
Crystalline Silica * (Quartz,); Respirable	Fine dust generated by demolition and processing activities	PEL = 100 µg/m^3	Inhalation	Respiratory irritation; Impaired pulmonary function (silicosis); lung cancer
Concrete Dust		PEL = 450 µg/m^3 ††		
Tetrachloroethylene (PCE) $[\ ]_{max}$= 8.1 ppm (soil gas)	Colorless liquid with a mild, chloroform-like odor	PEL = 25 ppm STEL = 100 ppm REL = CA **	Inhalation Ingestion Absorption	Irritation of eyes and respiratory system; skin redness, CNS depression, possible carcinogen
Asbestos $[\ ]_{max}$= 0.14% (soil)	White, brown, or blue fibrous material. Will appear as odorless nuisance dust; visually non-detectable at PEL	PEL = 0.1 f/cc AL = 0.05 f/cc EXC = 1.0 f/cc Perim. = 0.01 s/cc ††	Inhalation Ingestion	Causes pulmonary fibrosis (asbestosis); GI cancers. Regulated and non-regulated forms (amphiboles) indicated in pleural plaques and mesothelioma. Symptoms (chronic) include shortness of breath, cough, chronic hypoxia.
Chlordane $[\ ]_{max}$= 18 mg/kg (soil)	Colorless to amber liquid with mild chemical odor	PEL = 250 µg/m^3 **	Inhalation Ingestion Absorption	Headaches, dizziness, irritability, vomiting, or uncontrollable muscle movements. Probable carcinogen (liver)

Notes

Units: mg/m^3 = milligrams per cubic meter
µg/m^3 = micrograms per cubic meter
ppm = parts per million (by volume)
f/cc = asbestos fibers per cubic centimeter
s/cc = structures per cubic centimeter (TEM – CARB/AHERA Method)

PEL Permissible Exposure Limit; 8 CCR 5155
STEL Short-Term Exposure Limit; 8 CCR 5155
AL Project Action Level for Respiratory Protection
EXC Excursion Limit (asbestos); 8 CCR 1529
TLV Threshold Limit Value; ACGIH
* California Action Level as defined in 8 CCR 1532.1
** Exposure to carcinogens maintained As Low As Reasonably Achievable
† Lower Explosive Limit in air (20.9 % Oxygen)
†† Perimeter Action Level

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4.2 Exposure Prevention

Engineering controls (consisting primarily of an aggressive dust control program) are expected to be sufficient to control all exposures to particulate and particulate-bound contaminants. Assuming that lead (the highest concentrated COPC with respect to its lowest published exposure limit) is represented in all generated dust in concentrations equal to its maximum detected concentration in soil, the calculation for lead content of dust on site is:

$mg/m^3 = [(mg/m^3 \text{ dust}) \times (mg/kg \text{ As})]/10^6$

Using a lead concentration of 1500 mg/kg (the maximum detected value) in generated dust, the Action Level for lead of 0.030 mg/m^3 (8 CCR 1532.1, 5155) would be reached at total dust concentrations of approximately 20 mg/m^3, a value well in excess of the PEL for respirable or total nuisance dust (5 and 10 mg/m^3, respectively).

Dust becomes visible (depending on lighting, reflectivity, background, etc.) generally at or below a concentration of 2 mg/m^3. Specifications call for no visible fugitive dust evolution during earthwork, so the PEL for dust and particulate-bound contaminants is unlikely to be reached or exceeded. Required engineering controls (No earthwork will be performed without active dust suppression, achieved through application of water before and during soil-disturbing activities.) and personal protective equipment (PPE) requirements combined with general hygiene requirements (wash arms, face, and hands before eating or smoking) will prevent exposures due to inhalation or ingestion of contaminated dust. Screening for organic vapors will be performed during initial disturbance of contaminated soils and should any visibly stained soil, odor, or other indication of petroleum contamination become evident. A wash facility will be located on site at all times. In addition, the Site Safety Officer and Site Supervisor shall observe and warn the crew members to be aware of the initial symptoms of chemical exposure. The severity of exposure depends primarily on the specific activities undertaken and the care with which the activities are performed.

Any crew member will be removed from the work site and placed under watch immediately if these initial symptoms are noted:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

Level C protection may be required only in the event that unexpected contaminant concentrations are encountered or dust control efforts prove ineffective. Action levels for respiratory protection are established for the site based on maximum known concentrations. Respiratory protection will be utilized in accordance with Section 6.4 – 6.10 or other action taken if the following sustained (≥ 5 minutes) breathing zone concentrations are recorded:

Contaminant	Action Level
Lead	0.030 mg/m^3
Asbestos (breathing zone)	0.050 f/cc
Asbestos (perimeter)	0.005 s/cc *
PCE	10 ppm
Chlordane	0.100 mg/m^3
Nuisance Dust (total)	5.0 mg/m^3
Organic Vapor (total VOC)	10 ppm
COPCs (other)	0.5 x PEL

* Structures per cubic centimeter; analysis by transmission electron microscopy method; CARB modified AHERA. Exceedance of perimeter action level will result in increased dust control and other engineering controls; four days of exceedance will result in a cessation of work pending re-evaluation of engineering controls.

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4.2.1 Hazard Communication Program

A written hazard communication program has been established for Cornerstone. The purpose of this program is to transmit information about the various chemical hazards in the workplace to the workers using various media. The transmittal of information will be accomplished by means of a comprehensive hazard communication program, which will include container labeling and other forms of warning, Material Safety Data Sheets, and employee training in accordance with Title 8 CCR §5194. The program will be available at the Cornerstone office for review by all employees. Cornerstone will fulfill the hazard communication requirements through formal safety training, departmental safety meetings, and job site safety meetings. Material Safety Data Sheets for all chemicals likely to be encountered on this job will be maintained and available on site.

4.3 PHYSICAL HAZARDS

In order to minimize physical hazards, Cornerstone has developed standard safety protocols that will be followed at all times. Hazard analyses are produced, updated frequently, and reviewed daily with all affected crew members for every jobsite operation. Failure to follow safety protocols or continued negligence of these policies will result in expulsion of a crew member from the site as well as possible termination of employment.

All Cornerstone personnel are familiar with the field activities that will be conducted at the site. They are trained to work safely under various field conditions. In addition, Cornerstone personnel will use work practices designed to minimize physical hazards.

Hard hats, safety vests, and leather work boots will be required in all areas of the site.

4.3.1 Tripping, Slipping, and Falling Hazards

Cornerstone personnel will be reminded daily to maintain sure footing on all surfaces. Use of safety harnesses and fall arrest/restraint will be required for any personnel working 6 or more feet above any surface, including on manlifts, and whenever they are exposed to impalement hazards.

In order to minimize tripping hazards caused by construction debris, material will be removed daily from the work areas and stockpiled in appropriate designated storage areas. This "house cleaning" effort will be enforced by the SSO at the end of each day.

4.3.2 Head, Eye, and Back Injuries

As minimum requirements, hard hats and safety glasses will be donned prior to entering any active work area or performing any related job tasks. (This includes visitors, outside service contractors, etc.) Personnel will be trained in and required to use proper lifting techniques for all lifts.

4.3.3 Falling Objects

Cornerstone believes that all tasks can be accomplished without any object free-falling to the ground. No personnel shall work under equipment or elevated loads at any time. Areas beneath elevated work will be barricaded and posted with warning signs.

4.3.4 Heavy Equipment and Traffic

The use of heavy excavators, scrapers, and other equipment on site presents the greatest potential for injury to personnel. In order to minimize these hazards, designated routes will be established for transport of material through the site and specific traffic patterns will be established. All trucks will be equipped with operable backup alarms and shall use spotters for backing procedures.

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Personnel needing to approach heavy equipment during operation will observe the following protocols:

1. Make eye contact with the operator.
2. Signal the operator to cease heavy equipment activity.
3. Approach the equipment and inform the operator of intentions.

Only qualified personnel, as determined by the Site Superintendent, will operate heavy equipment. Those crew members directly involved with spotting for the operator will be the only personnel allowed within the operating radius of the heavy equipment. All other personnel will remain a safe distance away from these operations.

Cornerstone personnel and subcontractors will follow all Client traffic rules and instructions, including use of reflective safety vests. Barricades will be erected around any work sites within an open right-of-way, and all personnel will remain within barricaded area. Road and lane closures will be permitted by the City of Newark. Only trained flaggers will be used to direct traffic around and through the work area.

4.3.5 Site Pre-inspection of Equipment

Only equipment that is in safe working order will be permitted on site. To maintain this policy, all equipment brought onto the project site will be inspected for structural integrity, smooth operational performance, and proper functioning of all critical safety devices in accordance with the manufacturer's specifications. This inspection will be performed by a qualified equipment operator. Also, every operator will perform and document a Daily Equipment Inspection at the start of each work shift and turn the form in to the foreman by the end of shift.

Equipment found during this inspection not conforming to operational and safety requirements will not be put into service until all necessary repairs are made to the satisfaction of the inspection group.

4.3.6 Operator Qualifications

Only qualified operators familiar with the equipment to be used will be permitted to operate. Subcontractors will supply proof of operators' qualifications to operate in a safe manner, including certification for any equipment requiring it (lift trucks, etc.).

4.3.7 Electrical Hazards

Cornerstone will implement an Assured Grounding Program for the project. In order to prevent accidents caused by electric shock, the SSO will inspect all electrical connections on a daily basis. He will shut down and lock out any equipment that is found to have frayed wiring or loose connections until a qualified electrician can be contacted and repairs effected.

Electrical equipment will be de-energized and tested by qualified personnel before any electrical work is done. All equipment will be properly grounded before and during all work.

Due to possible wet conditions, ground fault circuit interrupters (GFCIs) will be used for all power cords between the power source and tool, unless the presence of a potentially explosive atmosphere precludes this procedure. Generators used to supply power will be grounded and equipped with GFCIs.

4.3.8 Welding Hazards

Personnel who will be performing or observing welding operations are required to use approved welding shields or glasses. Welding shields and glasses are to be inspected prior to each use for scratches and pits that would inhibit their ability to shield harmful ultraviolet light.

Workers will be required to wear protective clothing to shield the skin from slag and harmful ultraviolet light produced by welding operations. Persons working near welding operations that could ignite chemical protective clothing must

wear flame retardant outer apparel (Nomex or equivalent).

4.3.9 Fire and Explosion
All flammable liquids will be stored in UL-Approved safety containers in designated areas. Oxygen and acetylene cylinders will be stored secured upright in separate areas except when on carts for immediate use. All high-pressure cylinders will be transported with caps in place, and all valves and gauges will be inspected before each use. Monitoring for explosive vapors will be performed before any hot work undertaken in exclusion zone(s), and no hot work will be permitted if combustible gas or vapor concentrations at the lowest point exceed 10 percent of the Lower Explosive Limit (LEL).

4.3.10 Illumination: All work is expected to be performed during daylight hours. If night work is required, lighting will be maintained (and supplemented with additional if required) at each work area sufficient to maintain a minimum illumination level of 10 foot-candles. Emergency egress lighting will provide a minimum of 5 foot-candles of illumination.

4.4 ENVIRONMENTAL HAZARDS

4.4.1 Weather and Heat Stress
With the possible combination of ambient factors such as high air temperature, high relative humidity, low air movement, high radiant heat, and protective clothing use, the potential for heat stress is a concern. The potential exists for:

- Heat Rash is caused by continuous exposure to hot and humid air and aggravated by chafing clothes. Heat rash decreases ones ability to tolerate heat.

- Heat Cramps are caused by profuse perspiration with inadequate fluid intake and chemical replacement (especially salts). Signs of heat cramps include muscle spasm and pain in the extremities and abdomen.

- Heat Exhaustion is caused by increased stress on various organs to meet increased demands to cool the body. Signs of heat exhaustion include shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and listlessness.

- Heat Stroke is the most severe form of heat stress. The body must be cooled immediately to prevent severe injury or death. Signs and symptoms of heat stroke are red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong, rapid pulse; and coma.

Daytime temperatures at the Site may be expected to range from 2° C to 32° C (35° F to 90° F). Wearing an impermeable suit with rubber boots, gloves, hard hat, and full-face respirator imposes an additional 6° C to 11° C (10° F to 20° F) burden on the worker. For the purposes of this Environmental Health and Safety Plan, it is assumed that workers at the Site wearing Level C protective gear (if required) with impermeable suits will experience the same additional temperature burdens as described above. It is therefore possible that workers wearing Level C safety gear, with an impermeable suite, could be exposed to working temperatures inside their suits of approximately 8° C to 38° C (45° F to 100 °F). Cornerstone's action level for heat stress observation is set at 70° F. Whenever the ambient temperature is greater than or equal to this action level, the SSO will alert his crew to be vigilant for symptoms of heat stress. The SSO will also advise the crew to increase the amount of water intake.

Heat stroke, heat cramps, and heat exhaustion are covered in detail during general and site-specific training program. In addition, this information is discussed during safety "tailgate" meetings. Workers are encouraged to increase consumption of water and electrolyte-containing beverages such as Gatorade during warm

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weather. Water and electrolyte-containing beverages will be provided on-site and will be available for consumption during work breaks.

Protective Measures

Regular monitoring and other precautions relating to heat stress have been prescribed by NIOSH. The following protective measures will be taken by workers at the Site if ambient temperatures exceed 75° F.

1) Workers will take rest periods every two to four hours. Rest periods will be a minimum of fifteen minutes. Liquids (particularly electrolyte-replenishing fluids) will be available to all workers during rest periods.

2) Workers will wear lightweight clothing under impervious suits (i.e. short sleeve shirts are acceptable depending on anticipated chemical exposure levels).

3) NIOSH recommends that workers wearing impervious clothing receive physiological monitoring at regular intervals when the ambient air temperature approaches or exceeds 70°F. Physiological monitoring will consist of the following measurements (taken during prescribed rest periods):

a) Measure heart rate (HR) as early as possible in the rest period and record.

b) Check for the physical reactions related to heat stress. Physical reactions include fatigue, irritability, anxiety, and decreased concentration, dexterity or movement.
If the measured heart rate exceeds 110 beats per minute, or any of the above physical symptoms are noted, the work period will be shortened by 30 percent (NIOSH 1985). Work may resume after the heart rate and physical condition of the worker has returned to normal.

Cold Stress

Cool and wet conditions are possible during the execution of this work. The Site Safety Officer (SSO) and workers will be alert for signs and symptoms of cold stress (hypothermia). This is commonly caused by prolonged exposure to cool / windy conditions while wearing clothing that has become wet, either from precipitation, dust control measures, or paradoxically by perspiration caused by heavy work in protective suits.

The SSO will monitor the ambient air temperature using a thermometer in the support zone. At temperatures below 40° F, actual temperature or corrected for wind chill, the most current published ACGIH cold stress standard will be followed.

Field personnel will be observed for the following signs and symptoms:

- Pain in the extremities
- Uncontrolled shivering
- Malaise or reduced responsiveness

Any team member who exhibits these signs will be monitored for cold stress. Any individual with an oral temperature of less than 97° F will be taken immediately to a warming shelter.

A warming shelter will be provided on any job site where the ambient temperature is less than 40° F. Breaks will be taken in the shelter as needed according to ACGIH TLV for cold stress.

4.4.2 Hearing Conservation Program

Cornerstone has a comprehensive Hearing Conservation Program and requires use of hearing protection for all personnel working on or within 50 feet of heavy equipment or within any areas designated by management. Cornerstone's hearing conservation program

complies with both the California and Federal Hearing Conservation Standards.

4.4.3 Confined Space Entry

All trenches deeper then five feet into contaminated soils will be treated as Non-Permit-Required Confined Spaces in accordance with Cornerstone's Confined Space Entry Program. Initial and hourly monitoring will be performed throughout the work area for flammable gases or vapors, oxygen, carbon monoxide, and total VOCs. Continuous monitoring will be performed during all hot work and work involving use of internal combustion engines of any type in or around occupied spaces.

Work will cease and all spaces will be evacuated immediately in the event any meter goes into "alarm" mode, or any of the following parameters for acceptable entry is exceeded:

Parameter	Acceptable Range
Oxygen	19.5% - 23%
Combustible Gas	≤ 10% LEL
H_2S	≤ 2 ppm
CO	≤ 10 ppm
VOCs	≤ 10 ppm

The space will not be re-entered for any reason until the condition has abated or the condition has been further evaluated and deemed safe by the Site Safety Officer in consultation with the project Industrial Hygienist.

4.5 HAZARD ANALYSIS SUMMARY

This work involves significant risk from several sources. Physical hazards and construction activity present a higher than normal risk due to the confined work areas, use of protective equipment, and proximity to traffic. These risks will be minimized by adequate traffic control, planning, and worker education.

Excavation work at the site presents two principal exposure routes: ingestion and inhalation of dust contaminated with asbestos, metals, and particulate-bound organics. These risks will be minimized by use of engineering controls as well as appropriate personal protective equipment and personal hygiene.

Aggressive dust control measures required by the management plan as well as this site safety plan are expected to prevent potential overexposures to particulate and particulate-bound contaminants. A requirement for Level C respiratory protection is therefore not anticipated unless unanticipated contaminant concentrations are encountered. Periodic dust monitoring will be performed using a real-time aerosol monitor (MIE PDRAM or equivalent), and organic vapor screening and representative personal and ambient air sampling will be performed as detailed in Section 8 to confirm compliance with the Permissible Exposure Limits. Periodic perimeter monitoring also may be performed in order to evaluate site engineering and administrative controls.

Potential for generation of airborne contamination is expected to occur during all earthwork or soil-disturbing activities. Monitoring equipment will be used to identify downwind releases and upwind (background) concentrations. Respirators may be used to minimize exposure of workers in these areas only in the event that dusty conditions or air monitoring data indicate such a need. Otherwise, work will proceed without respiratory protection unless or until additional soil sampling or air monitoring results indicate protection is required or advisable. Protective clothing ensembles for each of the levels of protection are described in Section 6.

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4.6 TASK SPECIFIC RISK ASSESSMENT

TASK: Demolition of subsurface encumbrances
SPECIFIC HAZARDS: Utilities, equipment, slips, trips, & falls, noise, contact with contaminated materials, atmospheric hazards, fire and explosion
CONTROL MEASURES: All utilities will be disconnected and disconnect verified by SSO or his designee before commencement of any demolition activity. The work area will be surrounded by a barricade to exclude ground personnel from projectile and impalement hazards. All potentially exposed personnel shall wear hearing protection. Only qualified and experienced operators (as detailed in Section 4.3.6 of this HASP) will operate equipment. Hard hats and safety glasses will be required at all times. All hazardous building materials (asbestos, etc.) will have been removed and removal verified in writing by "soft demolition" subcontractor before commencement of demolition. Dust control will be utilized to reduce the potential for airborne concrete dust. Disturbance of structures coated with lead-based paint will be performed in accordance with this HASP, 8 CCR 1532.1, and Cornerstone 's lead protection program. Air monitoring and sampling will be conducted in accordance with Section 8 of this HASP.

Any USTs encountered will have contents evacuated and internal atmosphere completely inerted (0% LEL) before any permitted removal is performed.

Torch-cutting of rebar will be performed in accordance with Sections 4.8 and 4.9 of this HASP.

TASK: Sampling (hand core, trowel) of contaminated/potentially contaminated soil stockpiles, sidewalls, and excavations
SPECIFIC HAZARDS: Excavation failure / engulfment, noise, heavy equipment operations, vehicular traffic, organic vapors and particulate contaminants, back injuries / caught between.
CONTROL MEASURES: All excavations will be shored or sloped in accordance with construction safety orders before any entry. Samples will be taken directly from buckets or from stockpiled material removed from excavations whenever possible. Personnel will use care when walking around excavation edges. Level "D" personal protection will be used unless otherwise specified by Client or Cornerstone Site Safety Officers. The work area will be clearly marked. Ground personnel shall maintain eye contact with the equipment operator and wear hearing protection while inside the operating radius of the equipment, and shall otherwise maintain a minimum distance of 40 feet from the equipment unless spotting for the operator. Only qualified and experienced operators will operate equipment. Hard hats, safety glasses, gloves and work boots are mandatory for all personnel, and nitriele gloves, rubber overboots and tyvek suits (or equivalent) will be worn by all personnel entering performing any job tasks with potential for contact with contaminated materials. An aggressive program of dust control will be utilized to prevent any visible dust generation and will thereby reduce the potential for airborne contaminants, and screening of worker breathing zones will be performed in accordance with Section 8 to prevent exposure to hazardous VOCs. The immediate area around the GeoProbe™ rig will be flagged off, and traffic will be excluded to the greatest extent possible. Spotters/flaggers will be used to direct traffic as needed. Good footing will be maintained so that proper posture can be used for adding or removing auger flights, with additional personnel used as required to maintain control.

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TASK: Sampling from Cores
SPECIFIC HAZARDS: Contact with contaminated materials
CONTROL MEASURES: Rubber boots, coveralls, and nitrile gloves will be used by workers in direct contact with stockpile material. Respiratory protection will be required only if higher than expected levels of VOCs are encountered.

TASK: Excavation, Stockpile, and Loading / Offhaul of Contaminated Spoils
SPECIFIC HAZARDS: Utilities, noise, heavy equipment and truck/scraper operations, vehicular traffic, particulate contaminants and projectiles, hazardous vapor.
CONTROL MEASURES: A survey for underground utilities shall be conducted prior to any excavation. Personnel will use care when walking around excavation edges. Level "D" personal protection will be used unless otherwise specified by Client or Cornerstone Site Safety Officers. The work area will be clearly marked. Ground personnel shall maintain eye contact with the equipment operator and wear hearing protection while inside the operating radius of the equipment, and shall otherwise maintain a minimum distance of 40 feet from the equipment unless spotting for the operator. Only qualified and experienced operators will operate equipment. Hard hats, safety glasses, gloves and work boots are mandatory for all personnel, and rubber overboots and tyvek suits (or equivalent) will be worn by all personnel performing job tasks with potential for contact with contaminated materials. An aggressive program of dust control will be utilized to prevent any visible dust generation and will thereby reduce the potential for airborne contaminants. Sufficient water will be applied to all exposed soils to maintain surfaces above 70 percent of soil capacity, thereby preventing dust suspension. Spotters/flaggers will be used to direct traffic and spot trucks and flag other traffic across or through scraper spreads. Haul trucks will be securely tarped before transport of hazardous or contaminated material on any public road outside of project limits. Spilled material will be cleaned immediately from vehicles and (open) road surface and returned to excavation. Screening for organic vapor will be performed in areas associated with tanks or whenever odor is detected.

SECTION 5
WORK AND SUPPORT AREAS

To help prevent migration of contamination caused by personnel or equipment, work areas and personal protective equipment are clearly specified prior to beginning operations. The following designated work areas or zones are suggested by the NIOSH/ OSHA/USCG/EPA document, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities". The work area will be divided into three zones: an exclusion (or "hot") zone (EZ), a contamination reduction zone (CRZ), and a support zone. The excavation and/or shoring contractor is responsible for establishing these work zones; the recommended zones are summarized below.

5.1 EXCLUSION ZONE

The exclusion zones will consist of areas where inhalation, oral contact, or dermal contact with contaminants is considered to be possible.

It is anticipated that each EZ will encompass open excavations in contaminated (known or suspected) areas of the site prior to installation of clean base as well as the immediate confines of any stockpiles. The size and configuration of each area may vary according to air monitoring results. Each exclusion zone boundary will be clearly and conspicuously marked. A single entry and exit point will be established at each zone. Entry shall be limited to essential personnel or pre-approved visitors.

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5.2 CONTAMINATION REDUCTION ZONE

The CRZ will be established between the exclusion zone and support zone. In this area, personnel will begin the sequential decontamination process required to exit the exclusion zone. To prevent off-site migration of contamination and to facilitate personnel accountability, all personnel will enter and exit the exclusion zone through the CRZ. All vehicles and equipment exiting contaminated areas will traverse a trackout prevention area consisting of a minimum 50 foot paved area. Alternatively, rumble strips or a 20-foot pad of 6-inch minus rock may be used to dislodge materials from wheels and undercarriage. In no event will visible trackout to public roadways be permitted. Potentially contaminated material that is removed will be added to stockpile area, and rinsates generated by decontamination activities will be used for dust control on the contaminated stockpiles, which will be located in lined and bermed areas.

5.3 SUPPORT ZONE

The support zone will consist of a clearly marked area where the administrative area, break areas, and changing facilities are located. Smoking, drinking, and eating will be allowed only in designated areas. Sanitation facilities are provided in the support zone. These will include:

- Separate-sex portable toilet facilities
- Separate hand wash units with single-use towels and adequate disposal
- A source of potable drinking water with single-use cups. Single-serving bottled water also is acceptable.

5.4 ACCESS CONTROLS

The contractor shall establish the physical boundaries of each zone and shall instruct all workers and visitors on the limits of the restricted areas. No one shall be allowed to enter a restricted area without the required protective equipment for that area. The contractor's SSO shall ensure compliance with all restricted area entry and exit procedures.

The contractor's SSO shall also designate a decontamination corridor through which personnel may exit from a contaminated area and enter into adjacent clean break areas.

Visitors should check in immediately upon arrival. Only authorized visitors will be allowed access to active work areas. Each visitor will be required to provide and wear the necessary protective equipment for use during site visits and shall be escorted by the Supervisor while on site. All visitors, subcontractors and other personnel will be required to sign a safety plan acknowledgement sheet to certify that they have read and will comply with this site health and safety plan. Failure to comply with this site entry procedure will result in expulsion from the site.

SECTION 6
PROTECTIVE EQUIPMENT

The following lists define the required personal protective equipment for each work location and task within a specific zone.

6.1 EXCLUSION ZONE(S)

Tasks: Earthwork / Demolition
EPA Level: D/C *
Respiratory Protection: None *
Head: Hard hat
Hand: Work Gloves
Suit: Work Clothing
Foot: ANSI – Approved Steel-Toed Work Shoes
Eye: Safety Glasses; Face Shields**
Special Requirements: None
Comments: Hearing protection is required within 50 feet of operating power tools and all other areas found to present noise levels in excess of 85 dBA.

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* Soil data may used to support commencement of work in Level D protective equipment. Routine use of respiratory protection will be necessary only in the event that engineering controls are unable to maintain airborne dust concentrations below established action levels. Respiratory protection will be used in accordance with State and Federal respiratory protection standards as well as Cornerstone's Respiratory Protection Program.
** Face shields required for operations presenting projectile hazards as detailed in Section 4.6.

Tasks: All Cornerstone employees
EPA Level: D/C *
Respiratory Protection: None *
Head: Hard hat
Hand: Work Gloves
Suit: None †
Foot: Work Boots; Rubber boots or work boots with overboots only as needed to facilitate decontamination
Eye: Safety Glasses; Face Shields**
Special Requirements: † Coveralls and gloves needed only as required to prevent contact with and soiling by contaminated materials. Workers not in direct contact with soils may substitute work clothes and gloves for coveralls and Nitrile/Liner system.

Comments: Hearing protection is required within 50 feet of operating heavy equipment and all other areas found to present noise levels in excess of 85 dBA.

* Respiratory protection will be necessary only in the event that sustained levels of contaminants in worker breathing zones exceed project action levels or sampling results indicate individual components in excess of respective Permissible Exposure Limits (PELs). Respirators will also be necessary if areas of higher than expected concentrations of soil contaminants are encountered or engineering controls are unable to maintain airborne dust concentrations below established action levels. Respiratory protection will be used in accordance with State and Federal respiratory protection standards as well as Cornerstone's Respiratory Protection Program.

** Face shields required only as needed for splash hazards from contaminated ground water and other free liquids.

6.2 CONTAMINATION REDUCTION ZONE

Tasks: All decontamination procedures
EPA Level: D
Respiratory Protection: None.
Head: Hard hat.
Hand: Work gloves.
Suit: None *
Feet: Work Boots
Eye: Safety Glasses / Face Shield
Special Requirements: Coveralls will be available on site for use in unusual tasks that would otherwise result in excess soiling of work clothing. Waterproof suit, rubber boots, and face shield required for pressure washing of tools and equipment.
Comments: See Section 4.6

6.3 SUPPORT ZONE

Personnel working in the support zone will use the following Level "D" protective gear:

- Rubber boots or work boots with rubber overboots
- Hard hat
- Safety glasses
- Safety Vest

6.4 RESPIRATOR CARTRIDGES

Should conditions require an upgrade to Level "C" protection for some tasks, crew members working in Level "C" will wear NIOSH/MSHA-approved respirators equipped with combination organic vapor and P-100 HEPA air purifying cartridges. These cartridges hold approval for:

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- Dusts, fumes and mists with a TLV of 0.05 mg/m^3 or greater
- Asbestos containing dusts and mists
- Radon daughters and radionuclides
- Organic Vapors

6.5 CARTRIDGE CHANGES

All cartridges will be changed a minimum of once daily or more frequently as indicated by increased breathing resistance or End of Service Life Indicator (ESLI). However, water saturation of the HEPA filter or extremely dusty conditions may necessitate more frequent changes. Changes will occur whenever personnel begin to experience increased breathing resistance, notice any unusual odor inside the respirator, or experience excessive heat generation in the cartridges.

6.6 INSPECTION AND CLEANING

Respirators will be inspected daily before use by the individual user(s) and will be checked periodically by the Cornerstone SSO. All respirators and associated equipment will be decontaminated, cleaned, and disinfected by the user after each shift using materials that will be provided on site.

6.7 FIT TESTING

Annual respirator fit tests are required of all personnel wearing negative pressure respirators. Qualitative fit tests will utilize isoamyl acetate or irritant smoke. Fit tests must incorporate the style and size of respirator to be used. Additionally, a positive and negative pressure seal check shall be conducted each time any tight-fitting respirator is donned.

6.8 FACIAL HAIR

No personnel with facial hair that interferes with the respirator's sealing surface will be permitted to wear a respirator.

6.9 CORRECTIVE LENSES

Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the respirator's sealing surfaces. For workers requiring corrective lenses who also must don full-face respiratory protection, special spectacles designed for use with respirators will be provided. Eyeglasses rated as safety glasses (ANSI Approval Z87 displayed on frame) are acceptable provided they are fitted with rigid side shields.

6.10 MEDICAL CERTIFICATION

In accordance with the Respiratory Protection Standard and Cornerstone's and Contractor's Respiratory Protection Programs, only workers who have been certified by a physician as being physically capable of respirator use will be issued a respirator. Documentation of this approval will be maintained on site.

SECTION 7
DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

7.1 PERSONNEL DECONTAMINATION

Decontamination of personnel shall be accomplished to ensure that any material that they may have contacted in the exclusion zone is removed in the contamination reduction zone:

Step 1: Segregated equipment drop
Deposit equipment used on-site on plastic drop cloths or in containers with plastic liners.

Step 2: Overboot and glove wash
Scrub overboots and gloves with soap and water if visibly soiled.

Step 3: Overboot and glove rinse
Rinse boots and gloves with water.

Step 4: Outer glove removal
Remove outer gloves and deposit in container with plastic liner.

Step 5: Suit and boot removal
Remove Tyvek suit with assistance of helper or buddy as needed. Deposit in container with plastic liner. Pull off rubber boots.

Step 6: Respirator removal (Level C)
Remove respirator. Avoid touching face with gloves. Place respirator in wash basin.

Step 7: Inner glove removal (if used)
Remove inner gloves and dispose of in container with plastic liner.

Step 8: Wash
Wash hands, face, and neck before breaks and lunch.

All rinsates and dislodged soils and other potentially contaminated material will be added to fill or directly to haul trucks for disposal.

7.2 EQUIPMENT DECONTAMINATION

Brushing and establishment of a track-out zone will suffice for decontamination of vehicles. No visible trackout will be permitted onto public roadways, and any visible tracked material must be removed at least twice daily through wet sweeping or use of a HEPA- filtered vacuum system. A separate decontamination pad will be established for the decontamination of all equipment leaving hazardous waste exclusion zones (if any). The following steps will be performed sequentially:

Step 1: Gross Contamination Removal
Gross soil deposits will be removed manually from tracks, tires, drives, etc. using digging bars, scrapers, etc. before moving onto decontamination pad.

Step 2: Pressure Wash
All surfaces that cannot be sufficiently decontaminated manually and by track out buffer will be pressure washed with surfacted water to remove any remaining adhering contamination.

Step 3: Final water rinse
A final rinse is performed to remove dissolved contaminant, water, and surfactant residues. Rinsates will be recovered and sampled for COPCs. Disposal methods (sanitary sewer, licensed hauler, etc.) will be permitted appropriate to sample results.

7.3 SUSPECTED CONTAMINATION

Any employee suspected of sustaining skin contact with hazardous materials will proceed to the contamination reduction zone and wash off the contamination. If chemical contact causes injury, the employee will remove clothing, shower, don clean clothing, and immediately be taken to the First Aid Station.

7.4 SANITATION / HYGIENE

Before any eating, smoking, or drinking, personnel will exit exclusion zones and wash hands, arms, neck, and face. Separate - sex sanitation facilities will be available in the support zone if ten or more employees are to be accommodated.

7.5 OTHER DECONTAMINATION PROCEDURES

All decontamination liquids and disposable clothing will be handled as contaminated waste and disposed of properly at the direction of the client.

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SECTION 8
EXPOSURE MONITORING

Personal, perimeter, and ambient air monitoring will be conducted by Earth Safety Dynamics and/or Site Safety personnel as necessary in order to determine airborne contamination levels. Air sampling to ensure and document that engineering control measures in use are adequate to protect personnel and the public against the contaminants present on site will be conducted in accordance with 8 CCR Sections 5214, 5155 and 5192. Sampling will be performed as follows:

Asbestos:
Representative worker exposure monitoring for asbestos will be performed by contractor at the outset of soil disturbance. Sufficient worker breathing zone samples will be taken to constitute a negative exposure assessment (both full-shift and short-term or excursion limit) for each job task, area, and condition encountered. Sampling and analysis will be performed in accordance with NIOSH Method 7400.

Perimeter monitoring for asbestos (downwind, at least two samples adjusted during the shift) will be performed over at least three full shifts during the first week of disturbance of NOA-containing fill soils. Sampling will be repeated in each new area of NOA disturbance. Sampling and analysis will be performed in accordance with the CARB modified AHERA method. (TEM analysis of 0.45 micron filters; limit of detection $\leq$ 0.001 s/cc). Samples will be delivered overnight to a laboratory accredited by California and USEPA as well as AIHA for analysis on a 24-hour turnaround.

Note: Any perimeter value exceeding the site action level of 0.005 s/cc will result in enhanced dust control measures.

Lead:
Representative worker exposure monitoring for lead will be performed by contractor in accordance with 8 CCR 1532.1 at the outset of soil disturbance. Sufficient worker breathing zone samples will be taken to constitute a negative exposure assessment for each job task, area, and condition encountered. All sampling and analysis will be performed in accordance with NIOSH Method 7300.

VOCs; Organochlorine Pesticides:
Screening for VOCs (PCE) will be performed only in the event that a stain, odor, or other indication of potential exposure is encountered.

Objective data (site characterization data and visual and integrated aerosol measurements) may be used to document the lack of airborne OCP hazard as long as dust control measures are implemented in accordance with Construction Safety Orders and this Plan and no indication of contaminant levels exceeding those anticipated are encountered.

All personal and ambient sampling will be performed in accordance with NIOSH/OSHA, CARB, or EPA methods, and results will be shared with full crew at the next scheduled safety meeting.

Dust / Crystalline Silica:
Representative worker exposure monitoring for respirable dust and crystalline silica will be performed by contractor at the outset of demolition of structures or subsurface foundations, etc. presenting the potential for exposure to concrete dust. Sufficient worker breathing zone samples will be taken to constitute a negative exposure assessment for each demolition task. Sampling and analysis will be performed in accordance with NIOSH Method 7500.

Perimeter monitoring for total dust ($\leq$ 10 microns in mean aerodynamic diameter) will be performed daily throughout the duration of the removal action during activities that may significantly disturb COPC-impacted soil. The monitoring will be performed using three PDR-

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1000 DataRam™ particulate meters. Prior to the beginning of soil disturbance each day, a windsock or anemometer will be used to monitor the wind direction at the site and to help determine the location of the monitors at the project boundary. Fence line monitoring will be conducted at three locations (one upwind, two downwind) at approximate breathing zone height. Meters will be monitored by the field engineer or geologist to evaluate if excessive fugitive dust is present. Each time the meters are checked, the average upwind concentration (shift) will be compared to the average downwind values. If that difference is greater than the DTSC trigger level of 25 $\mu g/m^3$, increased dust control measures will be required. Meter will be factory calibrated and zeroed per manufacturer's specifications before each run.

Noise:
Noise levels will be evaluated and safe (85 dBA or less) perimeters established for all operations and equipment. Dosimetry will be performed for non-routine job tasks and those requiring frequent transit of areas requiring hearing protection to determine requirements for these tasks. All exposure monitoring records will be kept in the appendices of this Plan and made available to all employees and their designated representatives on request.

SECTION 9
EMERGENCY RESPONSE

Prior to start of field activities, the SSO shall plan emergency egress routes and discuss them with all personnel who will be conducting the field work. Initial planning includes establishing and posting of emergency warning signals and evacuation routes in case of an emergency.

9.1 EMERGENCY SERVICES

A tested system shall exist for rapid and clear distress communication. All personnel shall be provided concise and clear directions and accessible transportation to local emergency services. A map outlining directions to the nearest hospital will be posted on site.

The following emergency equipment shall be present on the site:

- Fire extinguishers
- Industrial first aid kit
- Portable eye washes, capable of supplying 15 minutes of water

9.2 EMERGENCY EVACUATION FROM EXCLUSION AND CONTAMINATION REDUCTION ZONES

Any personnel requiring emergency medical attention shall be evacuated immediately from exclusion and contamination reduction zones. Personnel shall not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life saving first aid. For others, decontamination may aggravate the injury or delay life saving treatment. If decontamination does not interfere with essential treatment, it should be performed.

If decontamination can be performed:
- Wash external clothing and cut it away.

If decontamination cannot be performed:
- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination; instruct them about specific decontamination procedures.
- Send along site personnel familiar with the incident

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9.3 FIRST AID

Only qualified personnel shall give first aid and stabilize an individual needing assistance. Life support techniques such as CPR and treatment of life threatening problems such as airway obstruction and shock will be given top priority. Professional medical assistance shall be obtained at the earliest possible opportunity.

At least two persons currently certified in first aid and CPR will be on site at all times during site activity. To provide first-line assistance to field personnel in the case of sickness or injury, the following items will be immediately available:

- First aid kit
- Portable emergency eye wash
- Supply of clean water

9.4 SPILL RESPONSE

Small spills (those capable of being contained and recovered using available personnel and materials) will be taken care of immediately upon detection. Any spill too large to be effectively managed by available resources will result in a call to the designated spill response provider (Phillip Service Corporation).

At least two persons currently trained in spill containmet will be on site at all times during site activity. To provide first-line assistance to field personnel in the case of small spill, the following items will be immediately available:

- Standard Spill Kit
- Additional absorbent
- Flat or Coal Shovels
- Salvage drum

9.5 EMERGENCY ACTIONS

Only individuals with minor injuries requiring minor medical attention (beyond first aid provided at the job site) will be transported to the hospital in company vehicles. If actual or suspected serious injury occurs, these steps shall be followed:

- Remove the exposed or injured person(s) from immediate danger.
- Render first aid if necessary. Affected personnel will be decontaminated after critical first aid is give.
- Obtain paramedic services or ambulance transport to local hospital. This procedure shall be followed even if there is no visible injury.
- Other personnel in the work area shall be evacuated to a safe distance until the site supervisor determines that it is safe for work to resume. If there is any doubt regarding the condition of the area, work shall not commence until all hazard control issues are resolved.
- Notify SSO and Project Manager of incident.
- Notify Cal/OSHA within 8 hours of serious injury or death.

9.6 GENERAL EVACUATION PLAN

In the general case of a large fire, explosion, or toxic vapor release, a site evacuation shall be ordered and shall follow these steps:

- Sound alarm (repeated long blast) and advise SSO and client representative.
- Evaluate the immediate situation and wind direction. All personnel will evacuate in the upwind or crosswind direction to the designated assembly area immediately outside the main gate. (Specific routes will depend on wind direction – check wind directions on site and choose route that will avoid areas downwind of any release.)
- All personnel will assemble in a designated upwind area when the situation permits, and a head count will be taken.
- Determine the extent of the problem.
- Coordinate with emergency response personnel to dispatch or direct a response team in protective clothing and self-contained breathing apparatus on site to evacuate any missing personnel or to correct the problem. If

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no trained Emergency Response Team is available on site, the off site emergency response provider designated below will be summoned immediately and directed by SSO upon arrival.

9.7 EMERGENCY PHONE NUMBERS

Fire /Medical Emergency 911

Large Spill Response (800) 800-7472
Philip Services Corporation
60 22nd St # 688
Oakland, CA 94612

Cal/OSHA (Regional): (415) 703-5210

Corporate Safety Manager / President:
Ron Helm
Mobile (408) 747-7512

Project Manager / SSO: Kurt Soenen
Mobile (408) 605-3037

Project CIH: Kevin Braun
Mobile (925) 980-0568

Spill Release: Office of Emergency Services
State O.E.S. (800) 852-7550

Medical Services (510) 437-4800
Highland Hospital
1411 East 31st Street
Oakland, CA 94602

Note: Each contractor will have own designated Medical Service provider.

When calling for assistance from outside emergency responders, use the procedures for reporting emergencies as outlined in Section 9.8.

Directions to Hospital:
Leaving the site, head toward Derby Ave. on E. 15th St. After one block, turn left onto Fruitvale Ave. Follow Fruitvale for 0.9 miles and turn left onto E. 27th St. Follow for 0.4 miles, turn right onto 23rd. Ave. After 0.3 miles, turn left onto E. 31st. St. Hospital is on the left; Follow signs to Emergency Department.

A map and is provided in Figure 1.

Note: Only those individuals with minor (non life-threatening) injuries are to be transported by project personnel. Emergency medical services will be summoned for all other injuries and illnesses.

9.8 STANDARD PROCEDURES FOR REPORTING EMERGENCIES

When calling for assistance in an emergency situation, the following information should be provided:

1. Call the appropriate emergency phone number (Posted on site; see above).

2. Provide the following information upon request:
- Name of person making the call.
- Telephone number at location of person making call.
- Name of person(s) exposed or injured.
- Nature of emergency.
- Actions already taken.

3. Remain on line until instructed by dispatch to hang up.

Note: When calling 911 from a cell phone, calls are routed through CHP central dispatch. Additional information regarding nature of emergency, appropriate response agency and measure, etc. may be required.

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SECTION 10
TRAINING REQUIREMENTS

All workers using respiratory protection will be trained in accordance with 8 CCR 5144. All field employees engaged in Hazardous Waste Operations (as outlined in the Scope and Application of the HAZWOPER Standards; 29 CFR 1910.120 and 8 CCR 5192) take a training class and pass a written examination in compliance with Federal and State Hazardous Waste Operations and Emergency Response standards). As a minimum, all site workers will be required to be trained in accordance with the following:

- Hazard Communication (8 CCR 5144)
- Lead Hazard Awareness (8 CCR 1532.1)
- Asbestos Hazard Awareness (8 CCR 1529)

All personnel entering exclusion zones or other regulated areas will be trained in Hazard Awareness and Control and the provisions of this site Health and Safety Plan and will be required to sign the Health and Safety Plan Acknowledgement Page.

SECTION 11
MEDICAL SURVEILLANCE PROGRAM

All workers using respiratory protection will receive clearance by a Physician or Licensed Healthcare Practitioner (PLHCP) prior to such use.

All personnel working in areas where they may be exposed to any contaminant or combination of contaminants in concentrations at or above permissible exposure limits or lead at or above the Action Level (30 µg.m3, 8 CCR 1532.1) without regard to use of respiratory protection are required to participate in the Company's Medical Surveillance Program. This program is initiated when the employee starts work on the project with a complete physical and medical history and is continued as required. Other medical consultants will be retained if additional expertise is required.

Medical Surveillance Elements

Item	Initial	Annual
Medical History	X	X
Work History	X	X
Visual Acuity	X	X
Pulmonary Function *	X	X
Audiometry	X	X
Chest X-Ray †	X	
Complete Blood Count	X	X
Blood Chemistry (SMAC)	X	X
Blood Lead / ZPP	X	X
Urinalysis	X	X
Dermatology Exam	X	X

* Pulmonary function test at discretion of physician after review of Pulmonary Fitness Questionnaire.

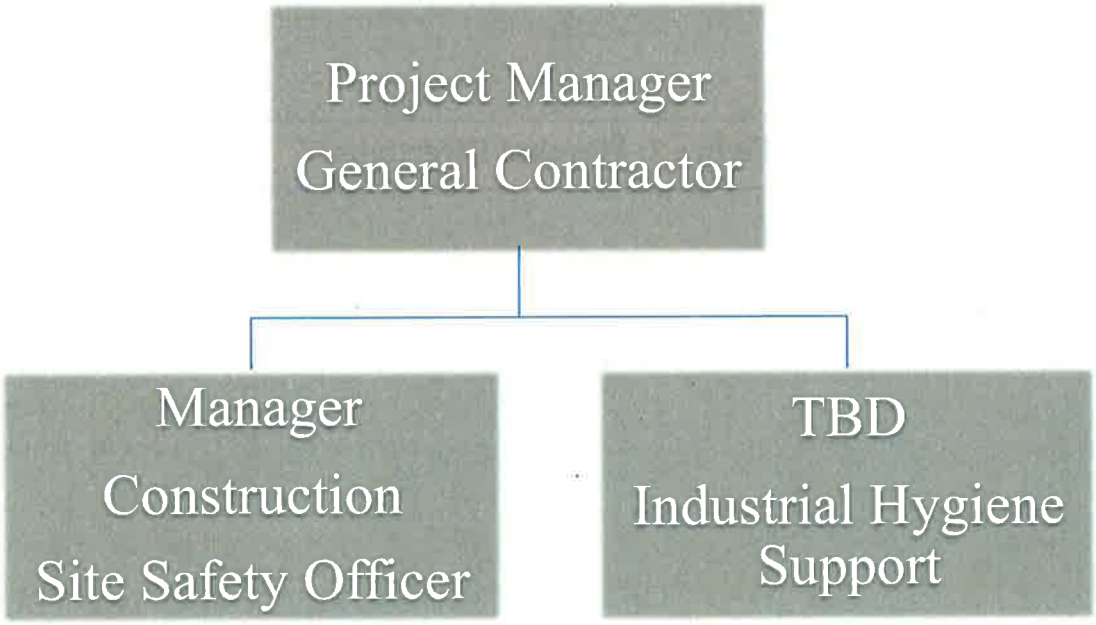
† Chest X-Ray required only if requirements for asbestos work as dictated by conditions (Classed work or potential exposures at or above the PEL).

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Figure 1:
Cornerstone Earth Group Project Health and Safety Organization



Figure 1:
General Project Health and Safety Organization



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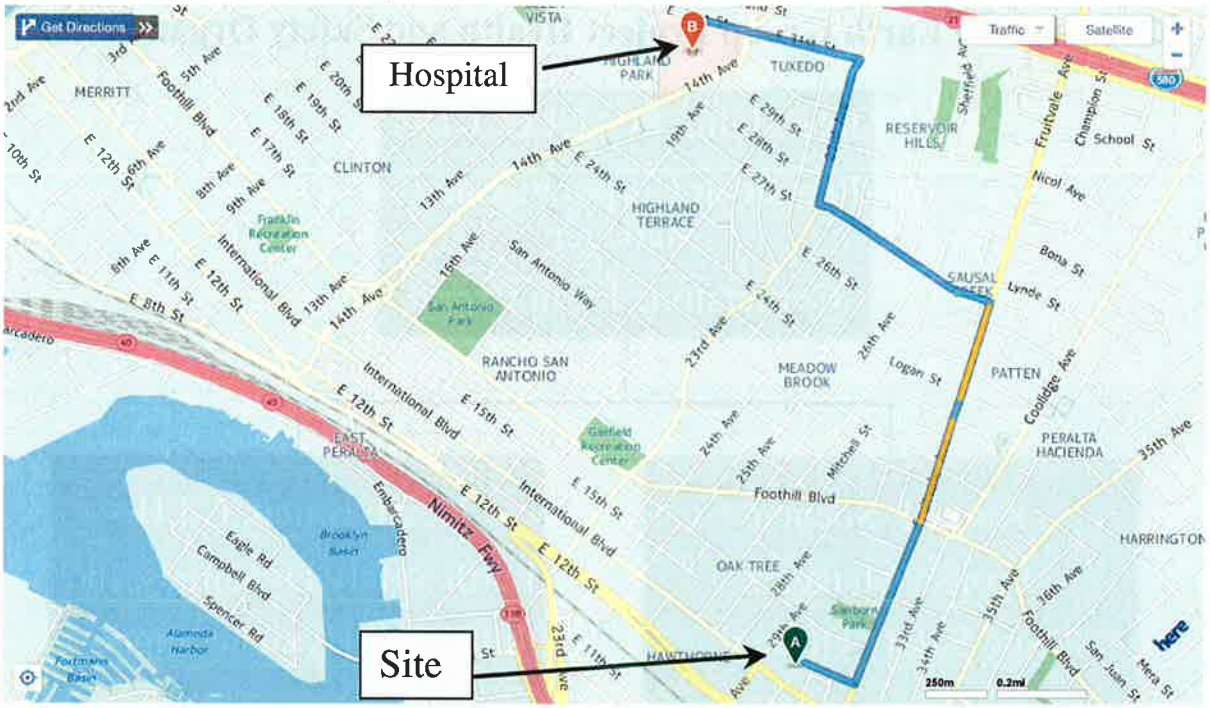


Figure 2: Hospital Directions

Health and Safety Plan Acknowledgement

I have read, understand, accept and will abide by all provisions of this Health and Safety Plan. I also agree to inform my supervisor and/or the Site Safety Officer of any conditions which are or appear to be unsafe.

Date	Time	Name (Print)	Signature

APPENDIX A: CHANGES TO THIS HEALTH AND SAFETY PLAN

APPENDIX B: SAFETY INSPECTION REPORTS

APPENDIX C: EMPLOYEE EXPOSURE MONITORING RECORDS

APPENDIX D: OSHA LOG 300 SUMMARY

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APPENDIX E: EMPLOYEE MEDICAL SURVEILLANCE AND IMMUNIZATION RECORDS

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APPENDIX F: RESPIRATOR FIT TEST RECORDS

APPENDIX G: EMPLOYEE TRAINING RECORDS

APPENDIX H: SAFETY MEETING FORMS

APPENDIX I: INCIDENT REPORTS

CORNERSTONE EARTH GROUP

APPENDIX D – FINAL NOA O&M PLAN

CORNERSTONE EARTH GROUP

Type of Services	**Operations and Maintenance Plan**
Location	**Aspire ERES Academy** **2956 International Boulevard** **Oakland, California**
Client	**Aspire Public Schools**
Client Address	**1001 22nd Avenue, Suite 300** **Oakland, California 94606**
Project Number	**729-4-6**
Date	**June 19, 2017**

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CORNERSTONE EARTH GROUP

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CORNERSTONE EARTH GROUP

Type of Services	**Operations and Maintenance Plan**
Location	**Planned Aspire ERES Academy** **2956 International Boulevard** **Oakland, California**

SECTION 1: OPERATIONS AND MAINTENANCE OVERVIEW

This Operations and Maintenance (O&M) Plan has been prepared on behalf of Aspire Public Schools (Aspire) for the cap remedy installed at the planned Aspire ERES Academy located at 2956 International Boulevard in Oakland, California (Site; see Appendix A, Figures 1 and 2). The O&M Plan presents the policies and procedures for long-term operation, maintenance, and monitoring of engineering controls and management of soils containing naturally occurring asbestos (NOA). This O&M Plan was prepared using language and formatting from the California Department of Toxic Substances Control (DTSC) O&M Plan Template for NOA Response Actions at Schools, dated October 11, 2005.

As stated within the Final Removal Action Work Plan (RAW) dated June 19, 2017 prepared by Cornerstone Earth Group (Cornerstone), actionable concentrations of NOA were identified in soils at the Site. Thus, an engineering control in the form of a cap was placed over soil containing actionable levels of NOA to create a barrier, greatly reducing exposures. Long-term remedy O&M activities are required to monitor and protect the cap. Accordingly, Aspire and DTSC will enter an agreement that requires Aspire to implement the O&M Plan under DTSC oversight. NOA intrusive activities, as defined in Section 7, are prohibited at the school site unless conducted in accordance with applicable provisions of the O&M Plan.

This O&M Plan will be implemented upon completion of RAW implementation activities. Plan response actions and long-term O&M activities will continue to be conducted under DTSC oversight, as required under the California Education Code (CEC), §17213.1 and §17213.2, and Health and Safety Code (H&SC), Division 20, Chapter 6.8, commencing with §25300 et. Seq. The Final O&M Plan, as modified and/or approved by DTSC, will remain in effect until DTSC has released Aspire in writing from the required O&M Plan, as specified in Section 10.3.

1.1 O&M PLAN GOAL AND OBJECTIVES

The primary goal of this O&M Plan is to prevent uncontrolled NOA exposures and to protect the health of students, faculty, staff, O&M personnel, and visitors at the Site. To accomplish this goal, the O&M Plan addresses the following objectives:

- Minimize disturbances of NOA containing soils;
- Describe the mitigation remedy, including installed cap systems;

- Establish an observation and monitoring program to identify areas of exposed NOA containing soils or damaged cap systems, and evaluate ongoing remedy effectiveness;
- Provide for timely repair or replacement needed to restore damaged cap systems;
- Train O&M inspectors, and other staff needed in personal health and safety protection and proper methods of observation and repair of cap systems;
- Provide for record-keeping of observations and repairs, and DTSC reporting requirements; and
- Make the O&M Plan available for public review with copies maintained at the Site and Aspire's office.

1.1.1 Naturally Occurring Asbestos (NOA) Hazard Summary

Asbestos is the common name for the fibrous form of certain naturally occurring iron-magnesium-silicate minerals. Six asbestos minerals are currently regulated by the EPA and the State of California. These six minerals are classified in two different groups based on their crystallographic structure and chemistry: a) chrysotile (serpentine group) and; b) amosite, crocidolite, actinolite, athophyllite and tremolite (amphibole group). All regulated forms of asbestos are considered potentially hazardous and classified as a known human carcinogen by State, Federal and international agencies. As defined in H&SC §25316 and §25260, asbestos is both a hazardous substance and a hazardous material.

Human health effects of asbestos are dependent primarily upon exposure to airborne asbestos fibers, which can be inhaled deeply into lungs. Exposure to asbestos through inhalation can result in health impacts including respiratory disease (asbestosis, a non-cancerous fibrosis of the lungs) and lung cancer (mesothelioma, cancer of the lung lining). In addition, asbestos and tobacco smoke in tandem have higher incidents of lung cancer. The longer a person is exposed to asbestos and the greater the intensity of exposure, the greater the chances for development of health problems.

1.1.2 O&M Personnel Roles and Responsibilities

Aspire will employ and designate the following key O&M personnel associated with implementation of the O&M Plan at the school sites: NOA Project Coordinator; O&M Project Professional; and School Site Designee. Aspire will retain a qualified professional to conduct observation training and a Competent Person (see Sections 4.2 and 7.4) to conduct asbestos awareness training. When necessary, Aspire will employ qualified contractors who will follow the Standard Operating Procedure (SOP) or a DTSC approved revised SOP (as described in Section 7.3) to perform NOA intrusive work impacting the installed cap systems at the Site. Appendix B includes the matrix for identifying O&M personnel roles and responsibilities. Aspire will notify DTSC within 14 days of any changes in the names, addresses, or telephone numbers for the key O&M personnel.

NOA Project Coordinator: *to be determined*
Aspire Public Schools
1001 22nd Avenue, Suite 300
Oakland, California 94606
Phone:
Mobile:
Email:

NOA Project Coordinator (Alternate): *to be determined*
Aspire Public Schools
1001 22nd Avenue, Suite 300
Oakland, California 94606
Phone:
Mobile:
Email:

This O&M Plan will be updated once contact information for the NOA Project Coordinators has been established.

The responsibilities of the NOA Project Coordinator are to:

- Implement the O&M Plan;
- Be familiar with Site conditions and cap systems installed at the Site;
- Evaluate work orders to determine if work will be NOA intrusive;
- Oversee implementation of a DTSC approved SOP for NOA intrusive work;
- Receive and submit all notices, comments, documents, reports, approvals, decisions, and other communications to and from DTSC on behalf of Aspire for the Site;.
- Identify and oversee provisions of observation training and asbestos awareness training;
- Accompany O&M Project Professional during annual observations;
- Submit O&M Plan and all subsequent reports, including Annual Observation Summary Reports, Five Year Review Reports, and NOA Intrusive Work Completion/Incident Reports; and
- Ensure that issues pertaining to O&M are brought to the attention of Aspire's Board, as appropriate, including requests for ongoing appropriations of funds and notification in the event that any exposures of NOA occur at the Site.
- Ensure the preservation of reports, forms and other records (e.g., O&M inspection summary reports, completed inspection forms, training records);
- Oversee the completion of periodic inspections with the O&M Professional in accordance with the schedule presented in Table 3; and,
- Ensure identified repairs are completed on schedule.

O&M Project Professional: Ms. Sarah Kalika
Cornerstone Earth Group
11270 Springbrook Road, Suite 101
Walnut Creek, California 94597
Phone: (925) 988-9500
Mobile: (925) 788-1999
Email: skalika@cornerstoneearth.com

Pursuant to Business and Professions Code, Chapters 7 and 12.5, and the California Code of Regulations, Title 16, Chapters 5 and 29, the O&M Project Professional is a California registered professional with expertise in NOA investigation and remediation, e.g., engineer or geologist, who is familiar with the cap systems installed at the Site. Slope stability is not anticipated to be an issue at the Site. To demonstrate expertise in NOA investigation and mitigation, the resume of the O&M Project Professional is included in Appendix C.

The responsibilities of the O&M Project Professional are to:

- Conduct annual observations (including the five-year reviews);
- Provide annual asbestos awareness training;
- Oversee the completion of periodic inspections in conjunction with the NOA Coordinator in accordance with the schedule presented in Table 3;
- Be responsible for evaluating the capping system performance, maintenance, and repair in conjunction with the NOA Coordinator;
- Prepare and sign Annual Observation Summary Reports and Five-Year Review Reports; and
- Perform other environmental professional work related to NOA matters at the Site as requested by Aspire.

1.1.3 School Site Designee(s)

The new school will be assigned a School Site Designee. The responsibility of the School Site Designee(s) is to:

- Ensure that all school staff with O&M roles has received appropriate training and direction;
- Ensure that activities which may potentially disturb NOA containing soils will not be conducted at Site without the knowledge and approval of the NOA Project Coordinator; and
- Provide information, as necessary, to staff and parents concerning any releases of NOA at the Site (information releases for NOA are prepared by Aspire, not on a local level).

1.2 PRELIMINARY O&M COST ESTIMATE

O&M begins upon completion of remedy installation. For planning purposes, Table 1 presents the estimated annual O&M costs.

Table 1: Estimated Annual O&M Costs*

Item	Preliminary Estimated Fee
Training (by consultant): training materials preparation and on-Site training session	$2,000
Scheduled Observations (by school staff): quarterly observation and documentation	$1,000
Annual Observation (by consultant): annual observation with DTSC, Aspire personnel	$1,000
Report Preparation (by consultant)	$3,000
DTSC Oversight: annual observation and report review	$2,000

*The fees presented within this table are an estimate based on the anticipated level of effort during the first two years of completed implementation.

SECTION 2: SITE DESCRIPTION

Table 2: Site Description

Designation	Description
Address	Aspire ERES Academy, 2956 International Boulevard, Oakland California
Location	The Site is bounded by East 15th Street to the north, Derby Avenue to the east, mixed-use developments to the west and beyond International Boulevard to the south.
Township & Range	Township 2 south, Range 3 West, Section 7 of Mt. Diablo Baseline and Meridian,
Assessor's Parcel Number	25-720-7-2, 25-720-1, and 25-720-2-1 (map and legal description provided in Appendix A)
Approximate Acreage	0.8 acres
Current Use	Prior to school construction, the Site consisted of a two-story apartment building, paved parking areas, and landscaping
Potable Water Supply	Provided by East Bay Municipal Utility District
Waste Water System	Site is connected to the publicly owned treatment works
USGS Topographic Quadrangle Oakland East, California 7.5 minute series, 1997	The Property is located at an elevation of approximately 50 feet above sea level; topography in the vicinity is generally flat, with a slight gradient to the southwest.

2.1 PREVIOUS ENVIRONMENTAL STUDIES

On behalf of Aspire, Cornerstone prepared a RAW to address soil, soil vapor, and ground water impacted with the chemicals of concern at the Site. The RAW was prepared at the request of the Department of Toxic Substances Control (DTSC) and presents a detailed summary of the prior environmental studies completed at the Site including a Phase I Environmental Site Assessment, Preliminary Environmental Assessment, and Supplemental Site Investigation. Please refer directly to the RAW for a complete overview of these prior studies.

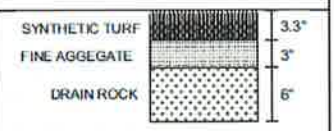
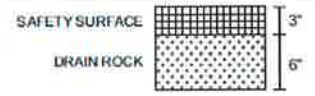
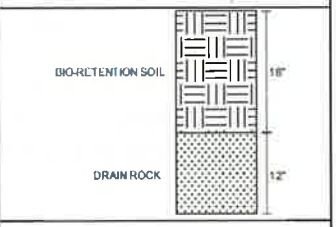
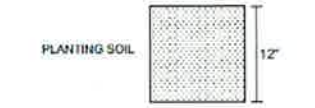
2.2 POST-MITIGATION SITE CONDITIONS

Aspire will develop the Site with the planned ERES Academy. The conceptual planned development is shown on Figure 2 in Appendix A.

SECTION 3: SUMMARY OF ENGINEERING CONTROLS

As discussed in the RAW, the selected remedy for the Site includes limiting exposure to NOA materials by installing a "cap". Table 3 presented below describes the specific NOA mitigation measures that will be implemented at the Site to limit future human contact with the NOA materials. The location of the planned engineering controls are shown on Figure 3 in Appendix A.

Table 3: Summary of Engineering Controls

Control System	Activity Level	System Components	Approximate Thickness	Demarcation Material	Conceptual Cross-Section
Hardscape	Low	Concrete	4 in. concrete over min. 6 in. aggregate base	None	Not available
		Asphalt pavement	3 in. pavement over min. 9 in. aggregate base		
Building Foundation	Low	Concrete	5 in. concrete over 1 in. sand over 6 in. gravel	None	Not available
Synthetic Turf	High	Synthetic turf	3.3 in.	None	
		Fine aggregate	3 in.		
		Drain rock	6 in.		
Play Area	High	Rubber safety surface	3 in.	None	
		Drain rock	6 in.		
Bio-Retention Area	Low	Bio-retention soil	18 in.	None	
		Drain rock	12 in.		
Landscape Area	Low	Planting soil	12 in.	Orange construction fencing	

Note: Bio-retention and landscape planting soils will be monitored by measuring the soil surface relative to the nearest hardscape feature (curb, pavement, concrete edge, etc.) and noted in the Observation Checklist (Appendix F).

SECTION 4: TRAINING

4.1 ASBESTOS AWARENESS TRAINING REQUIREMENTS

Asbestos awareness training is recommended for all Aspire maintenance and custodial staff (custodians, electricians, heating/air conditioning engineers, plumbers, etc.) who may come into contact with NOA containing soils at the Site. In accordance with California Code of Regulations (CCR), Title 8, Subchapter 4, Construction Safety Order, §1529(k)(9)(g), persons who may at any time be exposed to concentrations greater than the permissible exposure limit (PEL) for asbestos of 0.1 fibers per cubic centimeter of air (measured on an 8-hour time weighted average) must attend asbestos awareness training within sixty (60) days of hire, and must also attend annual refresher training.

The asbestos work class definitions and training requirements specified in Title 8 CCR, §1529(b) and 1529(k) refer primarily to "asbestos" or "asbestos containing materials (ACM)" and do not specifically address NOA; however, asbestos awareness training for NOA O&M activities will be consistent, i.e., work-equivalent, with these standards. See Appendix E for regulatory references.

Training provided to O&M employees will be commensurate with the OSHA work class and shall include, but not be limited to, the following subjects: methods of recognizing NOA; on-Site NOA locations; and health effects associated with asbestos exposure. Upon completion of training, O&M employees should have familiarity with appropriate hazard controls and work practices to avoid disturbing NOA and prevent NOA exposures (such as use of wet methods for dust suppression; protective clothing; dust or asbestos monitors; respirators; proper cleanup and disposal; decontamination of equipment and clothing; relationship between smoking, asbestos and cancer).

Video-taped Asbestos Awareness training may be an option as long as the training meets the criteria stated above; the video is up to date with any changes to the O&M Plan or engineering controls; and meets the following requirements: 1) Information in the training video is site specific, or is supplemented with site-specific information; 2) the students have an opportunity to ask questions of a knowledgeable person during the training (i.e., Competent Person who is familiar with the site [see Section 4.2]); and 3) the training is evaluated and found to be effective and adequate (i.e., employees can demonstrate sufficient knowledge of subjects described above). This evaluation can be done by the Project Coordinator and/or the O&M Project Professional. The use of video-taped training for new employees is not prohibited; however, there would be more of a burden on the District to demonstrate the effectiveness and adequacy of the training for such staff. The training shall be documented (as described in Section 8.6) and placed in the Inspection Summary Reports and Five-Year Reviews submitted to DTSC.

4.2 ASBESTOS AWARENESS COMPETENT PERSON

Aspire will designate a Competent Person (§1529(b)) to carry out training requirements as described in §1529(b) and (k) for O&M personnel. A "Competent Person" is one who:

- Can identify existing and predictable conditions in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees;
- Can identify existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure; and
- Has authority to take prompt corrective measures to eliminate such identified hazards.

The Competent Person may be an asbestos consultant, safety officer, or technician familiar with sampling techniques and potential asbestiform mineral formations. The Competent Person may utilize the assistance of the O&M Project Professional or other trained professionals as appropriate.

4.3 ASBESTOS O&M OBSERVATION TRAINING

A designated professional will conduct NOA observation training. The curriculum for NOA observation training will include, but not be limited to, the following subjects: overview of O&M Plan; descriptions and locations of on-Site mitigation measures/engineering controls; required

observation locations; recognition of deteriorated, eroded or damaged engineering controls; observation checklist completion; standard operating procedures (SOP) (see Appendix G). The SOP outlines policies and procedures for intrusive O&M work, i.e., maintenance and repairs, documentation of repairs, roles and responsibilities of O&M personnel and contact list of responsible persons.

New maintenance staff employees assigned to the schools, if expected to perform periodic observations of the NOA cap, will attend NOA observation training prior to performing observations at the Site. Training for designated maintenance staff will meet applicable requirements for 40 Code of Federal Regulations (CFR) 763.92(a)(1), [see Appendix E, 40 CFR Training Requirements for Asbestos Containing Materials in Schools] and 8 California Code of Regulations (CCR) §1529(k)(9)(G), Training Requirements for Asbestos in Construction (see Appendix E).

SECTION 5: O&M OBSERVATIONS

Table 4 presented below provides a summary of the annual observation and reporting schedule. Additional information is provided in Sections 5.1, 5.2, and 5.3.

Table 4: Annual Observation/Reporting Schedule

Annual Observation/Reporting Events	Timeframe
Periodic Observation	Quarterly
Annual Observation	**[month to be determined]**
Unplanned Observation	Following disturbance of cap, heavy rain event, or significant seismic event (>5.0M)

5.1 PERIODIC OBSERVATIONS

Periodic observations of the engineering controls will be conducted on an approximate quarterly basis and will be performed by Aspire under the direction of the NOA Project Coordinator. A checklist for the specific control measures must be completed for each observation. Upon completion, the checklists will be reviewed and signed by the NOA Project Coordinator (see Appendix F).

Aspire employees who are assigned to conduct O&M observations will be responsible for identification of any required repairs, and documentation of changes in Site conditions or usage, descriptions of any on-Site construction activities, or any other significant information related to effectiveness of the NOA engineering controls. Examples of such conditions include cracks in caps or sloped areas, soil movement, rivulets (a small stream), run-on or run-off or water (storm or irrigation), worn grass areas, visible geotextile/markers, and visible bare soils containing NOA.

Periodic observation reports will be maintained on-Site at the school and in the Aspire administrative files. All observation records will be available for DTSC and public review. Aspire employees who conduct periodic observations will take photographs during each observation for documentation as appropriate to demonstrate stability and/or failure of engineering controls.

The NOA Project Coordinator will be responsible for confirming that identified repairs are completed on schedule, and will sign-off in the completion blocks of the observation reports. Copies of periodic observation reports will be included in the Annual Cap Observation Summary Reports and Five Year Reviews submitted to DTSC.

5.2 OBSERVATIONS FOR UNPLANNED EVENTS

Aspire employees will also conduct observations of engineering controls during or immediately following unplanned events such as fires, broken utility lines, floods and/or heavy rain, seismic events, etc., where caps may be comprised and NOA soils may be exposed. "Heavy" rain for this Site may be defined as a precipitation event exceeding 0.5 inches per hour, using an on-Site rain gauge or forecast from the National Weather Service. "Significant" seismic events may include those earthquakes occurring nearby of a magnitude exceeding 5.0 on the Richter Scale. The NOA Project Coordinator will document all observations and required repairs or maintenance, and incorporate such documents into the Annual Cap Observation Summary Report.

The NOA Project Coordinator will notify DTSC of any failures, i.e., comprised integrity or possible NOA exposures, of the engineering controls resulting from unplanned events that are not repaired, following the SOP, within 14 days of discovery; such notifications will include a proposed schedule for completion of required repairs and maintenance.

5.3 ANNUAL OBSERVATIONS

The NOA Project Coordinator or O&M Project Professional, on behalf of the Project Coordinator, will notify DTSC at least 14 days in advance of each annual observation. The first annual observation will be completed by **[DATE]**, and all subsequent annual observations will be completed by **[DATE]** of every year thereafter.

All NOA engineering controls will be observed annually by the O&M Project Professional with experience in evaluating cover systems, and, when appropriate, slope stability issues. The NOA Project Coordinator may accompany the O&M Project Professional during the annual observation. The purpose of this observation is to identify and review completion of any required repairs, changes in Site conditions or usage, descriptions of any on-Site construction activities, or any other significant information relating to the NOA engineering controls that may have taken place over the previous twelve months.

During observations, all items flagged for required maintenance will have a specified action date for completion of required repairs. The NOA Project Coordinator is responsible for confirming that identified repairs are completed on schedule, and will sign-off in the completion blocks of the observation records. The NOA Project Coordinator will notify DTSC of any failures of the engineering controls that are not repaired following the SOP within 14 days of discovery; such notifications will include a proposed schedule for completion of required repairs and maintenance.

The Annual Observation Summary Report will be submitted to DTSC for review and approval within 60 days after completion of each annual observation, in accordance with reporting and notice requirements specified in Sections 8.2 and 8.5.1.

SECTION 6: FIVE-YEAR REVIEW

Five-Year Reviews will be conducted to evaluate ongoing remedy effectiveness where NOA remains in place. The purpose of five-year reviews is to determine whether the remedy:

- Remains protective of human health and the environment;
- Is functioning as designated; and
- Is maintained appropriately by O&M activities.

Each Five-Year Review will be conducted by the O&M Project Professional, who will prepare and sign the Five-Year Review report following the outline in Appendix J.

The NOA Project Coordinator, or O&M Project Professional on behalf of the NOA Project Coordinator, will notify DTSC at least 14 days in advance of each Five-Year Review observation. The first Five-Year Review observation will be completed by **[Date]**, and all subsequent annual observations will be completed by **[Date]**.

NOA engineering controls will be observed by the O&M Project Professional in the same manner as in the annual observation. The purpose of the 5-year observation is to identify and review completion of any required repairs, changes in Site conditions or usage, descriptions of any on-Site construction activities, or other significant information related to the NOA engineering controls that may have taken place over the previous five years. Measurement and evaluation of the clean fill cap overlying the NOA will also be part of each five-year inspection.

During observations, all items flagged for required maintenance will have a specified action date for completion of required repairs. The NOA Project Coordinator is responsible for confirming that identified repairs are completed on schedule and will sign-off in the completion blocks of the observation reports. The NOA Project Coordinator will notify DTSC of any failure of the engineering controls that is not repaired following the SOP within 14 days of discovery; such notifications will include a proposed schedule for completion of required repairs and maintenance.

The 5-year Review Report will be submitted to DTSC for review and approval within 60 days of completion of the fifth-year observation, in accordance with reporting requirements specified in Section 8.4. Aspire will perform additional NOA investigation, monitoring, and/or mitigation as required by DTSC based upon the findings of each Five-Year Review report.

SECTION 7: INTRUSIVE WORK ACTIVITIES

O&M personnel are required to submit all Site construction and maintenance work order requests, proposed to be conducted within the capped area, to the NOA Project Coordinator. The NOA Project Coordinator will evaluate in writing whether or not activities described in the work orders are considered "non-NOA intrusive" or "NOA intrusive". "NOA intrusive" activities are prohibited at the Site unless conducted in accordance with applicable provisions of the O&M Plan. "NOA intrusive" work includes any construction or maintenance work activities that disturb NOA containing soils including but not limited to: digging, drilling, excavating, grading, repairing,

removing, trenching, filling, gardening, and other soil movement that may penetrate or otherwise compromise the caps in place, thereby opening pathways for possible human exposures to NOA. If work is determined to be NOA intrusive, the NOA Project Coordinator will ensure that work practices are followed as specified in Sections 7.2, 7.3 and 7.4 of the O&M Plan. Advance notice of scheduled work will also be provided to DTSC as specified in Section 8.5.

7.1 NON-NOA INTRUSIVE WORK

Construction, repair, and/or maintenance activities at the Site are restricted by DTSC in accordance with the O&M Plan only when exposures of NOA containing soils are reasonably anticipated or when releases occur. Notifications to DTSC for construction, repairs, and/or maintenance activities are not required unless NOA soils are expected to be disturbed, or are inadvertently disturbed. "Non-NOA intrusive work" is defined as including construction, repairs, and/or maintenance activities at the Site where exposure to NOA containing soils is not anticipated and where the integrity of engineered control, such as hardscaped or landscaped caps, is not compromised. Aspire policies require the following procedures be taken when conducting non-NOA intrusive work at the Site:

- NOA Project Coordinator will provide information regarding location of cap systems and soils containing NOA to selected contractors and O&M personnel to minimize likelihood of NOA intrusion;
- O& M Professional and/or O&M personnel will conduct visits during construction and/or maintenance activities at the Site to ensure NOA containing soils are not being disturbed; and
- If NOA containing soils are inadvertently disturbed, the integrity of engineered controls is compromised, the NOA Project Coordinator will be responsible for notifying DTSC and implementing the appropriate procedures in accordance with the provisions described in Section 7.2.

7.2 NOA INTRUSIVE WORK

The following procedures are required by Aspire when performing NOA intrusive construction, repair, and/or maintenance activities to:

- Ensure that safeguards are in place to prevent or minimize NOA exposures to anyone at the Site;
- Prevent untrained or unauthorized personnel from performing intrusive work in NOA areas; and
- Restore the integrity of engineering controls (cap systems) in place if impaired or compromised by such activities.

These procedures will be overseen by the NOA Project Coordinator for all NOA intrusive work (as defined in Section 7.0 of this O&M Plan) performed by, or on behalf of, Aspire at the Site:

- Provide information regarding location of cap systems, cross-section construction details, and locations of all soils containing NOA to selected contractors;
- Verify that selected contractors and their employees will comply with Federal and State OSHA requirements (see Appendix E);
- Require Aspire employees to follow established Site-specific health and safety requirements (see Section 7.4) before starting NOA intrusive work;

- Require that construction and maintenance work be performed under and in accordance with a DTSC approved SOP (see Appendix G);
- Evaluate timelines, school and work schedules to ensure that NOA intrusive work is completed as soon as possible to minimize exposure risks;
- Require reasonable restrictions to Site access to reduce exposures to non-workers during NOA-intrusive activities;
- Implement dust control practices that utilize water;
- Manage any NOA containing or impacted soils brought to the surface in accordance with the soil management plan and in compliance with applicable, relevant, and appropriate provisions of State and Federal law; and
- Comply with all applicable, relevant and appropriate Federal, State and local requirements, such as the California Air Resources Board (CARB) Final Regulation Order, Section 93105, *Asbestos Airborne Toxics Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations*, also Section 93106, *Asbestos Airborne Toxic Control Measure for Surfacing Applications*.

7.3 STANDARD OPERATING PROCEDURE (SOP)

Whenever possible, NOA intrusive construction or maintenance work activities will be conducted in accordance with the DTSC approved SOP (see Appendix G for SOP). Except in unplanned situations, advance notification to DTSC will be submitted in accordance with requirements in Section 8.5. The SOP will be prepared in advance of proposed intrusive construction or maintenance work activities and submitted for DTSC review prior to implementation of the work.

The SOP identifies procedures to be followed for NOA intrusive work, including:

- Stabilization of Site;
- Limit on-Site access as appropriate;
- NOA exposure monitoring for workers;
- Required notification to DTSC;
- Management of excavated soils including dust control and soil segregation;
- Decontamination procedures for excavation equipment and workers;
- Geo-textile/marker, cap repair, or fill replacement procedures including temporary measures; and
- Evaluation and use of new fill materials.

If Site conditions are not adequately addressed in the pre-approved SOP, modification or revision of the SOP may be required. For example, the SOP does not include provisions for conducting air monitoring at fence lines, or use of a meteorological air station. When such air monitoring is required pursuant to Cal-OSHA or other regulatory requirements such as CARB's ATCMs (see Section 7.4), a modified or new SOP detailing such procedures will be submitted in advance for review by DTSC.

7.4 HEALTH AND SAFETY REQUIREMENTS

Aspire will designate a Competent Person (§1529[b]) to conduct an exposure assessment at the initiation of any NOA-intrusive construction operation (§1529[f][2][A]) to ascertain where airborne asbestos fibers may exceed the PELs (§1529[c]) during that operation. A "Competent Person" is one who:

- Can identify existing and predictable conditions in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees;
- Can identify existing asbestos hazards in the workplace, and selecting the appropriate control strategy for asbestos exposure; and
- Has authority to take prompt corrective measures to eliminate such identified hazards.

The Competent Person may be an asbestos consultant, safety officer or technician familiar with sampling techniques and potentially asbestiform mineral formation; the Competent Person may utilize the assistance of the O&M Project Professional or other trained professionals as appropriate. All personnel performing the O&M activities specified in the O&M Plan will be responsible for operating in compliance with the most current requirements of:

- Title 8, California Code of Regulations, §5192 (8 CCR 5192), General Industry and Construction Safety Orders;
- Title 8, California Code of Regulations, §1529 (8 CCR 1529), Asbestos, Construction Safety Orders;
- Title 29, Code of Federal Regulations, §1910.120 (29 CCR 1910.120), "Standards for Hazardous Waste Operations and Emergency Response (HAZWOPER)."
- Title 29, Code of Federal Regulations, §1926 (29 CFR 1926), Construction Industry Standards;
- Title 40, Code of Federal Regulations, §763, Subpart E (40 CFR 763), Asbestos Containing Materials in Schools;
- California Air Resources Board (CARB) Section 93105 – "Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations" and CARB Section 93106 – "Asbestos Airborne Toxic Control Measure for Surfacing Applications" as applicable; and
- Applicable local, State and Federal guidelines not listed above.

Site-specific health and safety requirements will be identified for the Site under the supervision of a certified industrial hygienist in accordance with current health and safety standards as specified by the Federal and California OSHA agencies. These requirements will be addressed in a Health and Safety Plan (HASP) that identifies proposed NOA intrusive work activities and specifies Site characteristics, current conditions, history, physical and chemical hazards, and methods of handing and controlling NOA to prevent or minimize exposures.

All personnel who perform NOA intrusive work at the site must follow these requirements. In addition, contractors doing fieldwork in association with this O&M Plan will develop their own HASP, which, at a minimum, meets the Site-specific requirements. A copy of a "Plan Acceptance Form" will be included in the HASP. All on-Site personnel will read the requirements and sign the "Plan Acceptance Form" before starting the specified NOA intrusive work.

SECTION 8: REPORTING AND RECORD KEEPING

8.1 DTSC REPORTING REQUIREMENTS

The NOA Project Coordinator will maintain records of training provided to O&M personnel, compile appropriate information, develop, and submit the following reports to DTSC:

- Annual Observation Summary Reports;
- Completion reports for NOA intrusive work; and
- Five-Year Review Reports.

8.2 ANNUAL OBSERVATION SUMMARY REPORTS

Annual Observation Summary Reports will summarize the periodic observations and will document completions, delays, or failures to repair any items identified as needing repairs. The Annual Observation Summary Report will be signed by the O&M Project Professional and NOA Project Coordinator, and will be submitted by the NOA Project Coordinator for DTSC's review and approval no later than 60 calendar days after the annual observation has been conducted. Annual Observation Summary Reports will follow the format outlined in Appendix H and will be included and maintained in files at Aspire and at the school office.

Annual Observation Summary Reports will include the following:

- Copies and a summary of the signed periodic observation checklists completed since preparation of the previous Annual Observation Summary Report;
- Results of the annual visual observation, measurements of cap thicknesses for areas needing repair;
- Description of actions taken since completion of the previous O&M annual observation;
- Copies of work orders and Completion Reports for any NOA intrusive work;
- Description of any maintenance or repairs identified as needed during the O&M annual observation;
- Description of recommendations or O&M Plan modifications;
- Description of actions planned or expected to be undertaken before the next O&M annual observation that will impact the engineering controls;
- Recommendations concerning any repairs to the installed caps that are still needed;
- Photographs depicting Site conditions to help demonstrate stability and/or failure of engineering controls;
- Conclusions regarding the ongoing effectiveness of the cap systems; and
- Documentation of additional NOA investigation, monitoring and/or mitigation activities required by DTSC.

8.3 COMPLETION REPORT FOR NOA-INTRUSIVE WORK

Within 60 days of completion, NOA intrusive work activities will be documented in a Completion Report, prepared by the O&M Project Professional, with information provided by the NOA Coordinator (as needed), to summarize the NOA intrusive work that has been done. The Completion Report will include the following information:

- Date of work performed;

- Work location with figures;
- Work activities performed, including restoration of cap systems where necessary;
- Work practices taken to prevent potential exposures;
- Variance or modification (if any) of the approved SOP; and
- Summary of finished Site conditions.

The O&M Project Professional will incorporate all Completion Reports for NOA intrusive work conducted during the year into the Annual Observation Summary Report. The format for Completion Reports will follow the outline in Appendix I.

8.4 FIVE-YEAR REVIEW REPORTS

The first Five Year Review Report for the Site will be completed five years from the date DTSC issued Site certification. All subsequent five-year review reports will be completed by **[DATE]** of every fifth year. The O&M Project Professional will complete the 5-Year Review Report. The NOA Project Coordinator will submit the 5-Year Review Report to DTSC for review and approval within 60 days after completion of each scheduled 5-Year Observation. Five-Year Review reports will be maintained in files at the school and Aspire administrative office, in accordance with Section 8.6 of the O&M Plan.

The 5-Year Review Report will follow the format in Appendix J to summarize remedy effectiveness in the five-year period. The report will identify any incidents or problems with the cap systems, and will evaluate system and component performance, effectiveness, and protectiveness. The 5-Year Review Report will state conclusions and make recommendations for any changes needed to maintain remedy protectiveness. Five-Year Review Reports will include the following components: Introduction, Site Background, Physical Setting, Site Chronology, Removal Actions, Five-year Review Process, Technical Assessment, Issues, Conclusions, Recommendations, and Cost Impacts. The "Technical Assessment" component will include a summary of the previous four annual reports and the information identified in the annual O&M observation.

In addition to the information required in the Annual Observation Summary Reports (see Section 8.2), the 5-Year Review Report will include a Technical Assessment and evaluation of the ongoing protectiveness of the remedy. This evaluation will address the following questions:

- Is the remedy functioning as intended at the Site by the remedy selection decision documents?
- Are the removal action objectives, goals, and criteria used at the time of the remedy selection still valid?
- Have there been any significant changes in the distribution of the subsurface NOA at the Site?
- Has any other information been provided to Aspire that could question the protectiveness of the remedy?
- Are any modifications needed to make the O&M Plan more effective?

8.5 NOTIFICATION AND REPORTING OF NOA INTRUSIVE WORK

Activities that disturb NOA containing soils are restricted by DTSC in accordance with the approved O&M Plan. The NOA Project Coordinator will submit notice to DTSC in writing, in advance of any NOA intrusive activities (i.e. where cap systems may be breached or otherwise compromised during the course of construction, repair, or maintenance activities) that are

anticipated to exceed seven days in duration from start to completion. All NOA intrusive work activities will be conducted in accordance with a DTSC approved SOP (see Appendix G). Advance notification to DTSC is required if the pre-approved SOP is modified or substantially rewritten.

8.5.1 Notification Timeframes

Notification to DTSC is not required for the following activities at the Site.

- The activities are not anticipated to disturb NOA containing soils; and/or
- The projected NOA intrusive work duration is less than seven days from start to finish and will follow the SOP.

Notification to DTSC by the NOA Project Coordinator is required for the following activities:

- Notify DTSC 14 days in advance if the activities are for NOA intrusive work, are anticipated to exceed seven days in duration from start to finish, and will follow the SOP;
- Notify DTSC at least 14 days in advance if the activities are for NOA intrusive work, and will follow a modified SOP. DTSC's approval of the modified SOP will be obtained prior to implementation of work;
- Notify DTSC at least 30 days in advance if the activities are for NOA intrusive work, and will follow a new SOP. DTSC's approval of the new SOP will be obtained prior to implementation or work; and/or
- Notify DTSC of unplanned events (i.e. broken sewer lines) if not repaired within 14 days; submit a Completion Report within 60 days after completion of work.

A summary of the notice and reporting requirements is presented below in Table 5.

Table 5. Notice and Reporting Requirements

Activity	DTSC Notification	Report to DTSC
Activities not disturbing NOA containing soils	No	No
NOA intrusive work <7 days, follows SOP	No	No
NOA intrusive work >7 days, follows SOP	Yes 14 days ahead of work	No
NOA intrusive work >7 days, follows new SOP	Yes 30 days ahead of work, pending new SOP approval	No
Unplanned events	Yes, if not completed within 14 days	Yes, within 60 days of completed work

8.5.2 Electronic Mail Notice Format

Written communication to DTSC may be submitted via email.

8.6 RECORD KEEPING AND RETENTION

All documented records (i.e. data, reports and other documents) prepared under the O&M Plan will be maintained by the NOA Project Coordinator at Aspire's administrative office and at the school. The records will be available for review upon request by the public and DTSC representatives. The records will include, but are not limited to:

- Periodic observation checklist, annual observation summary reports, 5-year review reports, completion reports for NOA intrusive work, photographs associated with all of the above;
- Records of training for asbestos awareness and NOA observation;
- All NOA training sessions will be logged and recorded for the administrative record, and documented in the Annual Observation Summary Report submitted to DTSC;
- At a minimum, the log will identify the name of the company providing the training, instructor's name and title and qualifications, names and signatures of staff persons attending training, with staff job title, and date(s) of training.
- Records of personal air monitoring and perimeter air sampling for asbestos concentrations during construction and maintenance work activities;
- Records of public inquiries for information about NOA at the Site; and
- Investigation and mitigation documents (i.e. PEA, RAW, Removal Action Completion Report, and O&M Plan) including surveys, photographs, design specifications and as-built drawings, and appendices.

All records will be preserved by the NOA Project Coordinator for a minimum of 7 years after the conclusion of each relevant activity. The NOA Project Coordinator will notify DTSC in writing at least six (6) months prior to destroying any documents prepared pursuant to the O&M Plan. If requested by DTSC, the NOA Project Coordinator will make requested documents available for review or copy.

Because of potential volume of paper that could be generated or stored, the NOA Project Coordinator may elect to maintain paper copies of the previous 12 months of reports and the latest five-year report, if applicable, and keep the rest as electronic files (in pdf format). DTSC's Administrative Record for the Site is available for public review during office hours at the following DTSC location:

Department of Toxic Substance Control
8800 Cal Center Drive
Sacramento, CA 95826
Attention: Mark Malinowski

SECTION 9: SITE ACCESS

Upon request, access to the Site will be arranged and provided by the NOA Project Coordinator at all reasonable times to DTSC representatives or O&M personnel.

SECTION 10: VARIANCE, MODIFICATION AND TERMINATION OF O&M PLAN

The NOA Project Coordinator may seek variance, modification, and/or termination of the O&M Plan at any time during the life cycle of the cap remedy. "Variance" refers to possible release

from specific individual O&M Plan requirements for a limited time period, while "modification" refers to permanent revision of specific individual O&M Plan requirements. DTSC may allow variance, modification or termination of the O&M Plan if DTSC determines that:

- Such variance, modification or termination is protective of public health and safety and the environment; and/or
- It is neither feasible nor appropriate to continue the O&M Plan as a component of the remedy selected for the Site.

10.1 O&M PLAN VARIANCE

NOA Project Coordinator may apply to DTSC for a written variance from the provisions of the O&M Plan. DTSC will evaluate each request and grant a variance request only after determining that such a request would be protective of human health and the environment.

10.2 O&M PLAN MODIFICATIONS

When long-term performance of the selected cap remedies has been confirmed, the NOA Project Coordinator may apply to DTSC to modify the requirements of the O&M Plan based on Site-specific monitoring results and conditions. Additionally, DTSC reserves the right to independently initiate appropriate O&M Plan modifications. As a result, DTSC may require the following O&M Plan modifications:

- Changes in the frequency of the O&M activities;
- Modification, replacement, or addition of components to the O&M Plan if O&M activities fail to achieve the O&M objectives of protecting public health, safety and the environment; and
- Evaluation, design, construction, and/or operation of additional remedial measures to achieve the O&M objectives.

10.3 TERMINATION OF O&M PLAN

Based on review of a 5-Year Review Report or a subsequent Annual Observation Summary Report, DTSC may determine if the cap remedy has met either of the following performance criteria required for termination of O&M activities:

- Availability of new scientific information resulting in changes or modifications to DTSC's technical criteria for evaluating unacceptable risk levels of NOA concentrations in soils; and/or
- Change in land use, where the Site is no longer used as an educational facility.

As required by H&SC §25359.7, prior to the sale, lease or sublease of the Site, or any portion thereof, the NOA Project Coordinator will provide the buyer, lessee, or sub-lessee with notice that NOA containing soils are located on or beneath the school sites.

DTSC will notify the NOA Project Coordinator in writing when continued O&M activities for the cap remedies are no longer required. Because caps are not anticipated to have any adverse impacts on building foundation systems or other components, removal and/or decommissioning of the caps following termination of the O&M activities will not be required by DTSC.

SECTION 11: LIMITATIONS

This report was prepared for the sole use of Aspire Public Schools and the Department of Toxic Substances Control. Contractors working on-Site are responsible for the health and safety of their employees and subcontractors. Cornerstone Earth Group, Inc. makes no warranty, expressed or implied, except that our services have been performed in accordance with the environmental principles generally accepted at this time and location.

SECTION 12: REFERENCES

Bay Area Air Quality Management Aspire, 2002. *Regulatory Advisory, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations*, November 19, 2002.

Bay Area Air Quality Management Aspire, 2006. *Compliance Advisory: Asbestos Airborne Toxic Control Measure (ATCM) for Construction and Grading Projects,* August 8, 2006.

California Air Resources Board, 1991. *Method 435, Determination of Asbestos Content of Serpentine Aggregate*, June 6, 1991.

California Code of Regulations, 2002. *Title 17, Section 93105, Final Regulation Order, Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations*, November 19, 2002.

California Geological Survey, 2002. *Special Publication 124: Guidelines for Geologic Investigations of Naturally Occurring Asbestos in California*, 2002.

Cornerstone Earth Group, 2017. *Final Removal Action Work Plan, Planned Aspire ERES Academy, 2956 International Boulevard, Oakland, California*, dated June 19, 2017.

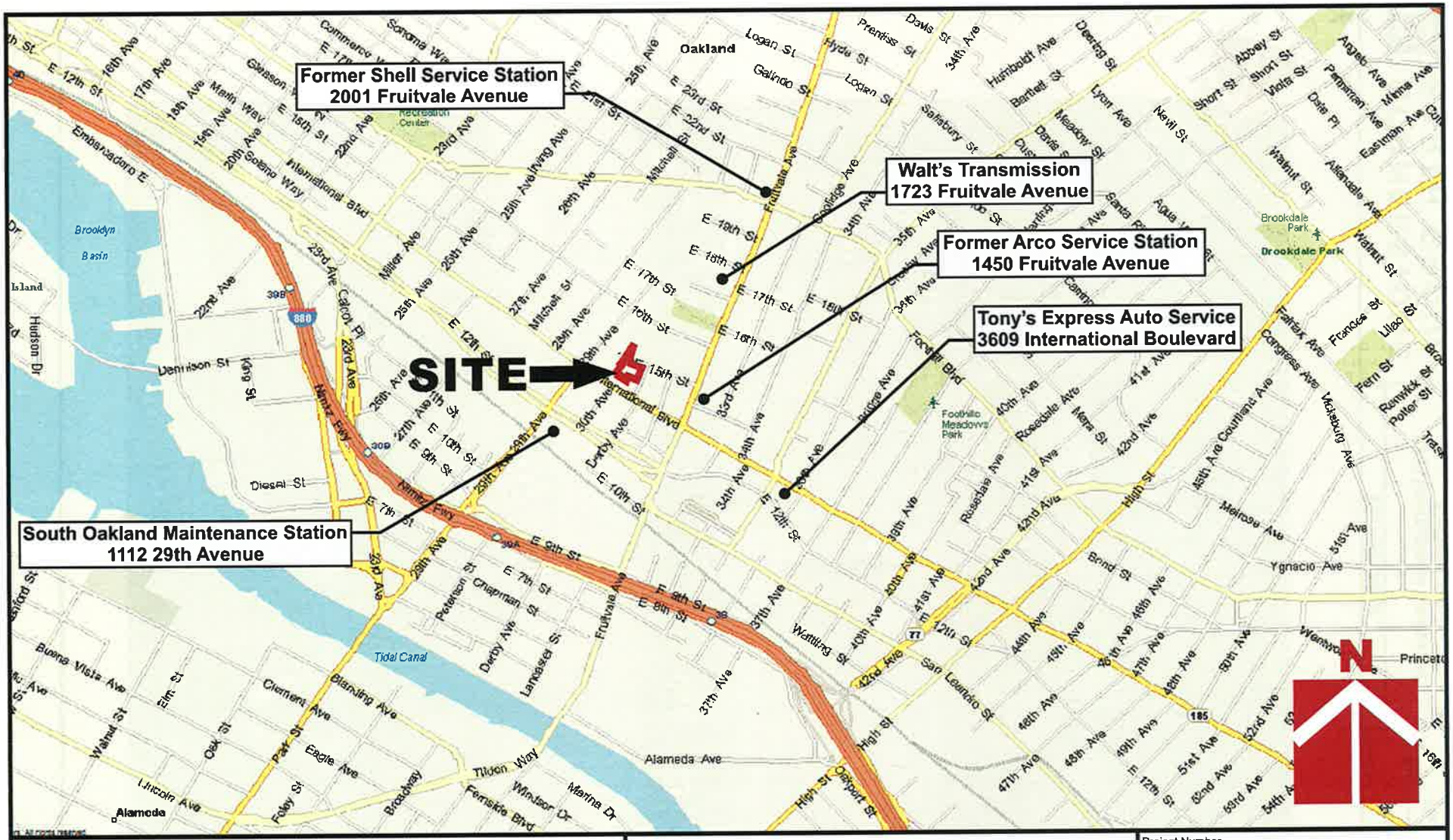
Cornerstone Earth Group, 2016. *Final Preliminary Environmental Assessment Report, Planned Aspire ERES Academy, 2956 International Boulevard, Oakland, California,* dated July 1, 2016.

Department of Toxic Substances Control, 2001. Information Advisory, Clean Imported Fill Material. October 2001.

Department of Toxic Substances Control, 2004. California Environmental Protection Agency Interim Guidance for Naturally Occurring Asbestos at School Sites, Revised September 24, 2004.

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APPENDIX A: FIGURES



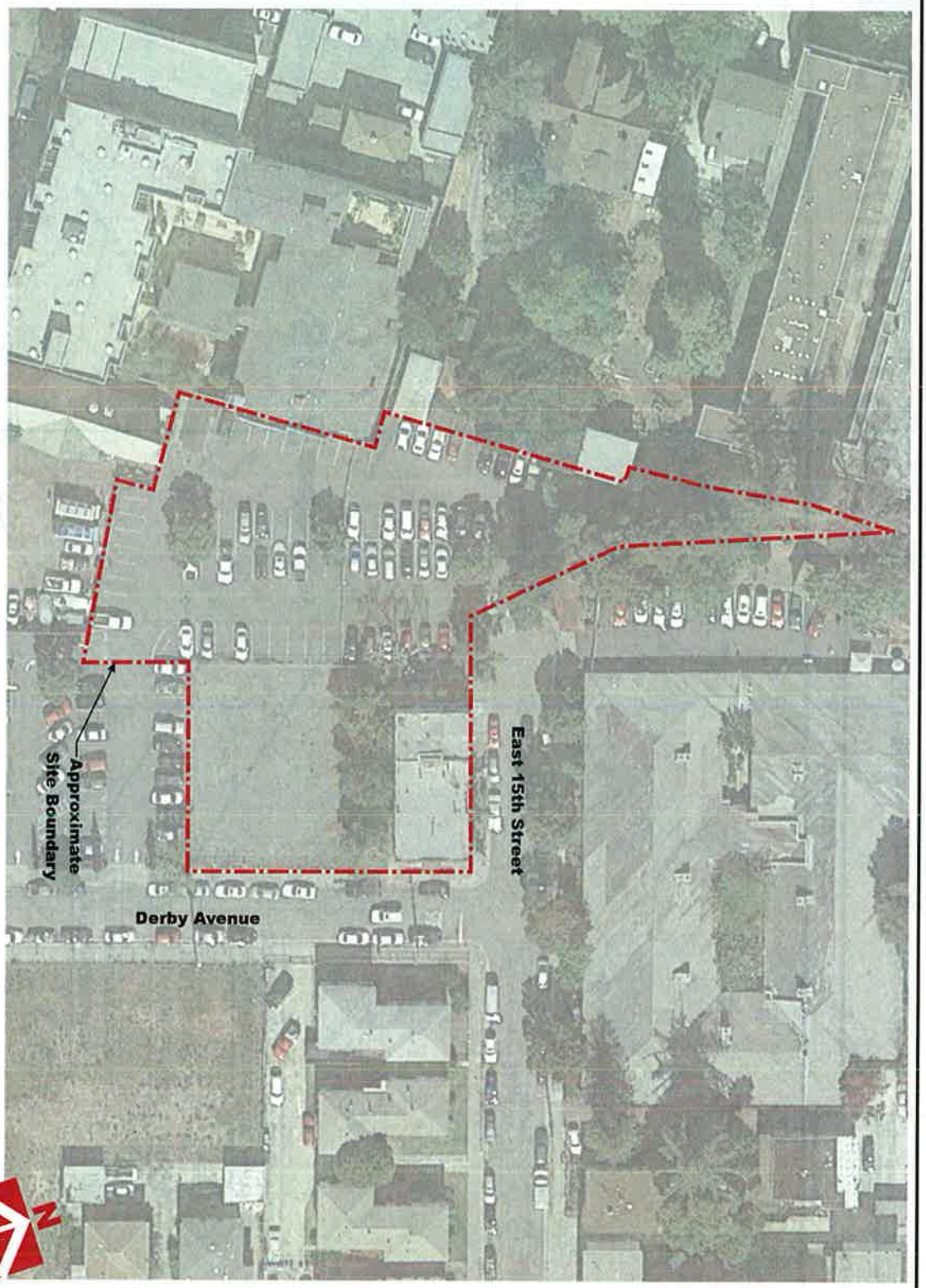
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Vicinity Map

2956 International Boulevard
Oakland, CA

Project Number	729-4-5
Figure Number	Figure 1
Date	June 2017
Drawn By	RRN

Base by Google Earth, dated 5/11/2015



APPROXIMATE SCALE (FEET)
0
50
100

N

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Site Plan - Aerial

2956 International Boulevard
Oakland, CA

Project Number	729-4-5
Figure Number	Figure 2
Date	June 2017
Drawn By	RRN, FLL



Base by K2A, Site Fire and Egress Plans - A0.04, dated 4/18/2016

Impermeable Surfaces

- BUILDING FOOTPRINT (5" concrete over 1" sand over 6" Class II aggregate base)
- CONCRETE PAVING (4" concrete over 4" Class II aggregate base)
- ASPHALT PAVING (3" concrete over 9" Class II aggregate base)

Permeable Surfaces

- BIO-RETENTION SOIL, (18" bio-retention soil over 12" drain rock)
- LANDSCAPE AREA, (12" planting soil)
- SAFETY SURFACE, (3" rubber over 6" drain rock)
- SYNTHETIC TURF, (3.3" turf over 3" fine aggregate over 6" drain rock)

N

0 40 80

APPROXIMATE SCALE (FEET)

Project Number 729-4-5

Figure Number Figure 3

Date June 2017

Drawn by RRN

Planned Cap Materials

2956 International Boulevard
Oakland, CA

CORNERSTONE EARTH GROUP

PARCEL MERGER/SITE PLAN

THAT REAL PROPERTY SITUATE IN THE CITY OF OAKLAND DESCRIBED AS PARCEL ONE OF THAT CERTAIN GRANT DEED FILED DECEMBER 31, 2015 IN RECORDERS DOCUMENT NUMBER 2015340920; THAT CERTAIN QUITCLAIM DEED FILED JUNE 3, 2005 IN RECORDERS DOCUMENT NUMBER 2005226878 AND PARCEL THREE OF THAT CERTAIN GRANT DEED FILED AUGUST 05, 2015 IN RECORDERS DOCUMENT NUMBER 2015215700, ALAMEDA COUNTY RECORDERS RECORDS

DATE: MAY 2016

BELLECCI & ASSOCIATES, INC.
CONCORD, CA

TITLE TO SAID ESTATE OR INTEREST AT THE DATE HEREOF IS VESTED IN:

RAMON D.J. NOBELA AND EVELYN NOBELA AS TRUSTEES OF THE RAMON D.J. AND EVELYN NOBELA LIVING TRUST DATED FEB 25, 2005, 3007 EAST 15TH ST.;

CITY OF OAKLAND, A MUNICIPAL CORPORATION AS TO PARCEL THREE, DERBY AVE;

TPC CS HOLDINGS I, LLC, AN IDAHO LIMITED LIABILITY COMPANY, AS TO PARCEL ONE, 2956 INTERNATIONAL BLVD..

DATUM NOTE:

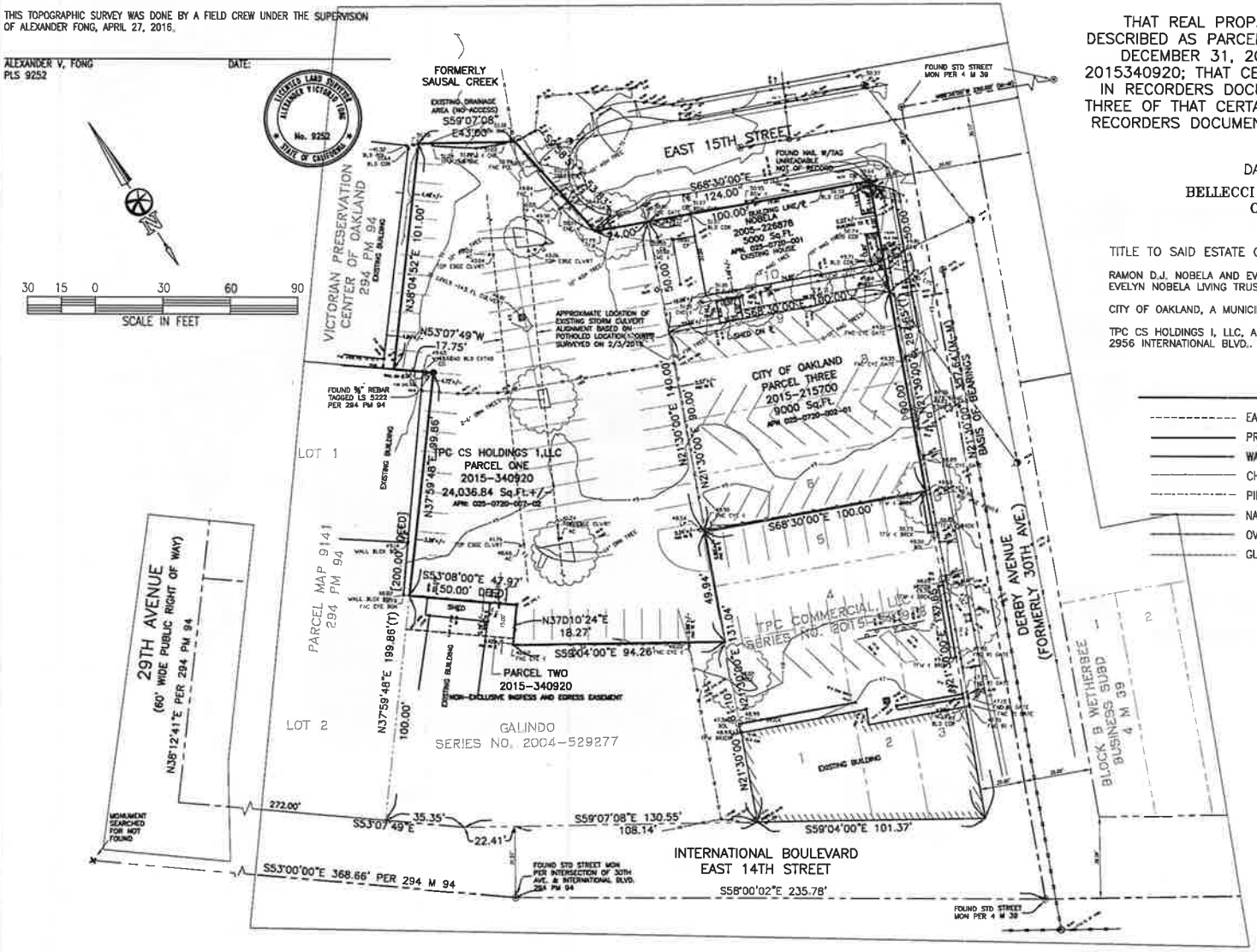
HORIZONTAL AND VERTICAL CONTROL DATA IS BASED ON REAL TIME GPS NETWORK OBSERVATIONS PROVIDED BY CALIFORNIA DRAFTING AND SURVEY SUPPLY. CALIFORNIA COORDINATE SYSTEM ZONE III, NAD83, NAVD88 DATUM.

THIS TOPOGRAPHIC SURVEY WAS DONE BY A FIELD CREW UNDER THE SUPERVISION OF ALEXANDER FONG, APRIL 27, 2016.

ALEXANDER V. FONG
PLS 9252

DATE:

REGISTERED LAND SURVEYOR ALEXANDER VICTOR FONG No. 9252 STATE OF CALIFORNIA



LEGEND

EASEMENT LINE	BOLLARD/POST
PROPERTY LINE	ELECTRIC
WALL	FIRE HYDRANT
CHAINLINK FENCE	FIRE SERVICE CONNECTION
PIPING	FIRE MARKER INDICATOR POST
NATURAL GAS UTILITY	FOUND MONUMENT
OVERHEAD LINE	GUY ANCHOR
GUARD RAIL	GUY POLE
	BACKFLOW PREVENTER
	WATER VALVE
	WATER BOX/METER
	GAS VALVE
	UTILITY 10" LID
	SANITARY SEWER CLEANOUT
	SANITARY SEWER MANHOLE
	STORM DRAIN MANHOLE
	STORM DRAIN INLET
	ELECTRICAL BOX
	TELEPHONE BOX
	LIGHT POLE
	SIGN
	UTILITY POLE

BLD	BUILDING
EP	EDGE OF PAVEMENT
FNC	FENCE
SD	STORMDRAIN
SL	STREETLIGHT
SSMH	SANITARY SEWER MANHOLE
TFRW	TOP FACE OF RETAINING WALL
WV	WATER VALVE

LEGAL DESCRIPTION
"EXHIBIT A"

All that real property situate in the City of Oakland, County of Alameda, State of California, described as follows:

All of Parcel Three as described within that certain grant deed to the City of Oakland recorded August 5, 2015 in document number 2015215700; all of that real property described within that certain quitclaim deed to Ramon D.J. Nobela and Evelyn Nobela, as Trustees of "The Ramon D.J. And Evelyn Nobela Living Trust" recorded June 3, 2005 in document number 2005226878; and all of Parcel One described within that certain grant deed to TPC CS Holdings I, LLC, an Idaho limited liability company recorded December 31, 2015 in document number 2015340920, Alameda County records, further described as follows:

Beginning at the northeast corner of Lot 1 as shown within that certain Parcel Map 9141 filed December 25, 2006 in Book 294, at Pages 94 to 98, Alameda County records, said corner being the True Point of Beginning for this description; thence along the northeasterly line of said Lot 1 of said map (294 PM 94) North 53°07'49" West, 17.75 feet, (a bearing taken for the purpose of this description); thence along the exterior line of said Parcel One of said grant deed (DN215340920) the following four (4) courses: North 38°04'52" East, 101.00 feet; South 59°07'08" East, 43.00 feet; South 9°58'51" East, 53.63 feet and South 68°30'00" East, 24.00 feet to the most northerly corner of said quitclaim deed (DN2005226878); thence along the northeasterly line of said deed (DN2005226878) to the most easterly corner of said (DN2005226878) South 68°30'00" East, 100.00 feet; thence southwesterly along the easterly line of said deed (DN2005226878) South 21°30'00" West, 50.00 feet to the most southerly corner of said deed (DN2005226878), said corner also being the most easterly corner of said Parcel Three of said grant deed (DN 2015215700); thence southwesterly along the easterly line of said Parcel Three (DN2015215700) South 21°30'00" West, 90.00 feet to the most southerly corner of said Parcel Three (DN2015215700); thence northwesterly along the southerly line of said Parcel Three (DN2015521700) North 68°30'00" West, 100.00 feet to the most westerly corner of said Parcel Three (DN2015521700); thence along the southerly prolongation of the westerly line of said Parcel Three (DN2015521700) South 21°30'00" West, 50.00 feet to the most southerly corner of said Parcel One

of said deed (2015340920); thence the following three (3) courses: North 59°04'00" West, 94.26 feet; North 36°52'00" East, 18.05 feet and North 53°08'00" West, 47.97 feet to a point lying on the easterly line of said map (294 PM 94); thence northeasterly along last said easterly line of said map (294 PM 94) North 37°59'48" East, 99.72 feet to the True Point of Beginning.

Containing an area of 38,036.84 Sq.Ft. (0.87 acres), more or less.

Attached hereto is a Plat labeled "Exhibit "B", hereby referred to and made a part hereof.

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APPENDIX B: MATRIX – O&M PERSONNEL ROLES AND RESPONSIBILITIES

CORNERSTONE EARTH GROUP

MATRIX – O&M PERSONNEL RESPONSIBILTIES

	NOA Project Coordinator	O&M Project Professional (Consulting PE or PG)	School Site Designee (Head Custodian)	Maintenance Staff
1. Training				
Coordinate training and refresher requirements for Aspire administrators, faculty and maintenance personnel.	X			
Track and schedule training and refresher requirements for Aspire staff.	X			
Coordinate NOA Awareness training for designated contractors working at the Site.	X			
2. Observations, Maintenance and Repairs				
Direct periodic/annual/5-year observations of engineered controls and completion of the observation checklists in compliance with O&M Plan.	X	X (annual and 5-year observations only)		
Monitor on-Site maintenance activities for compliance with dust mitigation and air monitoring requirements.			X	X

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MATRIX – O&M PERSONNEL RESPONSIBILTIES

	NOA Project Coordinator	O&M Project Professional (Consulting PE or PG)	School Site Designee (Head Custodian)	Maintenance Staff
Direct and oversee maintenance activities involving disturbance of NOA containing soils to help confirm that SOP is followed.	X			
Direct and oversee implementation of contingency plan in compliance with O&M Plan; obtain DTSC approval of work plan when required.	X			
Notify Aspire staff and parents regarding the O&M Plan; respond to questions.	X		X	
Perform observations, maintenance and repairs.	X		X	X
3. Record Keeping and Checklists				
Maintain records of all O&M related activities.	X			
Document activities that will potentially disturb NOA containing soils.	X	X (when given advance notice by Aspire)		

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MATRIX – O&M PERSONNEL RESPONSIBILTIES

	NOA Project Coordinator	O&M Project Professional (Consulting PE or PG)	School Site Designee (School Principal)	Maintenance Staff
Maintain and conduct quarterly review of Site files of maintenance reports.	X			
Complete and submit maintenance reports and records for agency review.	X	X (with details provided by Aspire)		
Document provision of NOA awareness training for designated contractors and staff.	X			
Complete observation checklist and file checklist.	X			
4. Reporting				
Coordinate reporting to regulatory agencies.	X			
Notify regulatory agencies of planned activities that disturb NOA containing soils but conducted pursuant to SOP.	X			

CORNERSTONE EARTH GROUP

MATRIX – O&M PERSONNEL RESPONSIBILTIES

	NOA Project Coordinator	O&M Project Professional (Consulting PE or PG)	School Site Designee (School Principal)	Maintenance Staff
Notify regulatory agencies of planned or unplanned activities conducted in accordance with a work plan approved by DTSC.	X			
Develop, complete, and submit periodic/annual/5-year reports.	X	X (annual / 5-year reports only)		

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APPENDIX C: RESUME OF O&M PROJECT PROFESSIONAL

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APPENDIX D: AS-BUILT DRAWINGS OF CAPPED AREA

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APPENDIX E: TRAINING REQUIREMENTS

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TRAINING REQUIREMENTS

40 Code of Federal Regulations (CFR) for Asbestos Containing Materials

Title 8 California Code of Regulations (CCR) for Asbestos in Construction

Note: As of September 2012, there are no Federal or State health and safety training requirements regarding work specifically related to NOA. The requirements stated below apply to work with Asbestos Containing Materials (ACM) and Potentially Asbestos Containing Materials (PACM), and will be used as guidelines for "best available management practices" when determining the level of training requirements for school Aspire maintenance staff. According to Cal-OSHA, outdoor soil grading and excavation generally falls under Class II Asbestos Work.

Class I Asbestos Work

In accordance with 8 CCR §1529 (b) and (k)(9)(E), "Class I asbestos work" by definition is activities involving the removal or thermal system insulation (TSI) and surfacing ACM and PACM. Training for Class I work shall be equivalent in curriculum training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR Part 763, Subpart E, Appendix C).

Class II Asbestos Work

In accordance with 8 CCR §1529 (b) and (k)(9)(E), "Class II asbestos work" by definition involves the removal of ACM which is not TSI or surfacing material. Training for Class II work shall be equivalent in curriculum training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR Part 763, Subpart E, Appendix C).

Class III Asbestos Work

In accordance with 40 CFR §763.92 (a)(1) and 8 CCR §1529 (k)(9)(E), "Class III asbestos work" by definition includes repair and maintenance operations where ACM are likely to be disturbed. Training for Class III work will be consistent with US EPA requirements for training of local education agency maintenance and custodial staff as set forth in 40 CFR §763.92(a)(2). Such a course shall also include "hands-on" training and shall take at least 16 hours.

Exception: For Class III operations for which the competent person determines that the US EPA curriculum does not adequately cover the training needed to perform that activity, training shall include as a minimum all the elements included in subsection (k)(9)(H) of this section. In addition, the specific work practices and engineering controls, set forth in subsection (g) of this section which specifically relate to that activity, shall include "hands-on" training in the work practices applicable to each category of material that the employee disturbs.

Class IV Asbestos Work

In accordance with 40 CFR §763.92(a)(1) and 8 CCR §1529 (k)(9)(F), "Class IV asbestos work" by definition includes maintenance and custodial activities during which employees contact but do not disturb ACM and activities to clean up dust, waste, and debris resulting from Class I, Class II and III activities.

Training for employees performing Class IV operations shall be consistent with US EPA requirements for training of local education agency maintenance and custodial staff as set forth in 40 CFR §763.92(a)(1). Such a course shall include available information concerning the locations of thermal system insulation and surfacing ACM/PACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been confirmed. Also included in this course will be instruction in recognition of damage, deterioration, and decontamination of asbestos containing building materials. Such course shall take at least 2 hours.

Other Training

In accordance with 8 CCR §1529 (k)(9)(G), training for employees who are likely to be exposed in excess of the Permissible Exposure Limit (PEL) and who are not otherwise required to be trained under subsections (k)(9)(C) through (F) of this section, shall meet the requirements of subsection (k)(9)(H) of this section.

(H) The training program shall be conducted in a manner that the employee is able to understand. In addition to the content required by provisions in subsections (k)(9)(C) through (F) of this section, the employer shall ensure that each such employee is informed of the following:

1. Methods of recognizing asbestos, including the requirement in subsection (k)(1) of this section to presume that certain building materials contain asbestos.

2. The health effects associated with asbestos exposure.

3. The relationship between smoking and asbestos in producing lung cancer.

4. The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures where Class III and IV work will be or is performed, the contents of EPA 20t-2003, "Managing Asbestos In Place" July 1990 or its equivalent in content.

5. The purpose, proper use, fitting instructions, and limitations of respirators as required by Section 5144.

6. The appropriate work practices for performing the asbestos job.

7. Medical surveillance program requirements.

8. The content of this standard including appendices.

9. The names, addresses, and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix I to this section, to comply with this requirement.

10. The requirements for posting signs and affixing labels and the meaning of the required legends for such sign and labels.

Access to Training Materials

1. The employer shall make readily available to affected employees without cost, written materials relating to the employee training program including a copy of this regulation.

2. The employer shall provide to DTSC, upon request, all information and training materials relating to the employee information and training program.

3. The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published.

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APPENDIX F: OBSERVATION CHECKLIST

CORNERSTONE EARTH GROUP

OBSERVATION CHECKLIST FOR NOA MITIGATION MEASURE AREAS

Date		**Inspector Name/Signature**	
Observation Frequency (circle one)		**Supervisor Name/ Signature**	

Hardscape Area		Surface Condition OK?	Maintenance Required	Recommended Action Schedule		
				Plan	Implement	Completion
Hardscape Systems		Yes / No	Yes / No			
		Yes / No	Yes / No			
Building Foundation		Yes / No	Yes / No			
		Yes / No	Yes / No			

Permeable Area		Distance to Monitoring Point	Surface Condition OK?	Maintenance Required	Recommended Action Schedule		
					Plan	Implement	Completion
Play Area		Not applicable	Yes / No	Yes / No			
			Yes / No	Yes / No			
Athletic Field		Not applicable	Yes / No	Yes / No			
			Yes / No	Yes / No			
Landscaping			Yes / No	Yes / No			
			Yes / No	Yes / No			
Bio-Retention			Yes / No	Yes / No			
			Yes / No	Yes / No			

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APPENDIX G: STANDARD OPERATING PROCEDURES (SOP)

CORNERSTONE EARTH GROUP

APPENDIX H: NOA ANNUAL OBSERVATION SUMMARY REPORT OUTLINE

CORNERSTONE EARTH GROUP

NOA OBSERVATION SUMMARY REPORT OUTLINE

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1.0 GENERAL INFORMATION

2.0 NARRATIVE OF OBSERVATIONS
- 2.1 Purpose of Current Annual Observation
- 2.2 Actions Completed Since Previous Inspection Summary Report
- 2.3 School Site Walkthrough
- 2.4 Annual Observation Checklist and Field Log
- 2.5 Asbestos Awareness Training
- 2.6 Discussion
  - 2.6.1 Hardscape Areas – Cap Integrity with Corrective Action Schedule
  - 2.6.2 Landscape Areas – Cap Integrity with Corrective Action Schedule
- 2.7 Conclusions and Recommendations

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- 2 Site Plan Map
- 3 Periodic (quarterly or as needed) Observation Checklists
- 4 Training Records
- 5 NOA Intrusive Work Completion Reports (if applicable)
- 6 Annual Observation Checklist and Field Notes
- 7 Photo Log: Include Photographs Depicting Site Conditions

CORNERSTONE EARTH GROUP

APPENDIX I: NOA INTRUSIVE WORK COMPLETION REPORT OUTLINE

CORNERSTONE EARTH GROUP

NOA INTRUSIVE WORK COMPLETION REPORT OUTLINE

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CORNERSTONE EARTH GROUP

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CORNERSTONE EARTH GROUP

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CORNERSTONE
EARTH GROUP

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Department of Toxic Substances Control - Fact Sheet

April 2017

COMMUNITY UPDATE

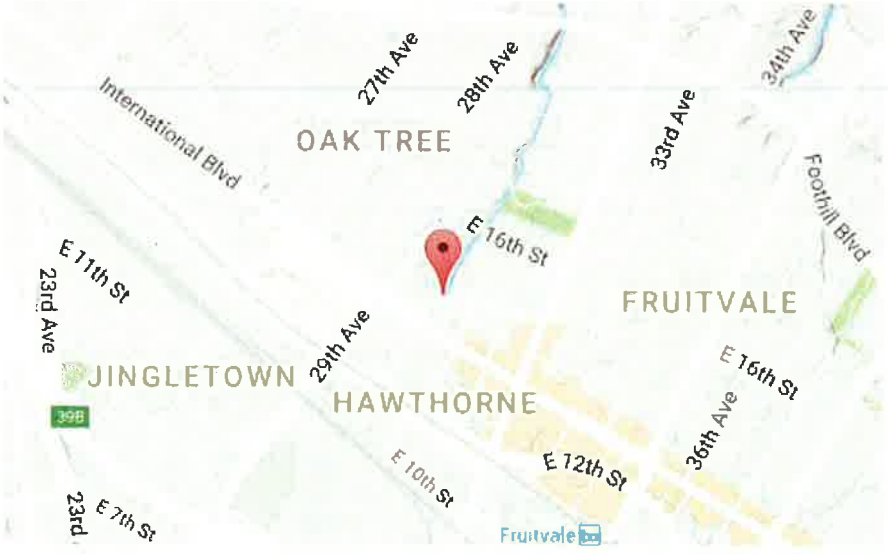
The mission of DTSC is to protect California's people and environment from harmful effects of toxic substances by restoring contaminated resources, enforcing hazardous waste laws, reducing hazardous waste generation, and encouraging the manufacture of chemically safer products.

DTSC Proposes Cleanup Plan for an Aspire School Site, 2956 International Blvd., Oakland CA 94601

Public Comment Period from April 28 to May 29, 2017

The Department of Toxic Substances Control (DTSC) invites you to review and comment on a draft plan to clean up elevated levels of lead and pesticides. The proposed cleanup also caps naturally occurring asbestos (NOA) and addresses impacts from regional groundwater pollution at the Aspire ERES Academy proposed K-8 school site (Site). The draft cleanup plan is called a draft Removal Action Workplan (RAW). The Site sits on about 49,000 square feet at 2956 International Blvd., Oakland, California 94601. Please see the map below for the location.

Environmental investigations at the Site found lead and the pesticides, endrin and chlordane, in soil above levels considered safe. DTSC requires action to clean up this contamination. We do this to lower the long-term risk to future students and staff at the Site. The relocated school plans to have 24 classrooms and a total of 600 students.



The red dot points to the Aspire Eres Academy Site

Public Comment Period

April 28, 2017 to May 29, 2017

DTSC encourages you to review and comment on the draft RAW. We will make a final decision on the draft RAW after all public comments have been reviewed and considered. Please submit written comments postmarked by May 29, 2017, or by E-mail on the same date to:

Mr. Craig Sanchez
DTSC Project Manager
8800 Cal Center Drive
Sacramento, California 95826
Craig.Sanchez@dtsc.ca.gov

History of the Site

Documents show that the Site was used for urban residential and commercial purposes for most of the last century. The apartment house on the Site and former structures located in areas where asphalt parking lots are now present may be the source for the pesticide and lead found in the soil.

Environmental Investigations

Aspire Public Schools conducted a Preliminary Environmental Assessment of the Site in October, 2016. DTSC required more investigation in late 2016. We focused on lead and two pesticides (endrin and chlordane). The investigation also focused on NOA in soil. In addition, DTSC asked that they investigate the groundwater due to the presence of solvents or volatile organic compounds found there. Solvents in groundwater may cause long term human health risk by migrating into indoor air.

The investigation included the collection of about 150 soil samples and 3 groundwater samples from locations throughout the property. Later sampling focused on lead, pesticides, NOA in soil and solvents in groundwater. In response to the investigation findings, DTSC required that Aspire Public Schools prepare a RAW. The objective of the RAW is to address potential long term risk to human health and the environment by assessing different cleanup options. Then, DTSC proposes an option for cleanup and mitigation.

Proposed Cleanup Options

DTSC considered the following three alternatives for the Site:

Alternative 1 – Do no action:
Alternative 2 – Dig up the polluted soil and transport it for off-site disposal;
Alternative 3 – Consolidate the polluted soil and then provide a cap for it on-site.

Both alternatives 2 and 3 include putting hard caps (buildings, sidewalks, and parking lots) across the Site to control NOA in soil. In addition, both alternatives 2 and 3 include a vapor control system. Workers would install this system in the new buildings to protect the indoor air from the presence of solvents.

Based on a careful analysis of effectiveness, implementability and cost of each alternative, DTSC recommends Alternative 2. Alternative 2 is a proven and commonly used cleanup action. This alternative includes digging out about 110 cubic yards of polluted soil. Then, workers will place the polluted soil in dump trucks. After securing the loads, drivers will transport the soil to a state permitted landfill for disposal.

California Environmental Quality Act (CEQA)

DTSC finds that this project is exempt from CEQA review. You may read our Notice of Exemption at the places listed on page three. If we approve this project, we will file the Notice of Exemption with the Governor's Office of Planning and Research State Clearinghouse.

Next Steps

At the close of the public comment period, DTSC will review and consider all public comments. We will make any necessary changes to the draft RAW before final approval. DTSC will send a Response to Comments document to anyone who submits comments.

If DTSC approves the draft RAW, the digging work will start in June this year. We will send out a work notice. Then, after cleanup, DTSC would certify that the Site is

safe for the relocated school.

Where to Find the Documents

You may review the draft RAW and other Site-related documents at the following places:

Aspire Public Schools
Reception
1001 22nd Avenue
Oakland CA 94606
Phone: (510) 434-5000

Cesar Chavez Branch Public Library
Attention: Pete Villasenor
3301 East 12th Street
Oakland, California 94601
Phone: (510) 535-5620

Department of Toxic Substances Control
Regional Records Office
8800 Cal Center Drive
Sacramento, California 95826
Please call (916) 255-3758 to make the necessary arrangements.

Site documents are also available on-line at:
www.envirostor.dtsc.ca.gov

Who to Contact for More Information?

Craig Sanchez
DTSC Project Manager
Phone: (916) 255-4369
Craig.Sanchez@dtsc.ca.gov

Nathan Schumacher
DTSC Public Participation Specialist
Phone: (916) 255-3650 or toll free at (866) 495-5651
Nathan.Schumacher@dtsc.ca.gov

Media Inquiries only:
Sandy Nax
DTSC Public Information Officer
Phone: (916) 327-6114
Sandy.Nax@dtsc.ca.gov

NOTICE TO HEARING IMPAIRED: TTY users may use the California Relay Service @ 711 or 1-800-855-7100. You may also contact the Public Participation Specialist listed at the end of this update.

AVISO Comunitario

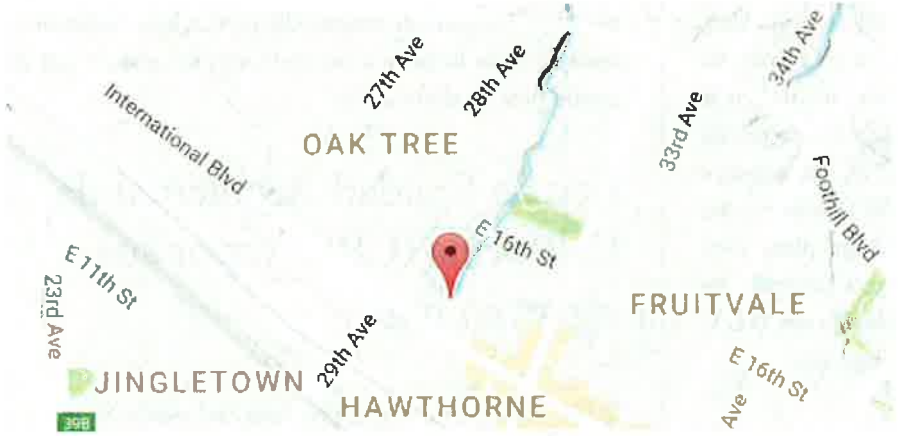
Nuestra misión es de proteger a Californianos y el medio ambiente de efectos dañosos de sustancias tóxicas, restaurando recursos contaminados, imponer leyes de residuos peligrosos, reducir la generación de residuos peligrosos, y fomentar la fabricación de productos químicos más seguros.

DTSC Propone Plan de Limpieza para el sitio escolar de Aspire, 2956 International Blvd., Oakland CA 94601

Período de comentarios públicos: 28 de abril a 29 de mayo de 2017

El Departamento de Control de Sustancias Tóxicas (DTSC, por sus siglas en inglés) le invita a revisar y presentar comentarios sobre un plan preliminar para limpiar altos niveles de plomo y pesticidas. La limpieza propuesta también incluye tapar asbestos que ocurren de manera natural y abordar el impacto de la contaminación del agua regional subterránea en el sitio escolar (K-8) propuesto para Aspire ERES Academy. El plan preliminar de limpieza se llama Plan de Acción de Eliminación preliminar (RAW, por sus siglas en inglés). El sitio se encuentra en alrededor de 49,000 pies cuadrados en el 2956 International Blvd., Oakland, California 94601. Por favor, vea el mapa de abajo para la ubicación.

Investigaciones ambientales en el sitio encontraron plomo y pesticidas (endrina y clordano) en la tierra con niveles por encima de lo que se considera seguro. DTSC requiere acción para limpiar esta contaminación. Hacemos esto para reducir el riesgo a largo plazo para los futuros estudiantes y el personal del sitio. La escuela reubicada planea tener 24 aulas o salones y un total de 600 estudiantes.



El punto rojo apunta al sitio de Aspire ERES Academy.

Public Comment Period

28 de abril de 2017 a 29 de mayo de 2017

DTSC le invita a revisar y presentar comentarios sobre el plan preliminar RAW. Vamos a tomar una decisión final sobre el proyecto RAW después de que todos los comentarios públicos hayan sido revisados y considerados. Por favor, envíe sus comentarios por escrito con sello postal antes del 29 de mayo de 2017, o por correo electrónico antes de la misma fecha con atención a:

Sr. Craig Sanchez
Jefe de Proyecto de DTSC
8800 Cal Center Drive
Sacramento, California 95826
Craig.Sanchez@dtsc.ca.gov

La historia del Sitio

Los documentos muestran que, por la mayor parte del siglo pasado, el sitio fue utilizado para fines residenciales urbanas y comerciales. El edificio de apartamentos y otras previas estructuras ubicadas en las zonas en donde el estacionamiento de asfalto está presente, pueden ser la fuente del pesticida y plomo que se encuentra en la tierra.

Investigaciones del Medio Ambiente

Aspire Public Schools llevó a cabo una evaluación ambiental preliminar del sitio en octubre de 2016. DTSC requirió más investigaciones a los finales de 2016. Estas se enfocaron en el plomo y dos pesticidas (endrina y clordano). La investigación también se centró en asbestos que ocurre de manera natural en la tierra. Además, DTSC pidió que se investigara el agua subterránea debido a la presencia de disolventes o compuestos orgánicos volátiles encontrados allí. Disolventes en el agua subterránea pueden causar riesgo para la salud humana a largo plazo si estos penetran al aire interior.

La investigación incluyó la colección de cerca de 150 muestras de la tierra, y 3 muestras de agua subterránea tomadas en diferentes sitios a través de la propiedad. La toma de muestras después se enfocó en el plomo, pesticidas, asbestos que ocurre de manera natural en la tierra, y disolventes en el agua subterránea. En respuesta a las conclusiones de la investigación, DTSC requiere que Aspire Public Schools preparare un RAW. El objetivo del RAW es abordar el riesgo potencial a largo plazo para la salud humana y al medio ambiente, evaluando las diferentes opciones de limpieza. Después de esto, DTSC propone la opción final de limpieza y mitigación.

Opciones de propuestas de limpieza

DTSC consideró las siguientes tres alternativas para el sitio:

Alternativa 1 - No tomar acción:
Alternativa 2 - Excavar la tierra contaminada y transportarla fuera del sitio para eliminar los desechos;
Alternativa 3 - Consolidar el suelo contaminado y luego proporcionar una tapa en el lugar.

Ambas alternativas 2 y 3 incluyen poner tapas duras (edificios, veredas y estacionamientos) en todo el sitio para controlar el asbestos que ocurre de manera natural en la tierra. Además, en ambas alternativas 2 y 3 se compone de un sistema de control de vapor. Los trabajadores instalarán este sistema en los edificios nuevos para proteger el aire interior de la presencia de disolventes.

Basado en cuidadosos análisis de eficacia, implementación, y el costo de cada alternativa, DTSC recomienda la Alternativa 2. La Alternativa 2 es una acción de limpieza probada y utilizada comúnmente. Esta alternativa incluye la excavación de aproximadamente 110 yardas cúbicas de suelo contaminado. Después de esto, los trabajadores colocan la tierra contaminada en camiones de volcar. Después de asegurar las cargas, los conductores transportarán la tierra a un vertedero autorizado por el estado para su eliminación.

Ley de Calidad Ambiental de California (CEQA, por sus siglas en inglés)

DTSC considera que este proyecto está exento de la revisión de CEQA. Usted puede leer nuestro Aviso de

Exención en los lugares indicados en la página tres. Si aprobamos este proyecto, vamos a presentar el Aviso de Exención con la Oficina del Gobernador de Planificación y Centro de Información Estatal.

Los próximos pasos

Al cierre del período de comentarios públicos, DTSC evaluará y considerará todos los comentarios públicos. Vamos a hacer los cambios necesarios al plan preliminar RAW antes de su aprobación final. DTSC enviará un documento con una respuesta a los comentarios a cualquier persona que sometió comentarios.

Si DTSC aprueba el plan preliminar RAW, el trabajo de excavación comenzará en junio de este año. Vamos a enviar un aviso de trabajo. Después de la limpieza, DTSC podrá certificar que el sitio es seguro para la reubicación de la escuela.

¿Dónde se encuentran los documentos?

Usted puede revisar el plan preliminar RAW y otros documentos relacionados con el sitio en los siguientes lugares:

Aspire Public Schools
Recepción
1001 22nd Avenue
Oakland, CA 94606
Teléfono: (510) 434-5000

Cesar Chavez Branch Public Library
Atención a: Pete Villasenor
3301 East 12th Street
Oakland, California 94601
Teléfono: (510) 535-5620

El Departamento de Control de Sustancias Tóxicas
Regional Records Office
8800 Cal Center Drive
Sacramento, California 95826
Por favor llame al (916) 255-3758 para hacer los arreglos necesarios.

Los documentos sobre el sitio también están disponibles en línea visitando a:
www.envirostor.dtsc.ca.gov

¿A quién puede contactar para más información?

Craig Sanchez
Jefe de Proyecto de DTSC
Teléfono: (916) 255-4369
Craig.Sanchez@dtsc.ca.gov

Nathan Schumacher
Especialista en Participación Pública de DTSC
Teléfono: (916) 255-3650 o al número gratuito (866) 495-5651
Nathan.Schumacher@dtsc.ca.gov

Para preguntas de medios de comunicación:
Sandy Nax
Oficial de Información Pública de DTSC
Teléfono: (916) 327-6114
Sandy.Nax@dtsc.ca.gov

Public Notice

The mission of DTSC is to protect California's people and environment from harmful effects of toxic substances by restoring contaminated resources, enforcing hazardous waste laws, reducing hazardous waste generation, and encouraging the manufacture of chemically safer products.

You may Review the Cleanup Plan for an Aspire School Site, 2956 International Blvd., Oakland 94601

Public Comment period: April 28 to May 29, 2017

The Department of Toxic Substances Control (DTSC) invites public comment on a draft cleanup plan or Removal Action Workplan (draft RAW) to cleanup elevated levels of lead, pesticides, cover up naturally occurring asbestos and prevent solvents from migrating into the new buildings. The approximately 49,000 square feet school site is located at 2956 International Blvd., Oakland CA 94601. Aspire Public Schools plans to use this Site for the relocated Aspires Eres Academy.

You can learn more about the proposed cleanup and provide comments to DTSC regarding the draft RAW during a public comment period that starts on April 28 and ends on May 29, 2017. You may submit your comments to Craig Sanchez, Project Manager, DTSC, 8800 Cal Center Drive, Sacramento, California 95826 or by e-mail to *Craig.Sanchez@dtsc.ca.gov.* You must send your comments no later than May 29, 2017.

DTSC finds that this project is exempt from California Environmental Quality Act (CEQA) review. DTSC has approval authority for the project. DTSC will file a Notice of Exemption if we approve the project. DTSC has made the CEQA documents and the draft RAW available for public review at:

Aspire Schools
Reception
1001 22nd Avenue
Oakland CA 94606
(510) 434-5000

Cesar Chavez Branch Public Library
Attention: Pete Villasenor
3301 East 12th Street
Oakland CA 94601
(510) 535-5620

The full administrative record:
DTSC Sacramento Regional Office
8800 Cal Center Drive
Sacramento CA 95826
(916) 255-3758

You can review this information electronically at *http://www.envirostor.dtsc.ca.gov/public/*.
For more information, please contact these DTSC staff:

Craig Sanchez
Project Manager
(916) 255-4369
Craig.Sanchez@dtsc.ca.gov

Nathan Schumacher
Public Participation Specialist
(916) 255-3650 or toll free (866) 495-5651
Nathan.Schumacher@dtsc.ca.gov

For the news media only, please contact:
Sandy Nax, Public Information Officer
(916) 327-6114
Sandy.Nax@dtsc.ca.gov

NOTICE TO HEARING IMPAIRED: TTY users may use the California Relay Service @ 711 or 1-800-855-7100. You may also contact the Public Participation Specialist listed at the end of this update.

Departamento de Control de Sustancias Tóxicas Abril de 2017

Aviso Público

Nuestra misión es de proteger a Californianos y el medio ambiente de efectos dañosos de sustancias tóxicas, restaurando recursos contaminados, imponer leyes de residuos peligrosos, reducir la generación de residuos peligrosos, y fomentar la fabricación de productos químicos más seguros.

Usted puede revisar el Plan de Limpieza para el sitio escolar de Aspire, 2956 International Blvd., Oakland CA 94601

Período de comentarios públicos: 28 de abril a 29 de mayo de 2017

El Departamento de Control de Sustancias Tóxicas (DTSC, por sus siglas en inglés) invita comentarios públicos sobre un plan preliminar de limpieza o el Plan de Acción de Eliminación (preliminar RAW, por sus siglas en inglés) para limpiar los niveles elevados de plomo, pesticidas, encubrir asbesto que ocurre de manera natural y prevenir que disolventes emigren a edificios nuevos. El sitio con aproximadamente 49,000 pies cuadrados de extensión está ubicado en el 2956 International Blvd., Oakland CA 94601. Aspire Public Schools tiene planeado utilizar este sitio para reubicar a la escuela Aspire ERES Academy.

Usted puede aprender más sobre la propuesta de limpieza y proporcionar comentarios a DTSC en relación con el proyecto del Plan de Acción de Eliminación durante el periodo de comentarios públicos que inicia el 28 de abril y finaliza el 29 de mayo de 2017. Usted puede enviar sus comentarios a Craig Sanchez, Jefe de Proyecto, DTSC, 8800 Cal Center Drive, Sacramento, California 95826, o por correo electrónico a Craig.Sanchez@dtsc.ca.gov. Debe enviar sus comentarios antes del 29 de mayo de 2017.

DTSC considera que este proyecto está exento de la revisión de la Ley de Calidad Ambiental de California (CEQA, por sus siglas en inglés). DTSC tiene la autoridad de aprobación para el proyecto. Si aprobamos el proyecto, DTSC presentará un Aviso de Exención. DTSC tiene los documentos de CEQA y el proyecto de RAW disponibles para revisión del público en las siguientes locaciones:

Aspire Schools
Recepción
1001 22nd Avenue
Oakland CA 94606
(510) 434-5000

Cesar Chavez Branch Public Library
Atención a: Pete Villasenor
3301 East 12th Street
Oakland CA 94601
(510) 535-5620

El expediente completo:
DTSC Sacramento Regional Office
8800 Cal Center Drive
Sacramento CA 95826
(916) 255-3758

Usted puede revisar esta información en forma electrónica en http//www.envirostor.dtsc.ca.gov/public/.
Para obtener más información, póngase en contacto con el siguiente personal de DTSC:

Craig Sanchez
Jefe de Proyecto
(916) 255-4369
Craig.Sanchez@dtsc.ca.gov

Nathan Schumacher
Especialista en Participación Pública
(916) 255-3650 o gratis al (866) 495-5651
Nathan.Schumacher@dtsc.ca.gov

Para noticias y los medios
Sandy Nax (916) 327-6114
Oficial del Información Pública
Sandy.Nax@dtsc.ca.gov

AVISO A PERSONAS CON DISCAPACIDAD AUDITIVA: Los usuarios de TTY pueden utilizar el Servicio de Retransmisión de California al 711 o 1-800-855-7100. También puede comunicarse con el especialista de participación pública que aparece al final de esta actualización.

Cal/EPA DTSC State of California

ATTACHMENT H

Aspire ERES Oakland Charter School Project, Oakland, California

Historic Resources Evaluation Report and Impact Analysis

Prepared for:

City of Oakland
Bureau of Planning
250 Frank H. Ogawa Plaza Suite 2114
Oakland, CA 94612

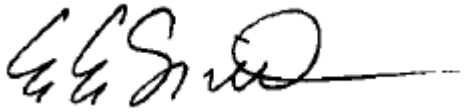
Prepared by:

Stantec Consulting Services Inc.
1340 Treat Boulevard, Suite 300
Walnut Creek, CA 94597

June 23, 2017

Sign Off Sheet

This document entitled Construction of the Aspire Charter School in the Fruitvale Neighborhood of Oakland, California was prepared by Stantec Consulting Ltd. ("Stantec") for the City of Oakland (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by  _____
(signature)

Everett Smith, MA

Reviewed and Approved by  _____
(signature)

Garret Root, MA

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APPENDIX C: DPR form for the 3007 East 15th Street, Oakland

Executive Summary

This Historic Resources Evaluation Report (HRER) and Impact Analysis provides the City of Oakland with; a description of the proposed Aspire ERES Academy International Boulevard Project, the site's historical background, architectural description of historic buildings identified within the Area of Potential Effects (APE), evaluation of historic resources within the APE, and impact analysis pursuant to the California Environmental Quality Act (CEQA) and to requirements of the National Historic Preservation Act (NHPA) of 1966 as amended. The properties recorded here have been evaluated in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines using the criteria defined in Section 5024.1 of the California Public Resources Code.

The objective of this study is to determine if there are A) historic buildings located within the APE and evaluate them for significance and B) determine if there will be significant impacts to determined or listed historical resources during construction of the proposed Aspire ERES Academy International Boulevard Project. The proposed project entails construction of a new 17,982 square foot school building with associated landscape improvements on four parcels (Alameda County Assessor Parcel Number (APN) 025-0720-001-00; 025-0720-002-001; 025-0720-005-02; and 025-0720-007-02) (Figure 1 and 2). There was one building located within the project site, a 1926 multi-family dwelling located at 3007 East 15th Street, that has since been demolished. The APE encompasses approximately 2.44 acres in the Fruitvale neighborhood of Oakland, California (Figure 3).

There are three historic-era buildings (50 years of age, built prior to 1967) located within the APE, one NRHP listed property, one previously evaluated and updated herein, and one new building. This HRER determined the Fruitvale Medical Building (3022 International Boulevard) is eligible for the NRHP, CRHR for the purposes of CEQA, and as a local landmark. This report also determined the former Woody's Smorgasburger (3000 International Boulevard) is not eligible NRHP, CRHR for the purposes of CEQA, or for the City of Oakland's local register. Lastly, the NRHP listed Alfred H. Cohen House is within APE, the impact analysis is assessed in this report. Since the project undertaking involves construction of a new building an impacts analysis will determine the project will "materially impair" or result in "substantial adverse change" to any identified historic resources within the project APE.

Abbreviations

APE	Area of Potential Effect
API	Area of Primary Importance
APN	Assessor's Parcel Number
ASI	Area of Secondary Importance
Aspire	Aspire Public Schools
CEQA	California Environmental Quality Act
City	City of Oakland
CRHR	California Register of Historical Resources
DPR	California Department of Parks and Recreation
HRER	Historic Resource Evaluation Report
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OCHS	Oakland Cultural Heritage Survey

1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND LOCATION

Aspire Public Schools (Aspire) proposes to construct a three-story public charter school (Aspire ERES Academy), which, will house kindergarten through eighth (K-8th) grade students. The proposed project will include site improvements such as play areas and surface parking lot. The proposed project site is on the northwest corner at the intersection of East 15th Street and Derby Avenue in the City of Oakland, California (Figures 1 and 2). Prior to construction commencement, a 1926 multi-family dwelling located at 3007 East 15th Street, was demolished. The proposed project is located approximately one block north of the commercial core of the Fruitvale Neighborhood. The project site consists of four Alameda County parcels, APNs 025-0720-001-00, 025-0720-002-001, 025-0720-005-02, and 025-0720-007-02, encompassing a total area of 1.20 acres. The proposed project would occupy 0.88 of the 1.20-acre parcel (Figures 4).

The new building would have a footprint of approximately 17,982 square feet with an entry facade of approximately 166.5 feet adjacent to East 15th Street. The three-story building would be 49 feet from grade level to the top of the parapet. Rooftop mechanical structures would exceed this height by less than four feet. The Aspire ERES Academy will add a valuable public education institution to the community, providing kindergarten through eighth grade instruction in a modern newly-constructed facility.

1.2 DOCUMENTS REVIEW

Stantec architectural historians conducted project specific historical research in September 2016. Oakland Historic Preservation Planner Betty Marvin provided historical documentation on the project area, including relevant excerpts from the OCHS prepared in 1993. Stantec architectural historians conducted primary and secondary research utilizing collections of the Oakland Public Library, the Online Archive of California, California State Library, as well as historic maps such as Sanborn Fire Insurance Maps, Thomas Brother Block books, and city street maps. These maps allowed Stantec historians to assess the configuration of the neighborhood surrounding the project area and how the impacted buildings fit within a larger geographic context.

Additionally, Stantec historians utilized The City of Oakland's Interactive Planning and Zoning GIS Map to review historic designation statuses for the NRHP, CRHR, and OCHS for the properties within the project APE (Figure 3). A search of the cultural resources located within the ¼ mile area was also conducted at the Northwest Information Center of the California Historical Resources Information System. This search effort identified the NRHP-listed Alfred H. Cohen House, and the Fruitvale Medical Building of secondary importance are located within the APE. Results of the searches are displayed in the table below:

Property	Description	Survey Ratings	NRHP Listed	Local Register	CEQA Historic Resource?	Within APE?
Alfred H. Cohen House, 1884	1440 29th Avenue, a Stick-Eastlake style residence	A3	Yes	Yes	**Yes**	**Yes**
Fruitvale Medical Building, 1927	3022 International Blvd, a Gothic Revival office building	4S7, Cb+3			**Yes**	**Yes**
Alpine Hotel, 1925	1479 Fruitvale Ave, a brick residential-commercial building	5D, C2+			**No**	**No**
Dwelling, 1900s	1524 29th Avenue	C3			**No**	**No**
Dwelling, 1900s	1448 29th Avenue	C3			**No**	**No**

1.3 METHODS AND APE DELINIATION

For this project, the Area of Potential Effect (APE) was defined as the parcels directly adjacent to the proposed Aspire project site. While the project site touches four parcels, only three contain historic-era resources, buildings over 50 years of age, the threshold for historic resources. 2946 International Boulevard, while adjacent to the project site, was developed in 2008, well short of the 50 year threshold and is therefore not part of this study. There was one historic-era building located within the project site, a 1926 multi-family dwelling located at 3007 East 15th Street, that has since been demolished. The APE encompasses approximately 2.44 acres in the Fruitvale neighborhood of Oakland, California (Figure 3).

There are three historic-era buildings located within the APE, one NRHP listed property, one previously evaluated, and one new building. The Alfred H. Cohen House, constructed in 1884 in the Stick/Eastlake Style, was listed on the NRHP in 1973, is a historic resource for the purposes of CEQA and is listed on the OCHS. The Fruitvale Medical Building (3022 International Boulevard), built in 1927 and the former Woody's Smorgasburger (3000 International Boulevard), built 1964 were both inventoried, evaluated, and included in the APE as they are all over 50 years of age.

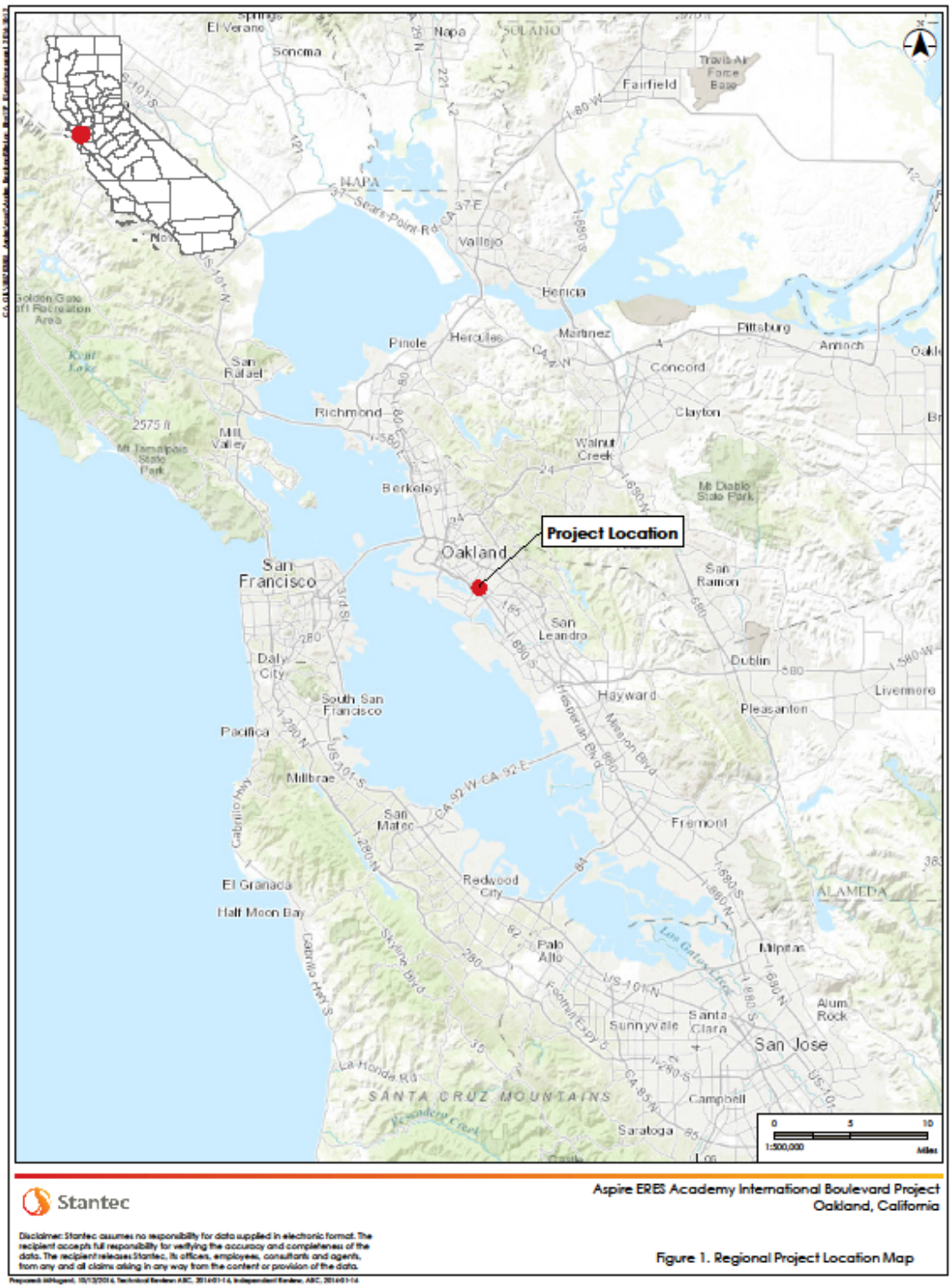


Figure 1 - Regional Project Location Map



Figure 2 – Project Site Map



Figure 3 – Project APE Map

2.0 HISTORIC CONTEXT

The project is located on the north side of International Boulevard (Formerly East 14th Street) near the intersection with Derby Avenue (Formerly 30th Avenue) in Oakland's Fruitvale Neighborhood. The Aspire school project is located within the Wetherbee Business Subdivision, a small commercial subdivision established in 1924. Fruitvale's neighborhood boundaries along the south and west is a tidal canal that separates Alameda Island from the mainland, Foothill Boulevard forms the northern boundary and 42nd Avenue forms the eastern side. The neighborhood earned its name from cherry and apricot orchards which occupied the land in the late 1800s. International Boulevard, formerly East 14th Street, is the primary east-west thoroughfare and home to the main commercial district of the neighborhood.[1]

2.1 EARLY DEVELOPMENT OF FRUITVALE

The origins of twentieth century commercial and residential development in Fruitvale stemmed from 1850s settlement. Gold Rush-era settlers leased and purchased land from the former Pealta Hacienda, a Mexican-era land grant. By the 1860s Fruitvale had evolved into a collection of rural estates with small and medium sized farms. In 1869, along East 14th and Fruitvale Avenue, development of a new suburban residential tract attracted wealthy Oakland residents including W.A. Bray a manufacturer, E.M. Derby a lumber magnate, and Henry Wetherbee. Wetherbee purchased a 6-acre parcel along East 14th Street and Fruitvale Avenue (location of the proposed Aspire school) and built a grand home with a rose and bamboo gardens, tall trees, dense hedge, tennis court, and stables in 1871. Wetherbee died in 1892, however, his widow, Mrs. Ellie Wetherbee lived at the property until 1924.[2]

In the early 1900s a transportation and building boom transformed the Bay Area into a regional urban hub. Fruitvale experienced this growth, as residential and commercial expanded at either end of East 14th Street near Fruitvale Avenue and High Street. By 1905 the neighborhoods rapid growth earned it the title "The Mushroom City." Following the 1906 earthquake and subsequent fire, refugees spread across the greater East Bay doubling neighborhood populations like Fruitvale. These new residents prompted development of former large estates into smaller subdivisions (Figure 5). The influx of urban newcomers voted in favor of annexation, in 1909 Fruitvale became part of Oakland.[3]

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[1] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 1-2; Thomas Bros, *Thomas Bros Block Book of Oakland Fruitvale District,* Volume 9 (Oakland: Thomas Brothers, 1924), 807.

[2] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 8-10; "Fruit Vale Its charming homes and fine residences. Henry Wetherbee's fine place," *Oakland Tribune,* September 30,1889; "A Pioneer's Death," *Oakland Tribune,* January 30, 1892.

[3] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 11-13.

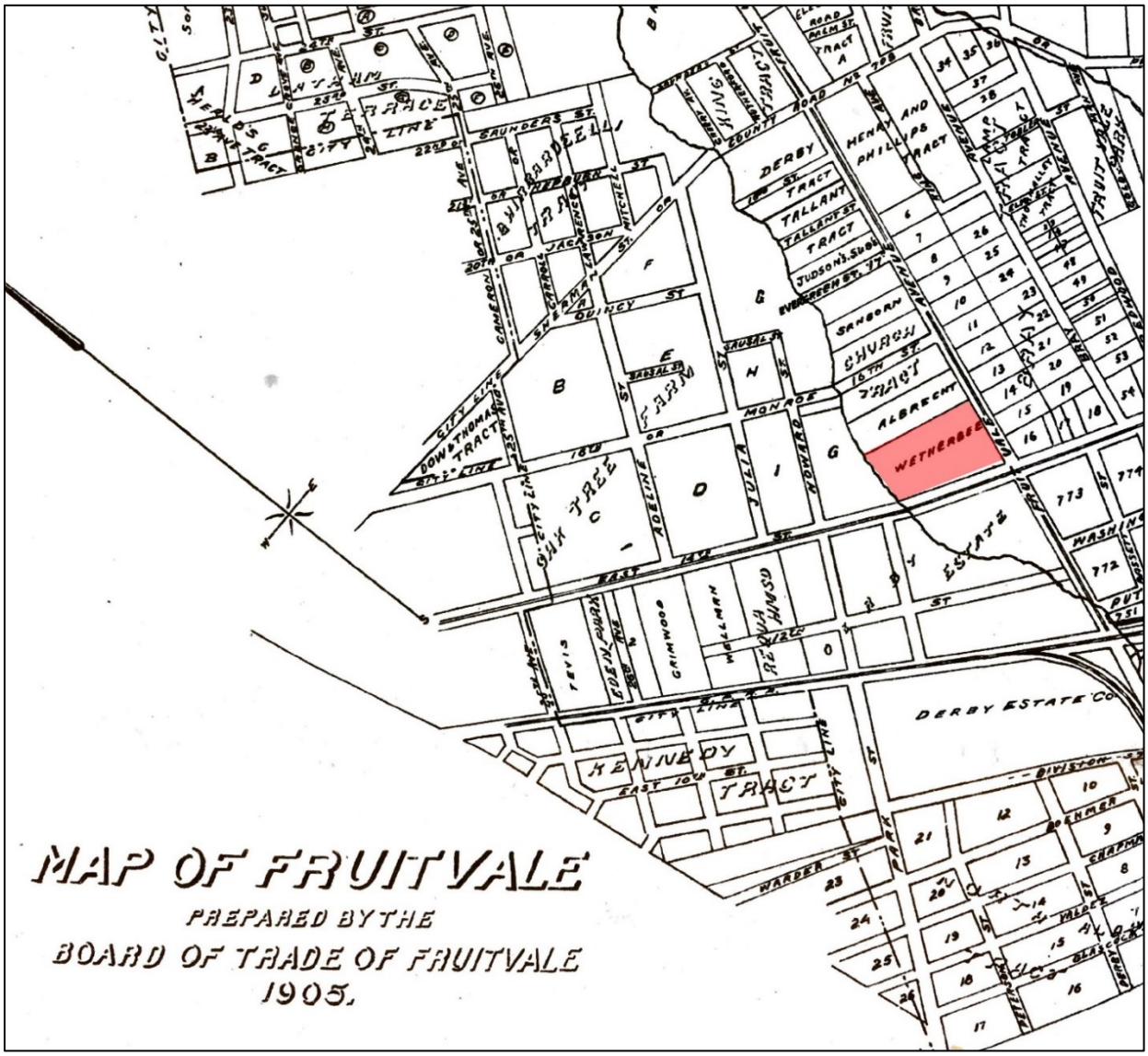


Figure 4 – Map of Fruitvale in 1905, red section indicates location of current Aspire project.[4]

Fruitvale's commercial core centered on East 14th Street between Fruitvale and 38th Avenue, characterized by commercial storefronts with residential flats above. The neighborhood attracted more residents due to its proximity to the Southern Pacific and Western Pacific Railroads and shipping with the tidal canal. By 1910, Fruitvale's population had grown to 35,000 residents. Greater Oakland experienced a population growth of 66,000 in 1900 to 150,000 in 1920 due to continued annexations. This infrastructural and residential intersection aided in manufacturing growth and earned the city the moniker "Detroit of the West." The increase in

[4] William T.Grubb, *Beautiful Fruitvale*, (Fruitvale, Ca: Fruitvale Board of Trade, 1905).

manufacturing and transportation directly contributed to the commercial expansion along Fruitvale's East 14th Street.[5]

East Oakland and Fruitvale became a regional commercial center described in 1922 as Oakland's "second city." The historic ranch properties such as Derby subdivided their property in the 1910s. By the late 1910s, only the Wetherbee property remained intact. In 1923, the Central National Bank, purchased a tract of land from Mrs. Wetherbee, and opened their first branch in Fruitvale at the corner of East 14th Street and Fruitvale Avenue. Other banking institutions soon followed with the American Bank and Bank of Italy. Montgomery Ward established a catalog warehouse and department store at East 14th and 29th, while its connection to the Fruitvale economy seems to have been somewhat limited it did dominate the look and feel of the districts' western end (Figure 6). While all this development occurred in Fruitvale's central business core many of the large residential estates were razed and replaced with modern commercial development.[6]



Figure 5 – Montgomery Ward and Company in the early 1920s.[7]

[5] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 12-15; Analee Allen, *Oakland.* (Charleston, SC: Arcadia Pub, 2005), 7-9.

[6] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 15-16; "Bank to Build $100,000 Branch," *Oakland Tribune,* September 29,1922; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924.

[7] Oakland Public Library, "Montgomery Ward Company," Cheney Photo Advertising Company, https://calisphere.org/item/ark:/13030/kt7z09r2w6/ (accessed June 15, 2017).

2.2 WETHERBEE BUSINESS SUBDISIVISION

In 1924, Ms. Ellen Wetherbee sold her 6-acre property for a record $300,000 to Walter G. Filler with the sale negotiated by E.B. Field Company (Figure 7). Development of the lot included construction of two new streets, 30th (renamed Derby Avenue) and 31st Avenues, connecting the property to the grid and the commercial and economic core of 14th Street and Fruitvale Avenue. The area experienced the fastest population growth in any part of Oakland. Within a four-block radius businesses in operation included department stores such as Piggly Wiggly, Woolworths, and Montgomery Ward, car dealerships including Studebaker, Hudson, Chevy Dodge, Buick, and Schleusters Western Auto Supply. These new industries spurred the continued redevelopment of Fruitvale from an affluent residential enclave, towards a second city within greater Oakland. This dramatic transformation razed the vast majority of the pre-1900 homes, today only the 1884 Alfred H. Cohen house at 1440 29th Street, remains.[8]

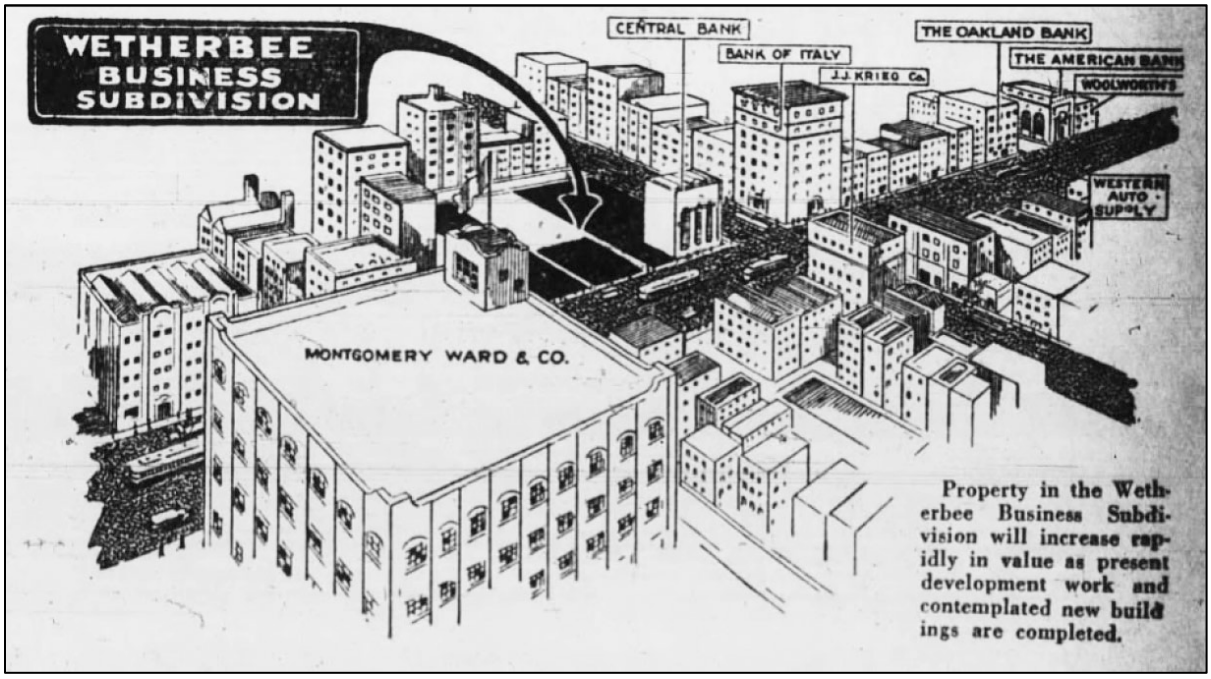


Figure 6 – A 1924 advertisement for the Wetherbee Business Subdivision.[9]

In 1926, the Fairview Properties Corporation purchased the lot on the northeast corner of 30th Avenue and East 14th Street, located in the new Wetherbee Business Subdivision. Fairview Properties constructed the Fruitvale Medical Building, the first professional medical office building in East Oakland, in 1927 (Figure 8). The building design team consisted of structural

[8] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924; "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924; "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet

[9] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924.

engineer John Carl Thayer, architect HC Haglund with architectural supervision by A.E. Young. Fairview Properties chose a Gothic design for the building, they hired W.A. Pentecost for the architectural and detail drawings. The Clipper Company did all the concrete working, including the full basement and acted as general contractor. Fairview Properties made a huge investment cementing the success of the building and the idea of a centralized medical office, they designed the building to showcase electricity. Additional technological and design advancements include strategic placement of multiple water heaters throughout the building rather than one central boiler unit. All this construction was completed in July 1927 but the installation of fixtures and customization continued until the building officially opened in January 1928 (for detailed information related to this resource see the DPR-523 form in the Appendix).[10]



Figure 7 – Fruitvale Medical Building in about 1930.[11]

[10] Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet; City of Oakland, Building Permit A25342, Fruitvale Medical Building, 1926.
[11] Oakland Public Library, "Fruitvale Medical Building,"1930.

2.3 POST-WAR OAKLAND

In the years following the end of World War II, the military production juggernaut that developed during the war had to be altered to civilian needs. During the war, African Americans and women were the dominant labor force, however, they were displaced by predominately white, returning veterans. These post-war interactions shaped Oakland for many years. In the 1950s Oakland, like cities across the country, saw a domestic migration of people and businesses to the new suburbs, abandoning the central core of cities. Those left behind were people who could not afford to leave or whose race limited their ability to move to more desirable neighborhoods regardless of financial standing. This system was further cemented with an increase in freeway construction. The freeways allowed suburban dwellers access to central business cores while acting as boarders for residents living below in the historic central neighborhoods. This flight of money caused a dramatic central core decline across California and the United States, but hit Oakland's predominantly African-American and Latino communities particularly hard. Exodus of business and residents lowered the commercial and economic tax base of the city while creating greater demands for human services. All this compounded unemployment, racial tension, and the physical deterioration of civic core and neighborhoods.[12]

The racial tensions on the 1950s and 1960s affected the ethnic makeup of the Fruitvale neighborhood. The densest, poorest, and most homogenous African American neighborhoods were concentrated near the bay and tidal canal while white homeowners began to migrate to the foothills. Housing practices during this time including overt market manipulation by real estate agents served to maintain neighborhood segregation when physical barriers failed. From the mid-1960s Fruitvale became dominant Latin-American, a makeup it maintains. In the 1960s the Oakland Public Library converted the Fruitvale post office building into its Latin American Branch. The 1960 Census indicated 17% of Fruitvale of Hispanic descent, increasing to 50% by 1990. In 1992, the Oakland Citizens Committee for Urban Renewal described Fruitvale as "the major Latino cultural center of the East Bay. While banking and professional office buildings anchored the neighborhood commercially, the 1950s saw an influx of new business such as used car lots and food chains. One such restaurant was Woody's Smorgasburger, which came to the Fruitvale neighborhood in 1964. For more information about this building, located at 3000 International Boulevard, please see the DPR-523 located in the Appendix of this report.[13]

[12] Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251; Advertisement, "Remmer & Jordan Pontiac," *Oakland Tribune,* March 8,1954.

[13] Robert O. Self, *American Babylon: Race and the Struggle for Postwar Oakland,* (New Jersey, Princeton: Princeton University Press, 2003), 164-166; Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993); Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, 1911): 198; Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, November 1950): 198; Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251.

3.0 DESCRIPTION OF HISTORICAL RESOURCES

3.1 FRUITVALE MEDICAL BUILDING

The six-story commercial building has a concrete foundation and frame with hollow clay tile walls (Figure 9). It has flat, parapet roof with pilaster caps, and windows with pointed arches. There are seven bays across the front (southwest) façade. The central bay provides the main pedestrian access through a decorative iron gate and glass door with a metal frame and a very large fixed transom window. There are large pointed arches on the second floor over each of the six side bays. Pointed pilasters with gothic motifs separate the seven bays on the first and second stories. The third through fifth story have rows of fourteen windows, each with cruciform muntins separating four lights. The sixth floor has similar windows but with pointed arches at the top. The gothic motifs on the pilaster caps on the peaked roof match the pilasters on the second story. There is an exterior metal fire escape on the northwestern end bay. A vertical metal sign hangs above the entrance and reads "Fruitvale MEDICAL Bldg." The southeast façade, facing Derby Avenue, mimics the front façade in design details but has only four bays. The northeast and northwest sides are devoid of Gothic Revival architectural details. They are both unadorned masonry walls with rows of casement windows on all floors. Drain pipes and conduit supplying power to exterior lighting wrap around these elevations (see DPR 523 on Appendix for a more in depth description).



Figure 8 – Fruitvale Medical Building at 3022 International Boulevard

3.2 WOODY'S SMORGASBURGER COMMERCIAL BUILDING

The rectangular-plan building is located on the west end of the parcel with the rest of the property an asphalt parking lot. The building has a hyperbolic paraboloid roof with a cross gable all clad in composition shingles. The building has a brick veneer apron with plywood panel siding with decorative half timbering in the upper half of the first story and in the gable ends. Fenestration consists of plate glass single-light windows and doors. A former metal IHOP sign post, converted to a cross, stands off the southeast corner of the building (see DPR 523 on Appendix for a more in depth description).



Figure 9 – Former Woody's Smorgasburger building at 3000 International Boulevard

3.3 ALFRED H. COHEN HOUSE

The Alfred H. Cohen House is a two-story Stick/Eastlake-style, wood frame house clad in channel siding with a steeply-pitched complex cross-gable roof covered with asphalt shingles. The house, built in 1884, rests on a brick foundation. The original fenestration, consists of a two-leaf door with arched and square lights and a rectangular stained-glass transom, one-over-one double-hung wood windows, and narrow arched double-hung windows in the square tower. The house has many Stick-style features including; a projecting bay window, a square corner tower with pyramidal turret, decorative bargeboard and brackets, geometric banded panels, a curved one-story porch with turned posts and balustraded railing, and a projecting front gable clad in narrow board-and-batten siding with upper story balcony (see NRHP Nomination form in Appendix for a more in depth description).



Figure 10 – the Alfred H. Cohen house

4.0 ELIGIBILITY AND ANALYSIS

Stantec Architectural Historians undertook this report to comply with by evaluating two, historic-era buildings located within the project APE (see Figure 3). The Alfred H. Cohen House is listed on the NRHP, OCHS, and as a historic resource for the purposes of CEQA. It was not studied further as part of this study. The Fruitvale Medical Building had been previously inventoried and evaluated in 1993 as part of OCHS. This current study find the building is eligible for the NRHP, a historical resource for the purposes of CEQA, and as a local landmark. This report also determined the former Woody's Smorgasburger (3000 International Boulevard) is not eligible NRHP, not a historical resource for the purposes of CEQA, or for the City of Oakland's local register. Since the project undertaking involves construction of a new building an impacts analysis will determine the project will "materially impair" or result in "substantial adverse change" to any identified historic resources within the project APE. CEQA requires that lead agencies consider impacts of proposed projects to cultural or historic resources. CEQA guidelines Section 15064(a) and 15064(c) set out the procedures for assessing historic resources.

The following sets out the relevant plans, policies, guidelines, and regulations for evaluating the significance of and impacts to historic resources.

4.1 APPLICABLE REGULATIONS, POLICIES, PLANS, AND GUIDELINES

NRHP and CRHR (for CEQA)

In order to be eligible for the NRHP or CRHR (for CEQA), a resource must be determined significant under at least one of the four criteria and retain integrity to its period of significance. The Criteria for the NRHP and CRHR are paraphrased below:

- Criterion A/1: Resources that are associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion B/2: Resources that are associated with the lives of significant persons in our past;
- Criterion C/3: Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- Criterion D/4: Resources that have yielded or may be likely to yield, information important in history or prehistory.

In addition to significance under one or more of the criteria listed above, a resource must possess integrity, defined by seven aspects as follows:

- Location: the place where the historic property was constructed or the place where the historic event took place.
- Design: the composition of elements that constitute the form, plan, space, structure, and style of a property.
- Setting: the physical environment of a historic property that illustrates the character of the place.
- Materials: the physical elements combined in a particular pattern or configuration.
- Workmanship: the physical evidence of the crafts of a particular culture or people during any given period of history.
- Feeling: the quality that a historic property has in evoking the aesthetic or historic sense of a past period of time.
- Association: the direct link between a property and the event or person for which the property is significant.

NRHP analysis is based upon all pertinent cultural resources guidance and best practices including that of 36 CFR Part 800 and technical bulletins including *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation.* CEQA analysis based on CEQA Guidelines outlined in Section 5024.1 of the California Public Resource Code.[14]

CITY OF OAKLAND THRESHOLDS FOR HISTORICAL RESOURCES

Lead agencies are responsible for evaluating historic period resources (over 50-years of age) for CRHR eligibility before determining if a project will impact a historic resource. If a project will cause substantial adverse change (i.e., demolition, destruction, relocation, or adverse alteration such that the significance cannot be conveyed) mitigation procedures may be necessary. In addition to CRHR eligibility lead agencies generally must consider a property a historic resource for the purposes of CEQA if it is included on a local register of historical resources.

As defined by the City of Oakland's *Guidance on Historical Resources*, a "historical resource" under CEQA is a resource that meets any of the following criteria:

1) A resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources;

[14] *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. National Park Service, 2002 Website accessed May 10, 2017: http://www.nps.gov/nr/publications/bulletins/nrb15/; California Public Resource Code, "Article 2, Historic Resources," http://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode =PRC&sectionNum=5024.1. Accessed May 15, 2017.

2) A resource included in Oakland's Local Register of historical resources, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;

3) A resource identified as significant (e.g., rated 1-5) in a historical resource survey recorded on Department of Parks and Recreation Form 523, unless the preponderance of evidence demonstrates that it is not historically or culturally significant;

4) Meets the criteria for listing on the California Register of Historical Resources; or

5) A resource that is determined by the Oakland City Council to be historically or culturally significant even though it does not meet the other four criteria listed above.

THE OAKLAND CULTURAL HERITAGE SURVEY (OCHS)

For purposes of environmental review under CEQA, the following properties will constitute the City of Oakland's "Local Register of Historic Resources": 1) All Designated Historic Properties (Landmarks, Heritage Properties, Study List Properties, Preservation Districts, and S-7 and S-20 Preservation Combining Zone Properties); and 2) Potential Designated Historic Properties that have an existing rating of "A" or "B" or are located within an Area of Primary Importance (API).

The OCHS uses a five-tier alphabetical (A through E) rating system for individual properties, from A (highest importance) to E (of no interest) and numerical ratings (1 to 3) for district status.

This Individual Property Rating is based on the following criteria:

-Visual Quality/Design: Evaluation of exterior design, interior design, materials and construction, style or type, supporting elements, feelings of association, and importance of designer.

-History/Association: Association of person or organization, the importance of any event, association with patterns of history, and the age of the building.

-Context: Continuity and familiarity of the building within the city, neighborhood, or district.

-Integrity and Reversibility: Evaluation of the building's condition, its exterior and interior alterations, and any structural removals.

Integrity is defined as "the ability of a property to convey its significance." The National Register criteria recognize seven qualities that define integrity: location, design, setting, materials, workmanship, feeling, and association.

Properties with conditions or circumstances that could change substantially in the future are assigned both an "existing" and a "contingency" rating. The existing rating (upper case letter) describes the property under its present condition, while the contingency rating (lower case letter, if any), describes it under possible future circumstances, such as if the property were restored. Properties are also given a numerical district status rating based on an assessment of

the property's area's significance; 1 (Area of Primary Importance, appears eligible for the NRHP), 2 (Area of Secondary Importance), and 3 (outside an identified district). Additionally, a plus (+) or minus (-) indicates whether the individual property is a contributor (+) or noncontributor (-) to any relevant district.

4.2 EVALUATION AND ANALYSIS

One property, 3007 East 15th Street, was located within the project site, it has since been demolished. All OCHS and DPR 523 form ratings for the properties within the APE were identified through utilization of the Oakland Planning and Zoning GIS map and OCHS survey forms. Three properties were identified for further analysis, based on state and local survey ratings, or status as NRHP or CRHP listed resources (Table 2). One property, the Alfred H. Cohen House (NRHP #73000394), is listed on the NRHP and occupies an adjacent parcel. A second property, located on an adjacent parcel, the Fruitvale Medical Building, was rated 4S7 ("may become eligible for NR as separate property when integrity is restored") under the old system (equivalent to 7N1 currently) on a DPR Form 523. The same property was rated Cb+3 locally under OCHS, indicating a resource of secondary importance tending to major importance if restored, not in a historic district. The third property, the Woody's Smorgasburger commercial building, was evaluated in 1993. The property's ratings do not reflect that the building is now over 45 years old. The Woody's Smorgasburger commercial building is also on an adjacent parcel. The project APE just touches the western edge of the Fruitvale Commercial Corridor ASI (Area of Secondary Importance), on the eastern edge of the project APE.

Table 2 - Identified Properties Within the Project APE

Property	Description	Location to Project	Survey Ratings	NRHP Listed	CRHP Listed	Local Register	CEQA Historic Resource?	Impact Assessment
Alfred H. Cohen House, 1884	1440 29th Avenue, a Stick-Eastlake style residence.	Adjacent to project site.	A3	Yes		Yes	**Yes**	**No significant impact.**
Fruitvale Medical Building, 1927	3022 International Blvd, a Gothic Revival office building.	Adjacent to project site.	4S7, Cb+3				**Yes**	**No significant impact.**
Woody's Smorgasburger, 1963	3000 International Blvd, a Mid-Century Modern A-frame commercial building.	Adjacent to project site.	6Z1				**No**	**n/a**

4.2.1 Fruitvale Medical Building

This study concludes, the Fruitvale Medical Building at 3022 International Boulevard appears eligible for listing on the NRHP under Criterion A and CRHR Criterion 1, because it is important within the context of East Oakland's Fruitvale Neighborhood development, specifically with association to the "Second City." The Fruitvale neighborhood experienced record setting growth in the 1910s and 1920s becoming the second most important area in Oakland. The neighborhood was anchored by multiple banks and office buildings with the Fruitvale Medical Building directly contributing to this when constructed in 1927. The commercial space represented the Wetherbee Business Subdivisions transition from a rural residential enclave to a commercial center. It contributed to the diversification of businesses located along East 14th Street and Fruitvale Avenue as it was one of the early professional buildings and is important representative of this commercial development theme.

There is no evidence that the property has any important association with any person or persons who made significant contributions to history at the local, state, or national level under NRHP Criterion B and CRHR Criterion 2. It was the first building developed on the Wetherbee Business Subdivision, the Wetherbee family were important figures in early Oakland history however all physical vestiges, their home and property have been demolished and the current property bares no connection to that family. The Fruitvale Medical Building was commissioned and owned by the Fairview Properties Company and later owned by Thomas and Virginia Brown research did not reveal that wither had significant associations in this regard. Further, the property tenants included numerous doctors and dentists, however research did not indicate any people playing an important role to the history of medicine.

The property does appear eligible for the NRHP under Criterion C and CRHR Criterion 3, because it is an important example of any type, period, or method of construction. In the years prior to the late 1920 doctors and dentist offices consisted of informal one to two room offices typically located at a private home. As cities grew and professionals worked farther from home, a new type of building was needed to provide easier access to medical professionals. The Fruitvale Medical Building is an important type of building as it is an early example of a medical office building. The building was designed specifically with doctors and dentists in mind, rooms were customized and all the newest technology was integrated into the building. This was a revolutionary advance from office parlors which often lacked electricity or proper plumbing. The building celebrated the use of electricity, allowing the building design to not be hemmed in by cumbersome steam pipes or centralized boilers. Further, its design fixed a common complain concerning privacy. A central receptionist directed patients to all the different medical specialists who had private offices. The offices, through modern electrical heating ensured all rooms were as comfortable as possible, given the circumstances. Additionally, the architecture of the building is significant. Research did not indicate that A.E. Young was a particularly important architect however the design exemplifies Gothic Revival architectural elements. The Fairview Properties company ensured the exterior architecture maintained the highest quality to match the interior design. Design details such as pointed pilasters with decorative gothic motifs separate the bays. The third through fifth floors have rows of eight windows in similar

arrangements to the front façade and the sixth floor has the same pointed arches and pilaster caps are character defining features of late Gothic Revival commercial architecture. In the 1950s the first-floor exterior was remodeled with the additional or roman brick and modern aluminum storefronts, however, the buildings more important architectural elements are located above the first story. The modifications are not so great to diminish its ability to convey its significance. The building retains integrity of location, setting, materials, workmanship, feeling and association.

Under NRHP Criterion D or CRHR Criterion 4 is not significant as a source, or likely source, of important information regarding history, building materials, construction techniques, or advancements in residential design or engineering. It is a well-documented building type and one of many similar dwellings found throughout California and the nation.

4.2.2 Woody's Smorgasburger

This study concludes, the former Woody's Smorgasburger at 3000 International Boulevard is ineligible for listing on the NRHP under Criterion A and CRHR Criterion 1, because it is not important within the context of East Oakland's Fruitvale Neighborhood development, specifically with association to the "Second City." The Fruitvale neighborhood experienced record setting growth in the 1910s and 1920s becoming the second most important area in Oakland. The neighborhood was anchored by multiple banks and office buildings. The Woody's Smorgasburger represents a second phase of construction in Fruitvale. Further, it is an example of infill construction and does not represent the growth of the neighborhood. Further it is not important within the development of Woody's Smorgasburger restaurant chain. This building was one of the later franchisees, the chain developed rapidly between 1956 and 1962, witht eh majority development in 1963. The Oakland location was constructed in 1964 and is therefore not associated with the development of the chain.

There is no evidence that the property has any important association with any person or persons who made significant contributions to history at the local, state, or national level under NRHP Criterion B and CRHR Criterion 2. It was the first building developed on the Wetherbee Business Subdivision, the Wetherbee family were important figures in early Oakland history however all physical vestiges, their home and property have been demolished and the current property bares no connection to that family. Research did not indicate who owned the restaurant, however given that it was a chain restaurant, it is unlikely the franchisee would have made any important contributions in this regard.

The property does not appear eligible for the NRHP under Criterion C or CRHR Criterion 3, because it is not an important example of any type, period, or method of construction. The former Woody's Smorgasburger building used a standardized design by Neil Johnson. Johnson originally created the design in 1962 for the Granada Hills Woody's Smograsburger location. Following completion of the Granada Hills location ten additional Woody's were constructed using that same Johnson design. The Woody's at 3000 International Boulevard was constructed in 1964 and was the 11 building to utilize the same design. While Johnson is arguably a master

architect for his work on the 1960 Steel House, this current building does not exemplify his work. This design was replicated throughout California and is characteristic of midcentury chain restaurant-type construction. This was a common practice for chain companies who hired and architect to make one plan that could be adapted to multiple sites. Further, since construction the buildings integrity has degraded as many of the architectural details, such as the windows under the gabled ends (fronting International Boulevard) have been removed or covered. The building has lost its integrity of design, materials, workmanship, feeling, and association. Degraded integrity, coupled with lack of significance make this building ineligible under NRHP Criterion C and CRHR Criterion 3.

Under NRHP Criterion D or CRHR Criterion 4 is not significant as a source, or likely source, of important information regarding history, building materials, construction techniques, or advancements in residential design or engineering. It is a well-documented building type and one of many similar dwellings found throughout California and the nation.

Lastly, the Oakland Cultural Heritage Survey (OCHS) had not previously evaluated the building as, at that time, it had not yet reached 50 years of age. This current study has determined the building is not eligible for the CRHR or NRHP under any criterion. Using the OCHS 50ve-tier alphabetical rating System for individual properties, this building receives a D as it is not significant as described in the sections above. It is currently not within an existing historic district.

4.2.3 Alfred H. Cohen House

The Alfred H. Cohen House is a NRHP-listed property (ID #73000394) located at 1440 29th Avenue, Oakland and on a parcel adjacent to the project site. The Alfred H. Cohen House (also known as the Alfred H. Cohen House) was listed on the National Register in 1973 and designated an Oakland Landmark, under Zoning Case #LM 74-335 in 1975 (Oakland Wiki 2017). No changes have been made to the property that would alter the property's status as a resource listed on the NRHP, or as an Oakland Landmark. The property meets the definition of a "historical resource" under CEQA as a National Register property and as a City of Oakland Local Landmark.[15]

4.3 IMPACT ANALYSIS

Two buildings within the APE were identified as "historical resources" under CEQA; the Fruitvale Medical Building and the Alfred H. Cohen House.

As defined by the City of Oakland's *CEQA Thresholds of Significance Guidelines*, the project would have a "significant impact" on the environment if it would:

1. Cause a substantial adverse change in the significance of an historical resource as defined in CEQA Guidelines section 15064.5. Specifically, a substantial adverse change includes

[15] National Register Digital Assets, Alfred H. Cohen House, https://npgallery.nps.gov/AssetDetail/NRIS/73000394 (accessed June 18, 2017).

physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be "materially impaired." The significance of an historical resource is "materially impaired" when a project demolishes or materially alters, in an adverse manner, those physical characteristics of the resource that convey its historical significance and that justify its inclusion on, or eligibility for inclusion on an historical resource list (including the California Register of Historical Resources, the National Register of Historical Resources, Local Register, or historical resources survey form (DPR Form 523) with a rating of 1-5).

Additionally, as described by City of Oakland's *CEQA Thresholds of Significance Guidelines*, the project would have a significant impact on the environment if it would cast a shadow on an historic resource such that the shadow would materially impair the resource's historic significance.

4.3.1 Fruitvale Medical Building

The Fruitvale Medical Building is located on an adjacent parcel to the project site, the project would not cause a substantial adverse change in terms of physical demolition, destruction, relocation, or alteration to the resource. The project may cause alteration of the resource's immediate surroundings by adding a new three-story modern-style building adjacent to the resource. The new construction, however, is still smaller in scale than the six-story Fruitvale Medical Building. Stylistically, the new construction is dissimilar to the resource, however, the neighborhood context is one of successive waves of development; each successive wave filling in new or vacant parts of the thoroughfare, renovating existing, and new construction. The significance of the Fruitvale Medical Building will not be materially impaired by the Aspire ERES Academy International Boulevard Project, as it will not adversely alter the resource's immediate surroundings. *The project will not cause substantial adverse change in the significance of the Fruitvale Medical Building. Additionally, the project will not cast a shadow on the Fruitvale Medical Building which would materially impair the resource's historic significance.*

4.3.2 Alfred H. Cohen House

The Alfred H. Cohen House's rear elevation abuts the project site. The house, fronts 29th Avenue to the northwest and the property features mature trees, specifically along the east edge of the property, abuting the Aspire ERES Academy International Boulevard Project site. The house is flanked by modern, multi-story infill developments. Additionally, a precursory line-of-sight analysis conducted by an architectural historian of the proposed project site as viewed from the Alfred H. Cohen House determined that there is little discernable visual effect on the Alfred H. Cohen House by the construction of the Aspire Charter School due to the height and fullness of the trees between the resource and the proposed school site (Figure 11).

It is the opinion of this report that the Aspire ERES Academy International Boulevard Project will not cause a substantial adverse change in terms of physical demolition, destruction, relocation, or alteration to the Alfred H. Cohen House. The resources importance is not justified by its

surroundings beyond its property borders. Therefore, the alteration imposed by the Aspire ERES Academy International Boulevard Project on the immediate surroundings of the Alfred H. Cohen House would not be substantial adverse change as the alteration would not materially impair the significance of the Alfred H. Cohen House, nor would it adversely alter the resource's status as a resource listed on the NRHP. *The project would not cause substantial adverse change in the significance of the Alfred H. Cohen House. Additionally, due to the distance between the project and the Alfred H. Cohen House and intervening trees and structures, the project would not cast a shadow on the Alfred H. Cohen House.*



Figure 11 – Looking to the Aspire School Site from the Alfred H. Cohen House, Facing Southeast.

4.3.3 Impact Statement for Historic Resources

The proposed project will not cause a substantial adverse change to two identified historical resources under CEQA (No impact). This report finds that the Aspire ERES Academy International Boulevard Project would not have a significant impact on the environment regarding historic resources under CEQA. Alternatives and mitigation measures are not required.

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APPENDICES

Appendix A DPR FORM FOR 3022 INTERNATIONAL BOULEVARD

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings _____
Review Code _____ Reviewer _____ Date

***Resource Name or #:** (Assigned by recorder) 3022 International Boulevard
P1. Other Identifier: _____

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Alameda
and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

- ***b. USGS 7.5' Quad** Oakland East **Date** 1959 (revised 1980) **Sec** Unsectioned; MD **B.M.**
- c. Address 3022 International Boulevard City Oakland Zip 94601
- d. UTM: (Give more than one for large and/or linear resources) Zone, 10 S 568021mE/4181530mN
- e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

3022 International Boulevard is located at the northwest corner of International Boulevard and Derby Avenue in the Fruitvale neighborhood of Oakland, CA. APN 25-720-5-2.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property at 3022 International Boulevard is located at the intersection of International Boulevard, a primary commercial corridor and Derby Avenue a historically mixed residential and commercial street. The six-story commercial building, primarily houses medical and dental offices. The primary entrance is along International Boulevard. On the northside of the building is a surface parking lot that is accessible via two driveways; one off Derby Avenue and one off International Boulevard. The building has a trapezoidal plan (**Photograph 1**) (see Continuation Sheet).

***P3b.Resource Attributes:** (List attributes and codes) HP7 – 3+ Story Commercial Building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)



P5b. Description of Photo: (view, date, accession #)
Photograph 1: Property overview, camera facing north, October 1, 2016.

***P6. Date Constructed/Age and Source:**
☒ Historic ☐ Prehistoric ☐ Both
1927, City of Oakland Building Permit

***P7. Owner and Address:**
Unknown
3022 International Boulevard
Oakland, CA 94601

***P8. Recorded by:** (Name, affiliation, and address)
Everett Smith
Stantec, Inc.
555 Capitol Avenue, Suite 650
Sacramento, CA 95814

***P9. Date Recorded:** October 3, 2016

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Historic Resource Evaluation Report, Aspire Charter School, Oakland, CA June 2017

***Attachments:** ☐NONE ☐Location Map ☒Continuation Sheet ☒Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 3022 International Boulevard ***NRHP Status Code** 6Z

B1. Historic Name: Fruitvale Medical Building, 3012-3028 East 14th Street

B2. Common Name: 3022 International Boulevard

B3. Original Use: Commercial B4. Present Use: Commercial

***B5. Architectural Style:** Gothic Revival

***B6. Construction History:** (Construction date, alterations, and date of alterations) The commercial building was constructed in 1927, for a full construction history see context below..

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** _____ **Original Location:** _____

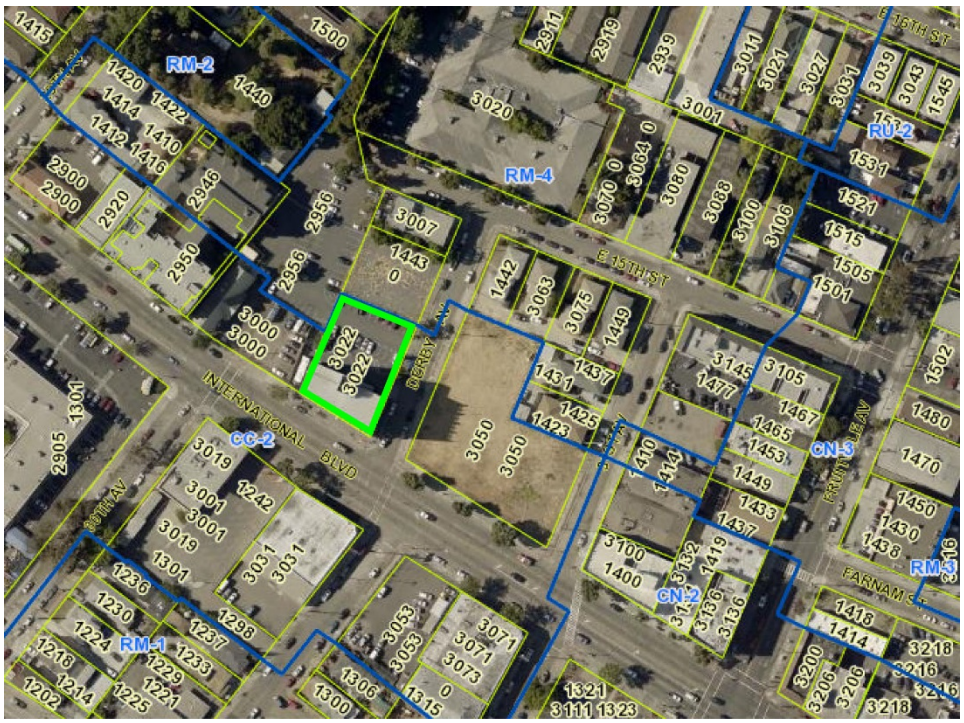
***B8. Related Features:** none

B9a. Architect: Arthur Young and Company b. Builder: Clipper Company

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a (Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The property at 3022 International Boulevard meets the criteria for listing in the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), and as a local resource under the Oakland local register. The property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act Guidelines (CEQA), using the criteria outlined in Section 5024.1 of the California Public Resources Code, the property does appear to be a historical resource for the purpose of CEQA (see Continuation Sheet).



B11. Additional Resource Attributes: (List attributes and codes) _____

***B12. References:** See footnotes

B13. Remarks:

***B14. Evaluator:** Garret Root

***Date of Evaluation:** June 2017

This space reserved for official comments.

P3a. Description (Continued):

The six-story commercial building with a concrete foundation and frame with hollow clay tile walls. It has flat, parapet roof with pilaster caps, and windows with pointed arches. There are seven bays across the front (southwest) façade. The central bay provides the main pedestrian access through a decorative iron gate and glass door with a metal frame and a very large fixed transom window. The primary entry, clad in roman bring, is flanked by three bays on either side, holding one storefront with large fixed picture windows in metal frames and glass pedestrian doors. There are large pointed arches on the second floor over each of the six side bays. Each arch is filled with windows divided vertically into seven lights, the two lights on either side of the center of the arch each have a casement window in a metal frame. There are three tall and narrow windows with pointed arch tops above the central bay. Pointed pilasters with gothic motifs separate the seven bays on the first and second stories. The third through fifth story have rows of fourteen windows, each with cruciform muntins separating four lights. The upper two lights are horizontal sliders and are smaller than the lower two lights of each window. The sixth floor has similar windows but with pointed arches at the top. The gothic motifs on the pilaster caps on the peaked roof match the pilasters on the second story. There is an exterior metal fire escape on the northwestern end bay. A vertical metal sign hangs above the entrance and reads "Fruitvale MEDICAL Bldg."

The southeast façade, facing Derby Avenue, mimics the front façade in design details but has only four bays (**Photograph 2**). Like the front façade, each bay on the southeast has a large pointed arch on the second floor, each with five vertical lights, however these arches lack the front façade's casement windows. As on the front, pointed pilasters with decorative gothic motifs separate the bays. The third through fifth floors have rows of eight windows in similar arrangements to the front façade and the sixth floor has the same pointed arches and pilaster caps. There is an exterior metal fire escape on the northeastern end bay. The northeast and northwest sides are devoid of architectural details. They are both unadorned masonry walls with rows of casement windows on all floors. Drain pipes and conduit supplying power to exterior lighting wrap around these elevations (**Photograph 3**).

B10. Significance (Continued):

Historic Context

The commercial building, constructed as a medical and dentist office building in 1927, is located at the intersection of International Boulevard (formerly East 14th Street) and Derby Avenue (Formerly 30th Avenue) in Oakland's Fruitvale Neighborhood. The office building is located within the Wetherbee Business Subdivision, a small commercial subdivision established in 1924. The gothic revival-style building is located along East Oakland's commercial corridor. Other prominent buildings include banks and department stores. The property, located in the Fruitvale neighborhood, is named for cherry and apricot orchards which occupied the land in the late 1800s. Fruitvale's south and west boundary is a tidal canal that separates Alameda Island from the mainland, Foothill Boulevard forms the northern boundary and 42nd Avenue forms the eastern side. International Boulevard, formerly East 14th Street, is the primary east-west thoroughfare and home to the main commercial district of the neighborhood.[1]

[1] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 1-2; Thomas Bros, *Thomas Bros Block Book of Oakland Fruitvale District,* Volume 9 (Oakland: Thomas Brothers, 1924), 807.

Early Development of East Oakland and Fruitvale

The origins of twentieth century commercial and residential development in Fruitvale stemmed from 1850s settlement. Gold Rush-era settlers leased and purchased land from the former Pealta Hacienda, a Mexican-era land grant. By the 1860s Fruitvale had evolved into a collection of rural estates with small and medium sized farms. In 1869, a 1.3 acre parcel located along East 14th and Fruitvale Avenue, was subdivided creating a new suburban residential tract. Oak Tree Farm Subdivision consisted of large ornate homes with wide lawns, ornamental fences and fountains, and broad, tree line streets. The neighborhood attracted wealthy Oakland residents including W.A. Bray a manufacturer, E.M. Derby a lumber magnate, and Henry Wetherbee. Wetherbee a mining and lumber magnate purchased a 6-acre parcel along East 14th Street and Fruitvale Avenue (location of the study parcel) and built a grand home with a rose and bamboo gardens, tall trees, a dense hedge, an a tennis court. Wetherbee purchased the property and built a house, stables, and outhouses in 1871. Wetherbee, earned his wealth during the gold rush, selling wares to miners. In 1856, he went into the lumber business, purchasing large tracts of timberland along the northern coast of California, establishing a shipping fleet, and transporting fresh cut lumber to San Francisco. Wetherbee represents one of the preeminent lumber barons of California, earning the title "The Prince of the Redwoods." Henry died in 1892, however, his widow, Mrs. Ellie Wetherbee lived at the property until 1924.[2]

However, in the early 1900s a transportation and building boom transformed the Bay Area into a regional urban hub. Fruitvale experienced this growth, as residential and commercial expanded at either end of East 14th Street near Fruitvale Avenue and High Street. By 1905 the neighborhoods rapid growth had earned it the title "The Mushroom City" due to the increased residential and commercial density along the tidal canal. Fruitvale had a strong civic identity and debates over incorporation or annexation were lively during this period. Following the 1906 earthquake and subsequent fire refugees spread across the greater East Bay doubling neighborhood populations like in Fruitvale. These new residents prompted development of large estates into smaller subdivisions. The Derby Estate Company owned property near the current intersection of East 14th Street and Derby Avenue, in 1906 they subdivided the property for residential and commercial development (**Figure 1**). The influx of urban newcomers, largely German immigrants, influenced the vote in favor of annexation, in 1909 Fruitvale became part of Oakland. Following annexation commercial development expanded at a rapid pace as many landmark bank buildings were constructed along East 14th Street.[3]

[2] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 8-10; "Fruit Vale Its charming homes and fine residences. Henry Wetherbee's fine place," *Oakland Tribune,* September 30,1889; "A Pioneer's Death," *Oakland Tribune,* January 30, 1892.

[3] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 11-13.

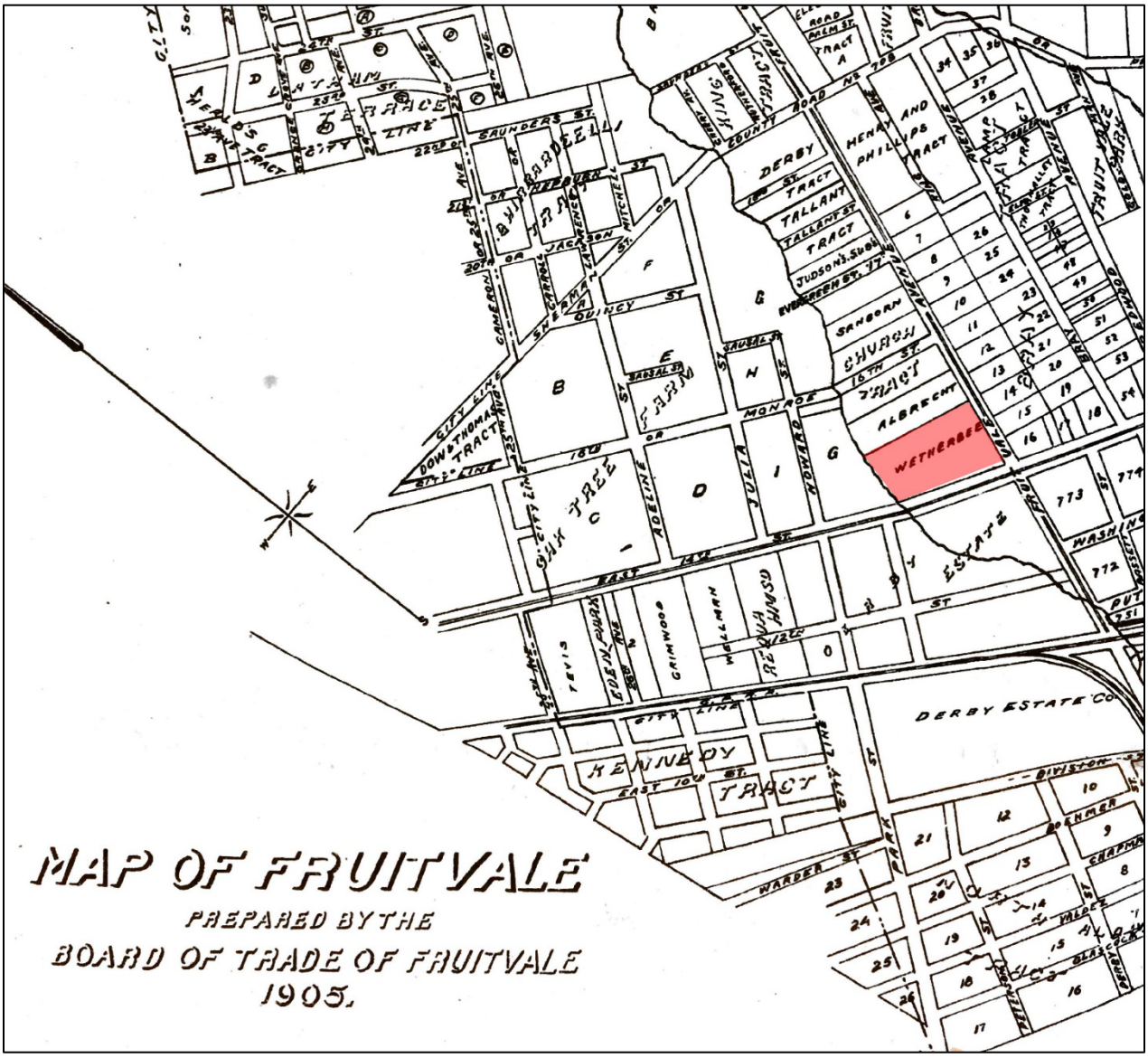


Figure 1. Map of Fruitvale in 1905.[4]

Fruitvale's commercial core centered on East 14th Street between Fruitvale Avenue and 38th Avenue was characterized by commercial storefronts with residential flats above. In addition to the influx of San Francisco residents post 1906, Fruitvale attracted more residents as it as situated near the Southern Pacific and Western Pacific Railroads and shipping associated with the tidal canal. By 1910, Fruitvale's population had grown to 25,000 to 35,000 residents. This growth prompted Oakland City Council to enact an early zoning ordinance that divided Oakland into residential and industrial districts. These zoning guidelines limited what could be constructed in a residential area such as no heavy industries, stables, or hospitals.

[4] William T.Grubb, *Beautiful Fruitvale*, (Fruitvale, Ca: Fruitvale Board of Trade, 1905).

Those areas, which included both sides of East 14th Street in Fruitvale, were identified as Industrial, allowing for any type of construction. Greater Oakland experienced a population growth of 66,000 in 1900 to 150,000 in 1920 due to continued annexations. This growth was due to its geographic location as an intersection point of rail road, and maritime infrastructure. This intersection contributed to manufacturing growth earning the city the moniker "Detroit of the West." The increase in manufacturing directly contributed to the commercial expansion along Fruitvale's East 14th Street.[5]

East Oakland and Fruitvale in particular became a regional commercial center described in 1922 as Oakland's "second city." The 1920s saw increased construction of masonry and concrete buildings, many utilized fast and economical hollow clay tile wall construction. In 1923, the Central National Bank, purchased a tract of land from Mrs. Wetherbee, and opened their first branch in Fruitvale at the corner of East 14th Street and Fruitvale Avenue. Other banking institutions soon followed with the American Bank and Bank of Italy opening branches along East 14th Street. Montgomery Ward established a huge catalog warehouse and department store at East 14th and 29th, while its connection to the Fruitvale economy seems to have been somewhat limited it did dominate the look and feel of the districts' western end (**Figure 2**). While all of this development occurred in Fruitvale's central business core many of the large residential estates were razed and replaced with modern commercial development. The old stalwarts such as Derby subdivided their property in the 1910s. By the early 1920s, only the Wetherbee property remained intact.[6]



Figure 2. Montgomery Ward & Company in the early 1920s.[7]

[5] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 12-15; Analee Allen, *Oakland*. (Charleston, SC: Arcadia Pub, 2005), 7-9.

[6] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 15-16; "Bank to Build $100,000 Branch," *Oakland Tribune,* September 29,1922; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924.

[7] Oakland Public Library, "Montgomery Ward Company," Cheney Photo Advertising Company, https://calisphere.org/item/ark:/13030/kt7z09r2w6/ (accessed June 15, 2017).

Wetherbee Business Subdivision and Fruitvale Medical Building

In 1924, Ms. Ellen Wetherbee sold her 6-acre property for a record $300,000 to Walter G. Filler with the sale negotiated by E.B. Field Company. E.B. Field Company specialized in commercial and industrial real estate. E.B. Field Company took over subdivision of the property for commercial and industrial customers (**Figure 3**). Sale of the property quickly generated a lot of interest as it was the last, large intact parcel not yet developed for commercial interests within the Fruitvale neighborhood. The area was experiencing the fastest population growth in any part of Oakland in 1924. Within a four-block radius businesses in operation in 1924 included department stores such as Piggly Wiggly, Woolworths, and Montgomery Ward, Car dealerships including Studebaker, Hudson, Chevy Dodge, Buick, and Schleusters Western Auto Supply. All of these new industries spurred the continued development of Fruitvale from an affluent residential enclave (only the 1884 Bray-Cohen house at 1440 29th Street remains), towards a second city within greater Oakland.[8]

The Wetherbee property sold in March 1924 and by May of that same year all the extant buildings, including the 1871 house, were razed has the property was cleared for development. Development of the lot was overseen by E.B. Field Company, who instructed construction of two new streets, 30th (renamed Derby Avenue) and 31st Avenues, to greater connect the property to the grid and the commercial and economic core of 14th Street and Fruitvale Avenue. Initially E.B. Field Company cited the property would include development of a theater, however this never came to fruition. However, one lot was purchased and developed into a one-of-a-kind office building.[9]

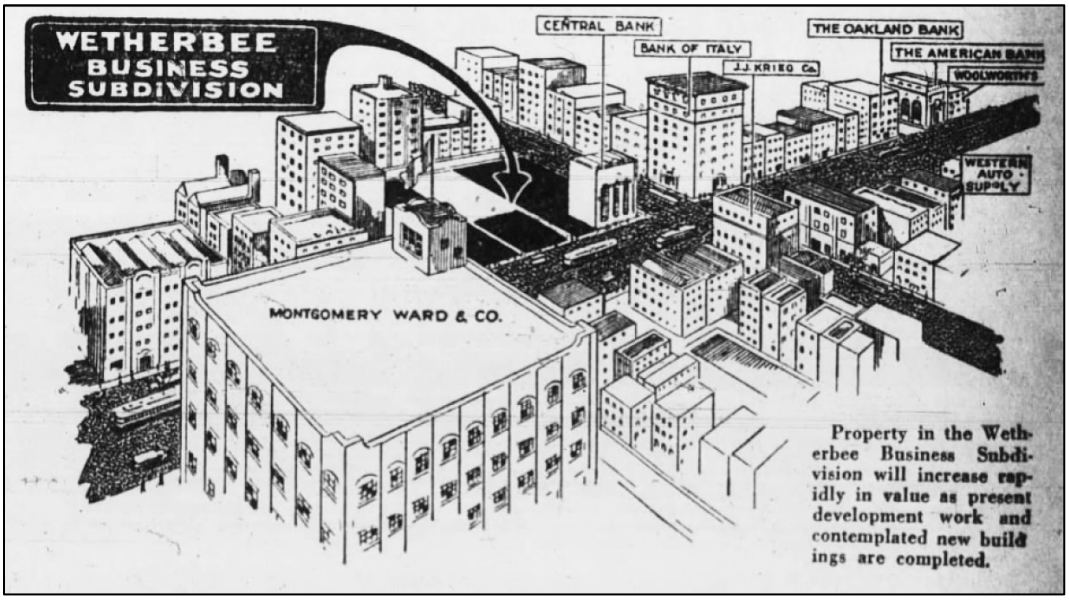


Figure 3. A 1924, advertisement for the Wetherbee Business Subdivision.[10]

[8] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924; "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924.
[9] "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet.
[10] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924.

In 1926, the Fairview Properties Corporation purchased the lot on the northeast corner of 30th Avenue and East 14th Street, located in the new Wetherbee Business Subdivision. Fairview Properties began construction in 1927 of the first professional medical office building in East Oakland. Up until the late 1920s doctors and dentists offices were typically operated out of their home. The front parlor was typically divided into a waiting area and an examination room. If their office was not in their home, doctors and dentists would have a standalone office in a building separate from the main house. The design of these early medical offices were not ideal as privacy was commonly an issue. Additionally, homes offices typically lacked amenities such as electricity, modern heating, or technological advances such as X-Ray machines, which was invented in 1895 but in 1909 only 12 dentists across the United States because in part, to office designs. Starting in the 1920s residential subdivisions sprawled outward away from city's core, it became more inconvenient for working people to access doctors and dentists at their home. Medical offices of the time that were located downtown were often in cramped spaces above existing businesses. Also, by the 1920s, automobile transportation became increasingly important with street parking an increasing problem.[11]

Fairview Properties Corporation aimed to fix this through construction of the Fruitvale Medical Building which was constructed specifically to professional tenants that held a MD or DDS license. The Fruitvale Medical Building solved many of the problems that developed as populations shifted from small towns and residential doctors and dentists to urban. The new building was constructed near established transportation infrastructure, included a dedicated parking lot, and a state of the art building designed for medical professions. The building's design was one of function, the building layout filtered through one central receptionist who directed patients to private doctor and dentist suites. Tenants designed their suites to include custom designed rooms including laboratories, treatment, exam, surgery, and therapy rooms. An X-ray laboratory was located on the third floor and a pharmacy, Howe Prescription Pharmacies, occupied the first floor. This customization effort resulted in every single room in the building to be of a different design and shape.[12]

The building design team consisted of structural engineer John Carl Thayer, architect HC Haglund with architectural supervision by A.E. Young. Fairview Properties chose a Gothic design for the building, they hired W.A. Pentecost for the architectural and detail drawings such as the wrought iron. The Clipper Company did all the concrete working, including the full basement and acted as general contractor. Fairview Properties made a huge investment cementing the success of the building and the idea of a centralized medical office, they designed the building to showcase electricity. The Fruitvale Medical Building was the first major office building on the West Coast to be all electric including heat, light, water heating, and power (**Figure 4**). Electric heating reduced the need for cumbersome ducting and eliminated the need for steam pipes or a central boiler. Oakland electrical company, Great Western Power Company installed a substation in the basement to power the building. Additional technological and design advancements include strategic placement of multiple water heaters throughout the building rather than one central boiler unit. All this construction was completed in July 1927 but the installation of fixtures and

[11] Melnick Medical Museum, "Doctor's and Dentist's Offices," https://melnickmedicalmuseum.com/exhibits/doctors-and-dentists-offices/ (accessed June 15, 2017); Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet.
[12] Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet; Melnick Medical Museum, "Doctor's and Dentist's Offices," https://melnickmedicalmuseum.com/exhibits/doctors-and-dentists-offices/ (accessed June 15, 2017).

customization continued until the building officially opened in January 1928. Fruitvale in the years leading up to World War II saw continued construction. [13]



Figure 4. Fruitvale Medical Building in ca. 1930.[14]

Post-War Oakland

In the years following the end of the war the military production juggernaut had to be altered to civilian needs. During the war, African Americans and women were the dominant labor force, however, they were displaced by returning veterans. These post-war interactions shaped Oakland for many years. In the 1950s Oakland, like cities across the country, saw a domestic migration of people and businesses to the new suburbs, abandoning the central core of cities. Those left behind were people who could not afford to leave

[13] Fairview Properties Corporation, "Fruitvale Medical Building," (San Francisco: Fairview Properties Company 1927), booklet; City of Oakland, Building Permit A25342, Fruitvale Medical Building, 1926.
[14] Oakland Public Library, "Fruitvale Medical Building,"1930.

or whose race limited their ability to move to more desirable neighborhoods regardless of financial standing. This system was further cemented with an increase in freeway construction. The freeways allowed suburban dwellers access to central business cores while acting as boarders for residents living below in the historic central neighborhoods. This flight of money caused a dramatic central core decline across California and the United States, but hit Oakland's predominantly African-American and Latino communities particularly hard. Exodus of business and residents lowered the commercial and economic tax base of the city while creating greater demands for human services. All this compounded unemployment, racial tension, and the physical deterioration of civic core and neighborhoods.[15]

The racial tensions on the 1950s and '60s affected the ethnic makeup of the Fruitvale neighborhood. The densest, poorest, and most homogenous African American neighborhoods were concentrated near the bay and tidal canal while white homeowners began to migrate to the foothills. Housing practices during this time including overt market manipulation by real estate agents served to maintain neighborhood segregation when physical barriers failed. From the mid-1960s Fruitvale became dominant Latin-American, a makeup it maintains. In the 1960s the Oakland Public Library converted the Fruitvale post office building into its Latin American Branch. The 1960 Census described 17% of Fruitvale as having a "Spanish surname," over two-and-a-half times the rate for the rest of Oakland, by 1990 the two census tracts adjoining the commercial strip along East 14th Street, by that time renamed International Boulevard, were over 50% Hispanic. In 1992 the Oakland Citizens Committee for Urban Renewal described Fruitvale as "the major Latino cultural center of the East Bay.[16]"

While banking and professional office buildings anchored the neighborhood commercially, the 1950s saw an influx of new business such as used car lots and fast food. While many single-family residences remained in neighborhoods north and west of Fruitvale Avenue, larger numbers of multi-family apartment buildings were constructed in the late 1940s and early 1950s. On the blocks surrounding the Fruitvale Medical Building, these changes were evident. In 1950, used car lots flanked the building on both sides in addition to a wholesale tire business was located one block east on 31st Avenue and an auto repair shop. Additional new business included furniture warehouses, a large facility located just west of the property with a second, on 31st Avenue. A block east, the Alpine Hotel which was contemporaneous in construction to the Fruitvale Medical Building had begun conversion to apartments.[17]

Fairview Properties retained ownership of the Fruitvale Medical Building from 1927 into the 1990s. During that time, multiple doctors and dentists filtered through the building, however it remained a strictly medical office building. By 1950, the parking lot located north of the building saw the addition of two, covered parking carports that have since been removed. Also, during the 1960s the original, first floor façade underwent changes through the addition of a roman brick apron and new aluminum storefronts replacing

[15] Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251.
[16] Robert O. Self, *American Babylon: Race and the Struggle for Postwar Oakland,* (New Jersey, Princeton: Princeton University Press, 2003), 164-166; Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993).
[17] Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, 1911): 198; Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, November 1950): 198; Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251; Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 18.

the original stone and wood storefronts, despite the modification they aluminum storefronts fit within the existing frame. While the buildings primary use has remained medical and dental, there has been a revolving door of businesses in the first floor including: the Kitchen Inn, multiple pharmacies, a beauty shop, and several restaurants. In the early 1990s Thomas and Virginia Brown purchased the property, they maintained ownership through the mid-2010s.[18]

Evaluation

OCHS evaluated the building as a part of the city's Fruitvale survey in 1993. That study concluded the building had a local rating of Cb+3 indicating a resource of secondary importance (C) tending to major importance if restored (b+) and it is not located within a historic district (3). The previous documentation efforts did not evaluate the building for the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR).[19]

This study concludes, the Fruitvale Medical Building at 3022 International Boulevard appears eligible for listing on the NRHP under Criterion A and CRHR Criterion 1, because it is important within the context of East Oakland's Fruitvale Neighborhood development, specifically with association to the "Second City." The Fruitvale neighborhood experienced record setting growth in the 1910s and 1920s becoming the second most important area in Oakland. The neighborhood was anchored by multiple banks and office buildings with the Fruitvale Medical Building directly contributing to this when constructed in 1927. The commercial space represented the Wetherbee Business Subdivisions transition from a rural residential enclave to a commercial center. It contributed to the diversification of businesses located along East 14th Street and Fruitvale Avenue as it was one of the early professional buildings and is important representative of this commercial development theme.

There is no evidence that the property has any important association with any person or persons who made significant contributions to history at the local, state, or national level under NRHP Criterion B and CRHR Criterion 2. It was the first building developed on the Wetherbee Business Subdivision, the Wetherbee family were important figures in early Oakland history however all physical vestiges, their home and property have been demolished and the current property bares no connection to that family. The Fruitvale Medical Building was commissioned and owned by the Fairview Properties Company and later owned by Thomas and Virginia Brown research did not reveal that wither had significant associations in this regard. Further, the property tenants included numerous doctors and dentists, however research did not indicate any people playing an important role to the history of medicine.

The property does appear eligible for the NRHP under Criterion C and CRHR Criterion 3, because it is an important example of any type, period, or method of construction. In the years prior to the late 1920 doctors and dentist offices consisted of informal one to two room offices typically located at a private home. As cities

[18] Betty Martin, Oakland Cultural Heritage Survey, Identification Sheet, "3022 East 14th Street," July 24, 1993; Oakland Cultural Heritage Survey, "DPR Fruitvale Medical Building for OCKS Completion Report, CLG Project #06-93-80101," September 30, 1994; Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, November 1950): 198.

[19] The NRHP and CEQA both require that historic properties be identified and evaluated by following standardized guidelines and applying significance criteria. Because CEQA guidelines are based on those of the NRHP, the two are nearly identical. For the sake of clarity, this report outlines the NRHP evaluation process; nevertheless, both NRHP and CEQA guidelines were applied in the preparation of this report.

grew and professionals worked farther from home, a new type of building was needed to provide easier access to medical professionals. The Fruitvale Medical Building is an important type of building as it is an early example of a medical office building. The building was designed specifically with doctors and dentists in mind, rooms were customized and all the newest technology was integrated into the building. This was an revolutionary advance from office parlors which often lacked electricity or proper plumbing. The building celebrated the use of electricity, allowing the building design to not be hemmed in by cumbersome steam pipes or centralized boilers. Further, its design fixed a common complain concerning privacy. A central receptionist directed patients to all the different medical specialists who had private offices. The offices, through modern electrical heating ensured all rooms were as comfortable as possible, given the circumstances. Additionally, the architecture of the building is significant. Research did not indicate that A.E. Young was a particularly important architect however the design exemplifies Gothic Revival architectural elements. The Fairview Properties company ensured the exterior architecture maintained the highest quality to match the interior design. Design details such as pointed pilasters with decorative gothic motifs separate the bays. The third through fifth floors have rows of eight windows in similar arrangements to the front façade and the sixth floor has the same pointed arches and pilaster caps are character defining features of late Gothic Revival commercial architecture. In the 1950s the first-floor exterior was remodeled with the additional or roman brick and modern aluminum storefronts, however, the buildings more important architectural elements are located above the first story. The modifications are not so great to diminish its ability to convey its significance. The building retains integrity of location, setting, materials, workmanship, feeling and association.

Under NRHP Criterion D or CRHR Criterion 4 is not significant as a source, or likely source, of important information regarding history, building materials, construction techniques, or advancements in residential design or engineering. It is a well-documented building type and one of many similar dwellings found throughout California and the nation.

Photographs (Continued):



Photograph 2. View of eastern side of the Fruitvale Medical Building, camera facing northwest. October 1, 2016.



Photograph 3. West side of Fruitvale Medical Building, camera facing southeast. October 1, 2016.



Photograph 4. North side of Fruitvale Medical Building, camera facing south. October 1, 2016.

Appendix B DPR FORM FOR 3000 INTERNATIONAL BOULEVARD

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) 3000 International Boulevard
P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Alameda
and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

- ***b. USGS 7.5' Quad** Oakland East **Date** 1959 (revised 1980) **Sec** Unsectioned; MD **B.M.**
- c. Address 3000 International Boulevard City Oakland Zip 94601
- d. UTM: (Give more than one for large and/or linear resources) Zone, 10 S 568021mE/4181530mN
- e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

3000 International Boulevard is located on the northern side of International Boulevard in the Fruitvale neighborhood of Oakland, CA. APN 25-720-7-1.

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property at 3000 International Boulevard is located at the T-intersection of 30th Avenue and International Boulevard, a commercial corridor. The single-story building, is currently used as a church. The property is enclosed on all side by a metal security fence, with one vehicular entrance off International Boulevard. The rectangular-plan building is located on the west end of the parcel with the rest of the property an asphalt parking lot. The building has a hyperbolic paraboloid roof with a cross gable all clad in composition shingles (**Photograph 1**) (see Continuation Sheet).

***P3b.Resource Attributes:** (List attributes and codes) HP6 – 1-3 Story Commercial Building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)



P5b. Description of Photo: (view, date, accession #)
Photograph 1: Property overview, camera facing west, October 3, 2016.

***P6. Date Constructed/Age and Source:**
☒ Historic ☐ Prehistoric ☐ Both
1964, City of Oakland Building Permit

***P7. Owner and Address:**
Unknown
3000 International Boulevard
Oakland, CA 94601

***P8. Recorded by:** (Name, affiliation, and address)
Everett Smith
Stantec, Inc.
555 Capitol Avenue, Suite 650
Sacramento, CA 95814

***P9. Date Recorded:** October 3, 2016

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation**: (Cite survey report and other sources, or enter "none.")
Historic Resource Evaluation Report, Aspire Charter School, Oakland, CA June 2017

***Attachments:** ☐NONE ☐Location Map ☒Continuation Sheet ☒Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 3000 International Boulevard ***NRHP Status Code** 6Z

B1. Historic Name: Woody's Smorgasburger, International House of Pancakes

B2. Common Name: 3000 International Boulevard

B3. Original Use: Commercial B4. Present Use: Religious

***B5. Architectural Style:** Modified Chalet

***B6. Construction History:** (Construction date, alterations, and date of alterations) The commercial building was constructed in 1964, for a full construction history see context below..

***B7. Moved?** ☒No ☐Yes ☐Unknown **Date:** _____ **Original Location:** _____

***B8. Related Features:** none

B9a. Architect: Neil Johnson, AIA b. Builder: Unknown

***B10. Significance: Theme** n/a **Area** n/a

Period of Significance n/a **Property Type** n/a **Applicable Criteria** n/a (Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The property at 3000 International Boulevard does not meet the criteria for listing in the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), or as a local resource under the Oakland local register. The property has been evaluated in accordance with Section 15064.5(a)(2)-(3) of the California Environmental Quality Act Guidelines (CEQA), using the criteria outlined in Section 5024.1 of the California Public Resources Code, the property does not appear to be a historical resource for the purpose of CEQA (see Continuation Sheet).



B11. Additional Resource Attributes: (List attributes and codes) _____

***B12. References:** See footnotes

B13. Remarks:

***B14. Evaluator:** Garret Root

***Date of Evaluation:** June 2017

This space reserved for official comments.

P3a. Description (Continued):

The building has a brick veneer apron with plywood panel siding with decorative half timbering in the upper half of the first story and in the gable ends. Fenestration consists of plate glass single-light windows and doors. A former metal IHOP sign post, converted to a cross, stands off the southeast corner of the building (**Photograph 2** and **3**).

B10. Significance (Continued):

Historic Context

The commercial building, constructed as Woody's Smorgasburger a subsidiary of International House of Pancakes in 1964, is located at the T-intersection of International (formerly East 14th Street) and Formerly 30th Avenue in Oakland's Fruitvale Neighborhood. The office building is located within the Wetherbee Business Subdivision, a small commercial subdivision established in 1924. The modified chalet, midcentury modern commercial building is located along East Oakland's commercial corridor. Other prominent buildings include banks and department stores built in the 1920s. The property, located in the Fruitvale neighborhood, was named for cherry and apricot orchards which occupied the land in the late 1800s. Fruitvale's south and west boundary is a tidal canal that separates Alameda Island from the mainland, Foothill Boulevard forms the northern boundary and 42nd Avenue forms the eastern side. International Boulevard, formerly East 14th Street, is the primary east-west thoroughfare and home to the main commercial district of the neighborhood.[1]

Early Development of East Oakland and Fruitvale

The origins of twentieth century commercial and residential development in Fruitvale stemmed from 1850s settlement. Gold Rush-era settlers leased and purchased land from the former Pealta Hacienda, a Mexican-era land grant. By the 1860s Fruitvale had evolved into a collection of rural estates with small and medium sized farms attracting wealthy Oakland residents including W.A. Bray a manufacturer, E.M. Derby a lumber magnate, and Henry Wetherbee. Wetherbee a mining and lumber magnate purchased a 6-acre parcel along East 14th Street and Fruitvale Avenue (location of the study parcel) and built a grand home with a rose and bamboo gardens, tall trees, a dense hedge, an a tennis court. Wetherbee, earned his wealth during the gold rush and in 1856, went into the lumber business. He purchased large tracts of timberland along the northern coast of California, establishing a shipping fleet, and transporting fresh cut lumber to San Francisco. Henry died in 1892, however, his widow, Mrs. Ellie Wetherbee lived at the property until 1924.[2]

In the early 1900s a transportation and building boom transformed the Bay Area into a regional urban hub. Fruitvale experienced this growth, as residential and commercial expanded at either end of East 14th Street near Fruitvale Avenue and High Street. By 1905 the neighborhoods rapid growth had earned it the title "The Mushroom City" due to the increased residential and commercial density along the tidal canal. Fruitvale had

[1] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 1-2; Thomas Bros, *Thomas Bros Block Book of Oakland Fruitvale District,* Volume 9 (Oakland: Thomas Brothers, 1924), 807.

[2] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 8-10; "Fruit Vale Its charming homes and fine residences. Henry Wetherbee's fine place," *Oakland Tribune,* September 30,1889; "A Pioneer's Death," *Oakland Tribune,* January 30, 1892.

a strong civic identity and debates over incorporation or annexation were lively during this period. Following the 1906 earthquake and subsequent fire refugees spread across the greater East Bay doubling neighborhood populations like in Fruitvale. These new residents prompted development of large estates into smaller subdivisions. The Derby Estate Company owned property near the current intersection of East 14th Street and Derby Avenue, in 1906 they subdivided the property for residential and commercial development (**Figure 1**). The influx of urban newcomers, largely German immigrants, influenced the vote in favor of annexation, in 1909 Fruitvale became part of Oakland. Following annexation commercial development expanded at a rapid pace as many landmark bank buildings were constructed along East 14th Street.[3]

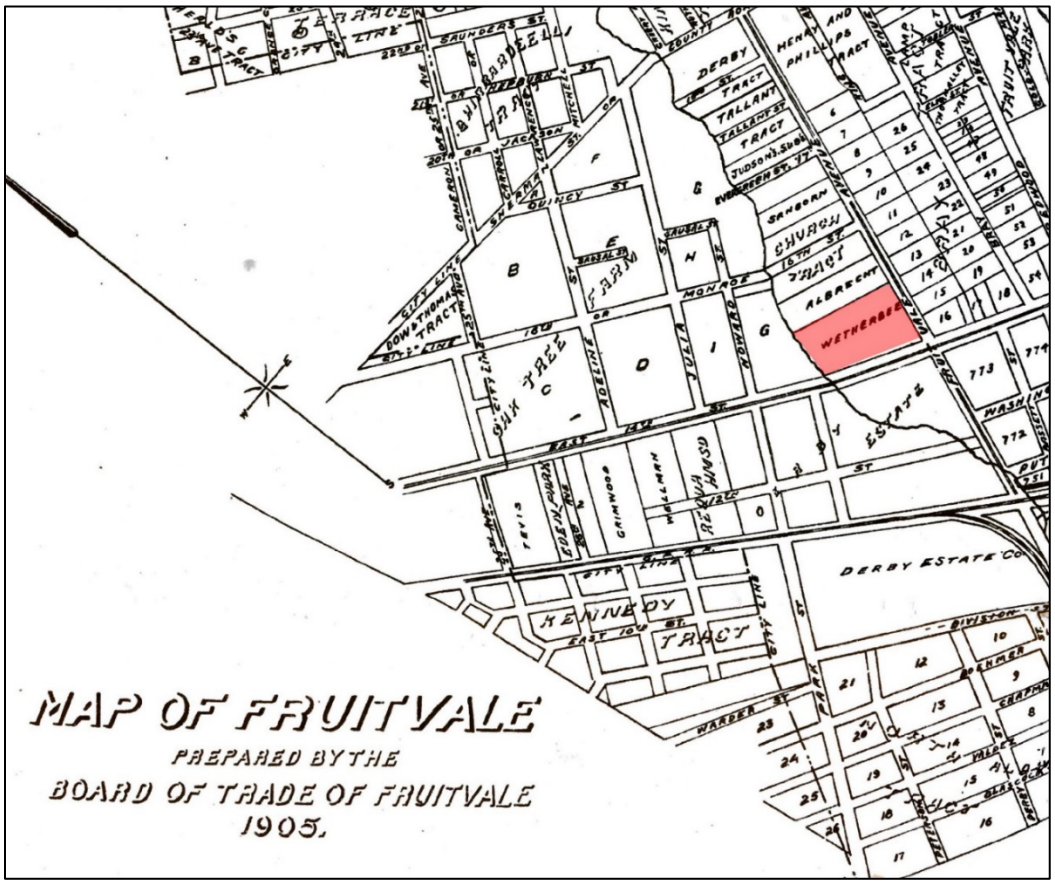


Figure 1. Map of Fruitvale in 1905.[4]

Fruitvale's commercial core centered on East 14th Street between Fruitvale Avenue and 38th Avenue was characterized by commercial storefronts with residential flats above. In addition to the influx of San Francisco residents post 1906, Fruitvale attracted more residents as it as situated near the Southern Pacific and Western Pacific Railroads and shipping associated with the tidal canal. By 1910, Fruitvale's population had grown to 25,000 to 35,000 residents. Greater Oakland experienced a population growth of 66,000 in 1900

[3] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 11-13.
[4] William T. Grubb, *Beautiful Fruitvale*, (Fruitvale, Ca: Fruitvale Board of Trade, 1905).

to 150,000 in 1920 due to continued annexations. This growth was due to its geographic location as an intersection point of rail road, and maritime infrastructure. This intersection contributed to manufacturing growth earning the city the moniker "Detroit of the West." The increase in manufacturing directly contributed to the commercial expansion along Fruitvale's East 14th Street.[5]

East Oakland and Fruitvale in particular became a regional commercial center described in 1922 as Oakland's "second city." In 1923, the Central National Bank, purchased a tract of land from Mrs. Wetherbee, and opened their first branch in Fruitvale at the corner of East 14th Street and Fruitvale Avenue. Other banking institutions soon followed and Montgomery Ward established a huge catalog warehouse and department store at East 14th and 29th, while its connection to the Fruitvale economy seems to have been somewhat limited it did dominate the look and feel of the districts' western end (**Figure 2**). While all of this development occurred in Fruitvale's central business core many of the large residential estates were razed and replaced with modern commercial development.[6]



Figure 2. The Montgomery Ward & Company building located in the Fruitvale neighborhood, in the early 1920s.[7]

Wetherbee Business Subdivision

In 1924, Ms. Ellen Wetherbee sold her 6-acre property for a record $300,000 to Walter G. Filler with the sale negotiated by E.B. Field Company. E.B. Field Company specialized in commercial and industrial real estate. E.B. Field Company took over subdivision of the property for commercial and industrial customers (**Figure**

[5] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 12-15; Analee Allen, *Oakland.* (Charleston, SC: Arcadia Pub, 2005), 7-9.

[6] Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 15-16; "Bank to Build $100,000 Branch," *Oakland Tribune,* September 29,1922; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924.

[7] Oakland Public Library, "Montgomery Ward Company," Cheney Photo Advertising Company, https://calisphere.org/item/ark:/13030/kt7z09r2w6/ (accessed June 15, 2017).

3). Sale of the property quickly generated a lot of interest as it was the last, large intact parcel not yet developed for commercial interests within the Fruitvale neighborhood. The area was experiencing the fastest population growth in any part of Oakland in 1924. Within a four-block radius businesses in operation in 1924 included department stores such as Piggly Wiggly, Woolworths, and Montgomery Ward, Car dealerships including Studebaker, Hudson, Chevy Dodge, Buick, and Schleusters Western Auto Supply. All of these new industries spurred the continued development of Fruitvale from an affluent residential enclave (only the 1884 Bray-Cohen house at 1440 29th Street remains), towards a second city within greater Oakland.[8]

The Wetherbee property sold in March 1924 and by May of that same year all the extant buildings, including the 1871 house, were razed as the property was cleared for development. Development of the lot was overseen by E.B. Field Company, who instructed construction of two new streets, 30th (renamed Derby Avenue) and 31st Avenues, to greater connect the property to the grid and the commercial and economic core of 14th Street and Fruitvale Avenue. Initially E.B. Field Company cited the property would include development of a theater, however this never came to fruition. However, one lot was purchased and developed into a one-of-a-kind office building. In 1926, the Federal Realty Company, purchased the property in the new Wetherbee Business Subdivision. Keeping with the automotive trends of the early 1920s the lot was developed into a used Chevrolet car lot in 1936.[9]

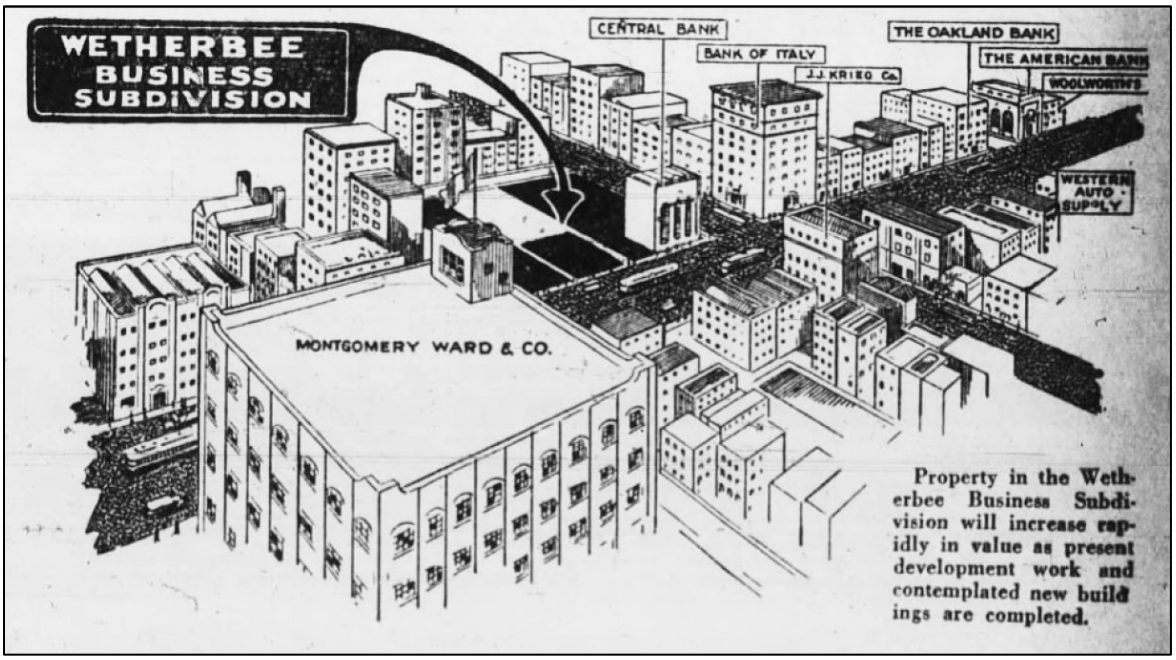


Figure 3. A 1924 advertisement for the Wetherbee Business Subdivision.[10]

[8] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924; "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924.
[9]"Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924; "Big estate site for industries," *Oakland Tribune,* March 26, 1924; Advertisement, "Wetherbee Business Subdivision," *Oakland Tribune,* April 19,1924; Advertisement, "The New Chevrolet Used Car Lot," *Oakland Tribune,* December 18,1936.
[10] "Wetherbee Estate Subdivided by E.B. Field Company," *Oakland Tribune,* April 13, 1924.

The study property remained a used car lot from 1936 until it was demolished in 1963. Over that time, multiple used car dealerships occupied the property. The property consisted of two, simple wood frame office buildings that shared one used car lot. In 1937 through 1939 the lot was owned by Glickbarg's used auto sales. From 1940 through 1943 Dana-Frane sold used Dodge and Plymouth cars at 3000 East 14th Street. In 1943, the lot passed to Joe's Auto Exchange, the company retained ownership for ten years before being sold to Remmer & Jordan Pontiac in 1953. Remmer & Jordan Pontiac continued operating at the property until 1963 when it was sold for a final time, this time to Woody's Smorgasburger, a southern California burger chain owned by International House of Pancakes.[11]

Post-War Oakland

In the years following the end of the war the military production juggernaut had to be altered to civilian needs. During the war, African Americans and women were the dominant labor force, however, they were displaced by returning veterans. These post-war interactions shaped Oakland for many years. In the 1950s Oakland, like cities across the country, saw a domestic migration of people and businesses to the new suburbs, abandoning the central core of cities. Those left behind were people who could not afford to leave or whose race limited their ability to move to more desirable neighborhoods regardless of financial standing. This system was further cemented with an increase in freeway construction. The freeways allowed suburban dwellers access to central business cores while acting as boarders for residents living below in the historic central neighborhoods. This flight of money caused a dramatic central core decline across California and the United States, but hit Oakland's predominantly African-American and Latino communities particularly hard. Exodus of business and residents lowered the commercial and economic tax base of the city while creating greater demands for human services. All this compounded unemployment, racial tension, and the physical deterioration of civic core and neighborhoods.[12]

The racial tensions on the 1950s and '60s affected the ethnic makeup of the Fruitvale neighborhood. The densest, poorest, and most homogenous African American neighborhoods were concentrated near the bay and tidal canal while white homeowners began to migrate to the foothills. Housing practices during this time including overt market manipulation by real estate agents served to maintain neighborhood segregation when physical barriers failed. From the mid-1960s Fruitvale became dominant Latin-American, a makeup it maintains. In the 1960s the Oakland Public Library converted the Fruitvale post office building into its Latin American Branch. The 1960 Census described 17% of Fruitvale as having a "Spanish surname," over two-and-a-half times the rate for the rest of Oakland, by 1990 the two census tracts adjoining the commercial strip along East 14th Street, by that time renamed International Boulevard, were over 50% Hispanic. In 1992 the Oakland Citizens Committee for Urban Renewal described Fruitvale as "the major Latino cultural center of the East Bay.[13]"

While banking and professional office buildings anchored the neighborhood commercially, the 1950s saw

[11] Advertisement, "Glickbarg's Bargains," *Oakland Tribune,* March 26,1937; Advertisement, "Dana-Frane As Is Bargains," *Oakland Tribune,* August 9,1940; Advertisement, "Joe's Auto Exchange," *Oakland Tribune,* November 9,1943;
[12] Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251; Advertisement, "Remmer & Jordan Pontiac," *Oakland Tribune,* March 8,1954.
[13] Robert O. Self, *American Babylon: Race and the Struggle for Postwar Oakland,* (New Jersey, Princeton: Princeton University Press, 2003), 164-166; Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993).

an influx of new business such as used car lots and food chains. While many single-family residences remained in neighborhoods north and west of Fruitvale Avenue, larger numbers of multi-family apartment buildings were constructed in the late 1940s and early 1950s. On the blocks surrounding the study parcel, these changes were evident. Additional new business included furniture warehouses, a large facility located just west of the property with a second, on 31st Avenue. By the early 1960s the study property has been numerous used car lots, however in 1964 the two car lot offices were razed and the property prepped for a new, rapidly expanding burger restaurant chain.[14]

Woody's Smorgasburger

Woody's Smorgasburger was the brainchild of Ralph Wood Jr. who, in 1956, opened the first Woody's in Culver City. The restaurant chain sold hamburgers in quarter and half-pound patties, larger than other competitors at the time. The thing that set Woody's apart from the competition was a plain bun with a condiment bar that allowed patrons to customize the burgers to their liking. Additionally it offered a self-serve sundae bar. The second restaurant, opened in 1958, in Redondo Beach with the third opened in 1960 in Gardena. In 1962, the chain was acquired by International House of Pancakes. The pancake chain was another Southern California institution, founded in 1958. In addition to Woody's the pancake company owned The Dog Houses, The Gold Cup, the Copper Penny's, and The Golden Oaks. The acquisition of Woody's by International House of Pancakes allowed for faster expansion through franchisees. By 1962, Woody's expanded to Torrance, Monterey Park, Los Angeles, Granada Hills, and Reseda. In 1963, six additional Woody's were under construction in Southern California (Glendale, Pasadena, Santa Monica, San Bernardino, Pomona, and Fullerton) (**Figure 4**). The first Woody's constructed outside Southern California was built in Palo Alto in 1963. Ralph Wood Jr. remained part of the Woody's brand until the late 1960s when he sold his share of the company to International House of Pancakes.[15]

In addition to the novel concept of build-your-own burger and the self-serve ice cream sundae bar the restaurant was also identified by the uniquely shaped building. The first three Woody's restaurants were custom designed buildings, however starting with the 1962 constructed Granada Hills location all subsequent Woody's used the same design. To brand the burger chain, International House of Pancakes hired Los Angeles architect, Neil Johnson, famous for his 1960 Steel House, to design a unique look for future Woody's Smorgasburgers. Johnson designed a building he called a "modified chalet," which featured a high-pitched roof that slants in multiple directions, technically called a hyperbolic paraboloid. The roofs were covered in epoxy resign meant to mimic the look of snow. All Woody's built from 1962 onward utilized

[14] Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, 1911): 198; Sanborn Fire Insurance Company, *Oakland,* Volume 2 (Oakland: Sanborn Fire Insurance Maps, November 1950): 198; Beth Bagwell, *Oakland the Story of a City*, Oakland: Oakland Heritage Alliance, 2012), 249-251; Oakland City Planning Department, Oakland Cultural Heritage Survey, "Fruitvale Neighborhood Commercial Revitalization Area Survey," Volume 34A, (City of Oakland, 1993), 18.

[15] Advertisement, "Greely Not Infallible," *Los Angeles Times*, July 28, 1963; Advertisement, "Franchises Are Available," *Los Angeles Times*, July 24, 1962; Advertisement, "Welcome to Woody's No. 3," *Los Angeles Times*, November 15, 1959; Sam Gnerre, "Woody's Smorgasburger Pioneers the Dress-it-Yourself Hamburger," http://blogs.dailybreeze.com/history/2016/04/23/woodys-smorgasburger-pioneers-the-dress-it-yourself-hamburger/ (accessed June 14, 2017); Roadside Architecture, "A-Frame Chains and Other Eateries," http://www.roadarch.com/eateries/aframe3.html (accessed June 14, 2017).

the Johnson design, which, by 1968 had grown to nearly twenty locations across California.[16]



Figure 4. A 1963 Woody's Smorgasburger napkin introducing the new and open restaurants.[17]

Following the completion of the Palo Alto location in 1963, several franchises, all using the Johnson design, were added in the greater San Francisco Bay Area and into Sacramento. The study property was constructed in 1964 with one added in Berkley the following year. In 1965 one was constructed in Sacramento, the farthest north the chain extended (**Figure 5**). The modern chalet design proved successful for the Woody's restaurants, and a simplified chalet design (changed the hyperbolic paraboloid roof in favor of a simpler cross gable) was utilized by International House of Pancakes from the late 1960s onward. Woody's began to lose their new construction momentum in the late 1960s as competing chains such as Bob's Big Boy increased their market share. Woody's Smorgasburger continued to operate under the International House of Pancakes franchise until the mid-1980s with the El Segundo franchisee lasting until 2005. The Woody's at 3000 International Boulevard operated into the 1980s before changing over to a IHOP. In the 2000s it became a church. Since its construction, the study property's integrity has degraded as much of the original ornamentation associated with Woody's has been removed.[18]

[16]"Restaurant to Rise in Granada Hills," *Los Angeles Times*, April 29, 1962; "2 Hamburger Houses Now Under Way," *Los Angeles Times*, August 25, 1963; Roadside Architecture, "A-Frame Chains and Other Eateries," http://www.roadarch.com/eateries/aframe3.html (accessed June 14, 2017).

[17] Sam Gnerre, "Woody's Smorgasburger Pioneers the Dress-it-Yourself Hamburger," http://blogs.dailybreeze.com/history/2016/04/23/woodys-smorgasburger-pioneers-the-dress-it-yourself-hamburger/ (accessed June 14, 2017).

[18] Roadside Architecture, "A-Frame Chains and Other Eateries," http://www.roadarch.com/eateries/aframe3.html (accessed June 14, 2017); Sam Gnerre, "Woody's Smorgasburger Pioneers the Dress-it-Yourself Hamburger," http://blogs.dailybreeze.com/history/2016/04/23/woodys-smorgasburger-pioneers-the-dress-it-yourself-hamburger/ (accessed June 14, 2017).

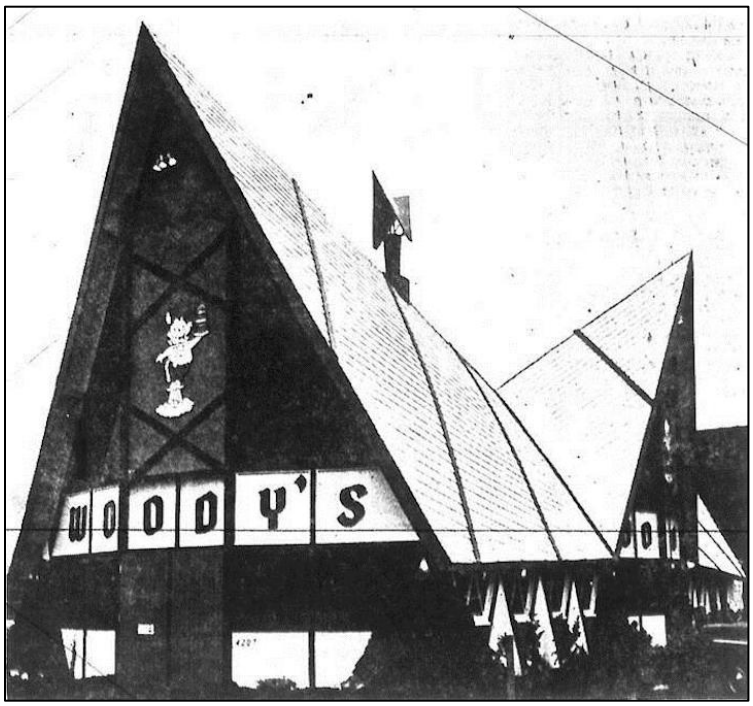


Figure 5. The Sacramento Woody's Smorgasburger showing all the corporate details.[19]

Evaluation

This study concludes, the former Woody's Smorgasburger at 3000 International Boulevard is ineligible for listing on the NRHP under Criterion A and CRHR Criterion 1, because it is not important within the context of East Oakland's Fruitvale Neighborhood development, specifically with association to the "Second City." The Fruitvale neighborhood experienced record setting growth in the 1910s and 1920s becoming the second most important area in Oakland. The neighborhood was anchored by multiple banks and office buildings. The Woody's Smorgasburger represents a second phase of construction in Fruitvale. Further, it is an example of infill construction and does not represent the growth of the neighborhood. Further it is not important within the development of Woody's Smorgasburger restaurant chain. This building was one of the later franchisees, the chain developed rapidly between 1956 and 1962, with the majority development in 1963. The Oakland location was constructed in 1964 and is therefore not associated with the development of the chain.

There is no evidence that the property has any important association with any person or persons who made significant contributions to history at the local, state, or national level under NRHP Criterion B and CRHR Criterion 2. It was the first building developed on the Wetherbee Business Subdivision, the Wetherbee family were important figures in early Oakland history however all physical vestiges, their home and property have been demolished and the current property bares no connection to that family. Research did

[19] "Architecture – Googie, or Semi-Googie, http://quirkyberkeley.com/wp-content/uploads/2014/04/Woodys-Sacramento.jpg, (Accessed June 14, 2017).

not indicate who owned the restaurant, however given that it was a chain restaurant, it is unlikely the franchisee would have made any important contributions in this regard.

The property does not appear eligible for the NRHP under Criterion C or CRHR Criterion 3, because it is not an important example of any type, period, or method of construction. The former Woody's Smorgasburger building used a standardized design by Neil Johnson. Johnson originally created the design in 1962 for the Granada Hills Woody's Smograsburger location. Following completion of the Granada Hills location ten additional Woody's were constructed using that same Johnson design. The Woody's at 3000 International Boulevard was constructed in 1964 and was the 11 building to utilize the same design. While Johnson is arguably a master architect for his work on the 1960 Steel House, this current building does not exemplify his work. This design was replicated throughout California and is characteristic of midcentury chain restaurant-type construction. This was a common practice for chain companies who hired and architect to make one plan that could be adapted to multiple sites. Further, since construction the buildings integrity has degraded as many of the architectural details, such as the windows under the gabled ends (fronting International Boulevard) have been removed or covered. The building has lost its integrity of design, materials, workmanship, feeling, and association. Degraded integrity, coupled with lack of significance make this building ineligible under NRHP Criterion C and CRHR Criterion 3.

Under NRHP Criterion D or CRHR Criterion 4 is not significant as a source, or likely source, of important information regarding history, building materials, construction techniques, or advancements in residential design or engineering. It is a well-documented building type and one of many similar dwellings found throughout California and the nation.

Lastly, the Oakland Cultural Heritage Survey (OCHS) had not previously evaluated the building as, at that time, it had not yet reached 50 years of age. This current study has determined the building is not eligible for the CRHR or NRHP under any criterion. Using the OCHS 50ve-tier alphabetical rating System for individual properties, this building receives a D as it is not significant as described in the sections above. It is currently not within an existing historic district.

Photographs (Continued):



Photograph 2. View of eastern side of the Fruitvale Medical Building, camera facing northwest. October 3, 2016.



Photograph 3. West side of Fruitvale Medical Building, camera facing southeast. October 3, 2016.

Appendix C NRHP NOMINATION FOR ALFRED G. COHEN HOUSE

PH 0047180

Form 10-300
(July 1969)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY – NOMINATION FORM

(Type all entries – complete applicable sections)

STATE: California
COUNTY: Alameda
FOR NPS USE ONLY
ENTRY NUMBER | DATE
JAN 19 1973

1. NAME

COMMON: The Alfred H. Cohen ~~Residence~~

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER: 1440 29th Avenue, Fruitvale

CITY OR TOWN: Oakland

STATE	CODE	COUNTY:	CODE
California	006	Alameda	001

3. CLASSIFICATION

CATEGORY (Check One)	OWNERSHIP		STATUS	ACCESSIBLE TO THE PUBLIC
☐ District ☒ Building	☐ Public	Public Acquisition:	☒ Occupied	Yes:
☐ Site ☐ Structure	☒ Private	☐ In Process	☐ Unoccupied	☐ Restricted
☐ Object	☐ Both	☐ Being Considered	☐ Preservation work in progress	☐ Unrestricted
				☒ No

PRESENT USE *(Check One or More as Appropriate)*

☐ Agricultural	☐ Government	☐ Park	☐ Transportation	☐ Comments
☐ Commercial	☐ Industrial	☒ Private Residence	☐ Other *(Specify)*	
☐ Educational	☐ Military	☐ Religious		
☐ Entertainment	☐ Museum	☐ Scientific		

4. OWNER OF PROPERTY

OWNER'S NAME: Miss Edith Emelita Cohen (life estate)

STREET AND NUMBER: 1440 29th Avenue

CITY OR TOWN:	STATE:	CODE
Oakland	California	006

5. LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC: Hall of Records, Alameda County Court House

STREET AND NUMBER: 1225 Fallon Street

CITY OR TOWN:	STATE	CODE
Oakland	California	006

6. REPRESENTATION IN EXISTING SURVEYS

TITLE OF SURVEY:

DATE OF SURVEY: ☐ Federal ☐ State ☐ County ☐ Local

DEPOSITORY FOR SURVEY RECORDS:

STREET AND NUMBER:

CITY OR TOWN:	STATE:	CODE

RECEIVED MAR 16 1973 NATIONAL REGISTER

SEE INSTRUCTIONS

STATE: California
COUNTY: Alameda
FOR NPS USE ONLY
ENTRY NUMBER
DATE

RECEIVED
MAR 16 1973
NATIONAL REGISTER

7. DESCRIPTION

CONDITION	(Check One)						
	☐ Excellent	☒ Good	☐ Fair	☐ Deteriorated	☐ Ruins	☐ Unexposed	
	(Check One)			(Check One)			
	☐ Altered	☒ Unaltered *		☐ Moved	☒ Original Site		

DESCRIBE THE PRESENT AND ORIGINAL (*if known*) PHYSICAL APPEARANCE

The acquisition of over 200 acres of the Peralta Grant which was to become "Oak Tree Farm" was started on July 6, 1854 when Watson Augustus Bray and his brother John Grandid Bray bought 35 acres from a John Kennedy. Four years later they purchased an additional 75.31 acres from Mr. Kennedy for $5,000. In 1863 Watson A. Bray continued the expansion of his property when he paid $5,697 to Mr. J. B. Lemoine for 37.98 adjoining acres, and a few days later transacted for another 53.83 acres from Mr. Lemoine's holdings. (See map of 1869 attached.)

The home that Mr. Bray built on his country estate for his family was completed in 1858 and Mr. and Mrs. Bray and their infant daughter Emma moved from San ~~Francisco~~ to "Oak Tree Farm" (in what was then called Fruit Vale) on January 20, 1859. Here five more children were born, including two sets of twins. Soon other families moved into Fruitvale area where they built large homes and estates surrounded by extensive lawns, tree-lined drives and flower gardens, as well as vegetable gardens and the luxuriant fruit orchards for which the area was named. All of these homes had numerous out-buildings, such as barns to shelter horses, cows and chickens; carriage houses, arbors and gazeboes. These neighbors played important roles in the development of the San Francisco Bay area, and included such prominent names as Requa, Derby, Harmon, Wellman, Harrub, Crockett, Wetherbee, and Grimwood.

When Emma Bray, who had come to Oak Tree Farm as a baby, became engaged to Alfred Henry Cohen, her wedding present from her parents was a seventeen-room house on the property across the road from her parents' home "where the asparagus patch had been". Alfred A. Cohen, brilliant attorney for the Big Four in San Francisco, owner of 72-roomed "Fernside" in Alameda, and father of Alfred H. Cohen, furnished the new house as a wedding present of the groom's parents.

Over 300 guests attended the wedding on February 24, 1884. When the newly wed Alfred H. Cohens left their wedding reception, instead of going directly to the honeymoon suite awaiting them in Del Monte, they slipped across the street and watched their wedding reception "wind down" from their brand new home. They lived in this house at 1440 29th Avenue the rest of their lives, and their four children Alfreda, Douglas, Marion, and Edith Emelita were born there. Edith Emelita Cohen, the surviving member of her generation, still lives in the house which her mother bequeathed to her as a life estate.

In 1918 when the third child, Marion Cohen, was married to William Gilliland, her parents remodeled the carriage house, (which was Bray's wedding present to the Alfred H. Cohens, and which was also built in 1884) and had it moved to the front of the property at 1448 29th Avenue (to the North of the big house), as a home for them. Marion and William Gilliland lived there all their married lives, and today their children consider the Gilliland home as still a part of the original property.

* Rear porch restored following 1906 earthquake.

SEE INSTRUCTIONS

8. SIGNIFICANCE

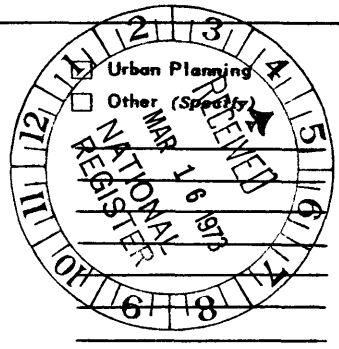
PERIOD *(Check One or More as Appropriate)*

☐ Pre-Columbian	☐ 16th Century	☐ 18th Century	☐ 20th Century
☐ 15th Century	☐ 17th Century	☒ 19th Century	

SPECIFIC DATE(S) *(If Applicable and Known)* 1884

AREAS OF SIGNIFICANCE *(Check One or More as Appropriate)*

Aboriginal	☐ Education	☐ Political	☒ Urban Planning
☐ Prehistoric	☐ Engineering	☐ Religion/Philosophy	☐ Other *(Specify)*
☐ Historic	☐ Industry	☐ Science	
☐ Agriculture	☐ Invention	☐ Sculpture	
☒ Architecture	☐ Landscape Architecture	☐ Social/Humanitarian	
☐ Art	☐ Literature	☐ Theater	
☐ Commerce	☐ Military	☐ Transportation	
☐ Communications	☐ Music		
☐ Conservation			



STATEMENT OF SIGNIFICANCE

When Watson A. Bray and his family moved into "Oak Tree Farm", Fruit Vale, Alameda County, California in 1859, they came to a pastoral area of open meadows, fruit orchards, and oak groves half way between the hills and the Bay. Shortly after "Oak Tree Farm" was built, other families came to the Fruit Vale area. The heads of these families were prosperous businessmen from San Francisco. Unable to build the generously styled homes their imaginations and big families required on the narrow 25 foot lots of land-squeezed San Francisco, they elected to build their homes in the East Bay and commute via train and ferryboat to work in San Francisco. In the Fruit Vale area there was ample space for them to indulge their ebulliently individualistic fancies, and homes with verandas, side wings, porticoes, conservatories, solariums, porte cocheres, and towers proliferated in abundance. Victorian domestic architecture, which reached its most luxuriant flowering in California was well represented in Fruit Vale's homes and estates.

By 1881, when Emma Bray's engagement to Alfred Cohen was announced and her father started building the house at 1440 29th Avenue, which was to be her wedding present when she was married in 1884, Fruit Vale was no longer rural but suburban in quality. Many friends and neighbors in large and comfortable homes surrounded by spacious grounds, gardens, and outbuildings, lived near enough for a lively social round of picnics, dinners, and singing around the piano.

Today the house at 1440 29th Avenue is one of the last of the original homes built in the Fruit Vale area in that period. Now Fruitvale is a district of the City of Oakland and, except for this one relic of rural days, it is an urban community, crowded and closed in by business, apartment houses and small homes. Miss Emelita Cohen, who lives in the old house says, "I am witness to these changes. I was born in this house and in my childhood had the run of the quiet, peaceful and beautiful neighborhood. When I was old enough, I had my own horse and could visit friends in the hills who had their own horses too. Now I live here in this oasis in the midst of the city where I have space, old trees and flowers and room for my dogs, and the old home about the same as it always was, inside and out."

This is the significance of this house. It is indeed "about as it always was, inside and out", and this is so because for 87-1/2 years it has been lived in and loved and cherished by the same family. It is one of the few Victorian houses, perhaps the only one, in Northern California about which

SEE INSTRUCTIONS

9. MAJOR BIBLIOGRAPHICAL REFERENCES

M. W. Wood, "History of Alameda County, 1883".

San Francisco Chronicle, January 9, 1972.

Elinor Richey, "The Ultimate Victorians".

10. GEOGRAPHICAL DATA

LATITUDE AND LONGITUDE COORDINATES DEFINING A RECTANGLE LOCATING THE PROPERTY						OR	LATITUDE AND LONGITUDE COORDINATES DEFINING THE CENTER POINT OF A PROPERTY OF LESS THAN TEN ACRES					
CORNER	LATITUDE			LONGITUDE				LATITUDE			LONGITUDE		
	Degrees	Minutes	Seconds	Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	Degrees	Minutes	Seconds
NW	°	'	"	°	'	"		37°	46'	47" N	122°	13'	40" W
NE	°	'	"	°	'	"							
SE	°	'	"	°	'	"							
SW	°	'	"	°	'	"							

UTM 10/568090 4181450 (C)

APPROXIMATE ACREAGE OF NOMINATED PROPERTY: 1a.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE:	CODE	COUNTY	CODE
STATE:	CODE	COUNTY:	CODE
STATE:	CODE	COUNTY:	CODE
STATE:	CODE	COUNTY:	CODE

RECEIVED MAR 16 1973 NATIONAL REGISTER

11. FORM PREPARED BY

NAME AND TITLE:
Mrs. Thomas E. Edwards

ORGANIZATION
Society for the Preservation of Victorian Houses

DATE
November 10, 1972

STREET AND NUMBER:
237 Bishop Ave.

CITY OR TOWN:
Richmond

STATE
California 94801

CODE
006

12. STATE LIAISON OFFICER CERTIFICATION

As the designated State Liaison Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service. The recommended level of significance of this nomination is:

National ☐ State ☐ Local ☒

Name _____

Title State Liaison Officer

Date FEB 12 1972

NATIONAL REGISTER VERIFICATION

I hereby certify that this property is included in the National Register.

_____
Chief, Office of Archeology and Historic Preservation

Date 6/19/73

ATTEST:

_____
Keeper of The National Register

Date 6 12 73

SEE INSTRUCTIONS

RECEIVED
MAR 16 1973
NATIONAL REGISTER

Form 10-300a
(July 1969)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY - NOMINATION FORM

(Continuation Sheet)

STATE	
California	
COUNTY	
Alameda	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
	JUN 19 1973

(Number all entries)
No. 7 Description (continued) (page 2)

The lot on which the Alfred H. Cohen house is set is approximately one acre, all that is left of the more than 200 acres of the "Oak Tree Farm" property. There are old elm, walnut, and locust trees, a tall lombardy poplar, and a linden tree left from the old days. A meandering garden, with enormous lemon verbena, heliotrope and fuchsia plants, roses and many other old-fashioned perennials and bulbs, extends behind the house.

Architectural Description
by AIA East Bay Chapter Historic Preservation Officer

The home is of the "Stick" or "Bracketed" style of architecture which was the fashion in Northern California from about 1870 until 1885.

The plan, with overall dimensions of approximately 55 ft. by 75 ft., is irregular with bays, wings and porches typical of that style.

The structure is of wood frame with painted exterior wood finish. It has two main stories with attic rooms within the roof area. It is supported on a four-foot high base element and brick foundations.

The front one-story porch is 6-1/2 ft. wide and wraps around the square entrance element. The porch roof is supported by pairs of slender turned columns with ornate capitols that reflect a Moorish influence, and embrace brackets which support the cornice. The columns rest on a balustrade with turned balusters that is 2'6" high. The front steps have been reconstructed with simple wood railings but evidence indicates that the original steps had railings to match the porch railing.

The entrance element, approximately 10'6" square, extends up through the second story in the form of a tower terminating in a third story free-standing tower with a steep pyramidal roof. The tower at the front (westerly) and northerly sides features an arched window flanked on either side by narrower arched windows having the same spring line. A balcony is cantilevered out from the center window. A single square-headed window at the second story is composed with the brackets supporting the balcony.

The entrance consists of a pair of oak doors, 4'7" x 8', with stained glass transom above. The doors are recessed in an exterior vestibule 2'3" deep, 5'9" wide, and 11'7" high. The door leaves each have a clear glass arched panel, 1'3" x 3'5", with a multicolored glass panel above and a wood panel below.

The main parlor wing extends out to the depth of the porch in an octagonal form which extends up through the second story and is superimposed by a gable supported by brackets at the corners. Wishbone-like open bargeboards support the cornice of the gable. A similar octagonal wing projects from

No. 7 Description (continued) (page 3)

the southerly elevation and a square wing projects from the northerly elevation.

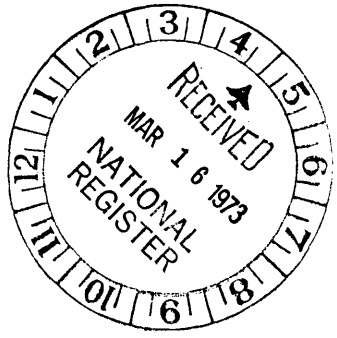
The main body of the structure is sheathed with 1" x 10" channel rustic with 8-3/4" exposure, and 1-1/2" x 7" corner boards, moulded. A heavy moulded water table occurs at the main floor level and a lesser one is at the second floor level. Above the band course in the area of the brackets supporting the roof cornice, forming a frieze, and at the gables appear vertical boarding with inverse "V" battens at 5-1/2" centers. Similar vertical boarding occurs at the bulkheads and heads of windows, and at other locations for accent.

Windows, generally, are 3'0" and 2'6" wide by 8'6" high, double hung at the first story, and 7' high at the second story, incased in architraves extending through two stories from the water table and terminating with brackets at the roof cornice, accenting the vertical. Brackets spaced about 3 feet apart continue around the building supporting the cornice where there are no windows.

The main roof has a 45 degree slope, and originally was covered with wood shingles, but presently is covered with green asphalt shingles.

The interior custom made woodwork and trim are of exceptionally fine quality with original red mahogany finish. It consists of a symphony of turnings, brackets, mouldings and paneling in a blend of redwood and mahogany which is outstanding in quality and craftsmanship. The interior is elaborated on elsewhere in this report. (See Attachment A).

A. Lewis Koue, F.A.I.A.



Form 10-300a
(July 1969)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES
INVENTORY - NOMINATION FORM

STATE	
California	
COUNTY	
Alameda	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
	JUN 19 1973

#8

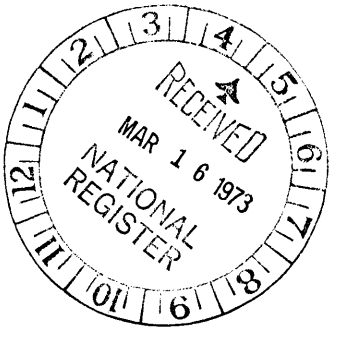
Statement of Significance *(Continuation Sheet)* #1

(Number all entries)

this claim can be made. A house in its original condition unaltered, and with its original furnishings, which has been lived in and cared for continuously by one family; a house of style, dignity, and character which reflects the quality of its inhabitants.

According to A. Lewis Koue, F.A.I.A., and Historic Preservation Officer for the East Bay Chapter of the A.I.A., "This is a fine example of this style and period, and the craftsmanship is superb. It has remained with the original family, and practically all of the finish and furnishings are original or from an even more historic family home."

Our Victorian houses, bold expressions of an individualistic period, are in jeopardy. They are vanishing under the combined onslaught of spiraling property taxes, urban renewal projects, freeways, and other land-clearing public works. Houses like this will not be built again, because of the rising building costs and the decline of handcraftmanship in the building crafts. The serene and gracious old house at 1440 29th Avenue is not a flamboyant example of Victorian architecture, but is a building that embodies the distinguishing characteristics of its architectural type-specimen. Without question, it fully meets the following amont the criteria established to evaluate potential entries to the National Register. It is a site and building that possesses "integrity of location, design, setting, materials, workmanship, feeling and association . . . . The building embodies distinctive characteristics of a type, period, and method of construction that represent a significant and distinguishable entity."



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Attachment A

Interior and Furnishings, Alfred H. Cohen Home

There is a front porch, a large sun porch in the back, and a kitchen porch. All the rooms on the first and second floors have double walls with space between, and the ceilings of the downstairs rooms are twelve feet high. The house has front and back staircases, plus a third staircase to the third floor.

The front hall (10' x 14') is uniquely finished in curly redwood, a wedding gift from neighbor Henry Wetherbee who owned the Navarro Mill in Mendocino County. Here two mirrors are inset, and above the front door are stained glass windows of astonishingly contemporary design. The floor is hardwood parquet. An old mahogany grandfather clock, originally from the Bray home, stands in the front hall.

Opening off the front hall is the front parlor (14' x 22'), a room that is formal, elegant and yet airy in quality. At the front, or street side, are plate glass bay windows. Ingenious brackets hold the lace curtains that veil the windows out from the surface of the panes, to accommodate the cedar inside shutters which are found on all the windows. The ceiling is papered with the original imported paper, and on the floor is the carpeting which was woven to fit the size of the room. The original furniture is still in this room; a birdseye maple cabinet, chairs, table and two Chinese tables, one octagonal with a marble top. Against one wall now stands an immense mirror framed in maple, (about 10' x 7') which came from Alfred Cohen's parents' 72-room house "Fernside" in Alameda. Also from Fernside is the center of a huge Aubusson carpet made into a rug. This carpet was woven in Europe to size for one of the rooms at Fernside and was shipped to the West Coast in two freight cars because it was too big to fit in one.

The library (12' x 20') opens off the parlor. It also opens into the front hall and to the rooms at the back of the house. All of these rooms on the ground floor have tall sliding doors which can close off each room, but which are usually left open. The doors are of redwood and are carved on both sides with a design that is repeated on all of them. The door hardware is designed brass and very handsome. The library has the original carpeting and ceiling paper. Here there is a large fireplace with the special feature of a high mahogany mantel designed with side shelves framing a mirror. On it are an original clock and matching urns, a wedding gift to the Alfred Cohens from the Sathers. The tiles around the fireplace were made in Europe and depict scenes from Sir Walter Scott's novels. The fireplace is flanked by bookcases with glass doors. In this room also is an old-fashioned desk which belonged to Judge Crockett, a neighbor and friend.

Across the hall from the library is the front dining room (12' x 18'). One side of this room is dominated by a built-in sideboard which is flush with the wall, with side shelves, a large mirror, and drawers and cupboards below. This was a wedding gift brought from England by Captain George Cummings, Master of the sailing ship "Three Brothers". On the opposite wall is a tiled fireplace with wood surrounds that carry the same design as that

of the sideboard. The dining table is mahogany with eight side chairs and two arm chairs. This room also has the original designed ceilings. (All the rooms thus far described have been kept exactly as they were originally.)

When the house was built there was a large room at the rear with a fireplace and piano, used as a family living room and music room. It was finished in plaster, and off it was the back dining room (12' x 14') at the side, and the remainder of the back was a large glassed-in sun porch (12' x 28'). At the time of the 1906 earthquake, the violent twisting caused two brick chimneys to crash together and to come through the roof into this back living and music room.

When the repairs were to be made, Alfred Cohen decided to finish the whole room in redwood. He designed and rebuilt the room with redwood paneling, heavy beams, and over the fireplace a thick mantel of curly redwood with scalloped sides. Shelves of the same design supported by wrought iron scrolls are over the tall, thick, redwood doors. The rest of the hardware in this room is wrought iron.

Sometime earlier than the renovations necessitated by the 1906 earthquake, a side porch (which had divided the library and this back living room) was converted into a room to connect them. It was finished in pine, and makes the back living room L-shaped (14' x 28'). In this connecting section there is another of the enormous floor to ceiling mirrors that came from "Fernside", the Alfred A. Cohen estate in Alameda.

The second dining room (known as the "breakfast room") aforementioned, is at the rear of the house and is finished in pine, and has a row of windows overlooking the garden. Doors open from the breakfast room to the back living room (or "redwood" room) and the pantry.

The pantry has the original high and wide dish cabinets facing each other with drawers below, and from the pantry there are doors leading to the front dining room, the kitchen, and the back hall from which the back stairs rise.

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The kitchen (12' x 14') still has an old French range, though it is no longer used and has had a dish cabinet built over it.

Upstairs there are five bedrooms and two bathrooms, a long hall (22' x 6'), a back hall (10' x 6'), and a linen room (4' x 10'). The master bedroom (14' x 16'), and alcove (9' x 9') extend across the front of the house. The other bedrooms opening from the upstairs hall and across the back are somewhat smaller. Two of the bedrooms have fireplaces with tiles from Europe, and all except the front bedroom had built-in marble washstands. The original beds, bureaus and tables are in three of the bedrooms: the master bedroom which is in walnut, a room furnished in curly maple, and a third bedroom which also has walnut bed and bureau. On the third floor there is a tower room in front, two sides of which are windows. In addition there is a large finished room which extends the width of the house in back, (and which was used as a playroom and occasionally as a dormitory for an overflow of young guests), and an L-shaped attic extending across the house and to the front.

Within the house there are a few gas jets left, although electricity was installed in 1907 or earlier.


BERKELEY
OAKLAND
EAST OAKLAND
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No 91
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CRAWFORD TRACT
PARSONS
CHARTER LINE
J MORA MOSS
PERALTA
WATSON
HAMPEL
MILBURY TRACT
CAMERON TRACT
FEENEY
DIMOND
RHODA
DR. MERRITT
MOUNTAIN VIEW CEMETERY
ROMAN CATHOLIC CEMETERY
RESERVOIR
LAKE MERRITT
FRUITVALE
CREEK
C.P.R.R.Co
CAL & NEVADA R.R.
YARDS & SHOPS
SHIP YARDS
WHARF
ALAMEDA
S.P.R.R.

Form 10-301
(Dec. 1968)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES

PROPERTY MAP FORM

(Type all entries - attach to or enclose with map)

STATE	
California	
COUNTY	
Alameda	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
	JUN 19 1973

SEE INSTRUCTIONS

1. NAME

COMMON: Alfred H. Cohen Residence

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER:
1440 - 29th Avenue

CITY OR TOWN:
Oakland

STATE:	CODE	COUNTY:	CODE
California	006	Alameda	001

3. MAP REFERENCE

SOURCE:
Gaskill and Vandercook

SCALE: 1 inch equals 1/2 mile

DATE: 1888

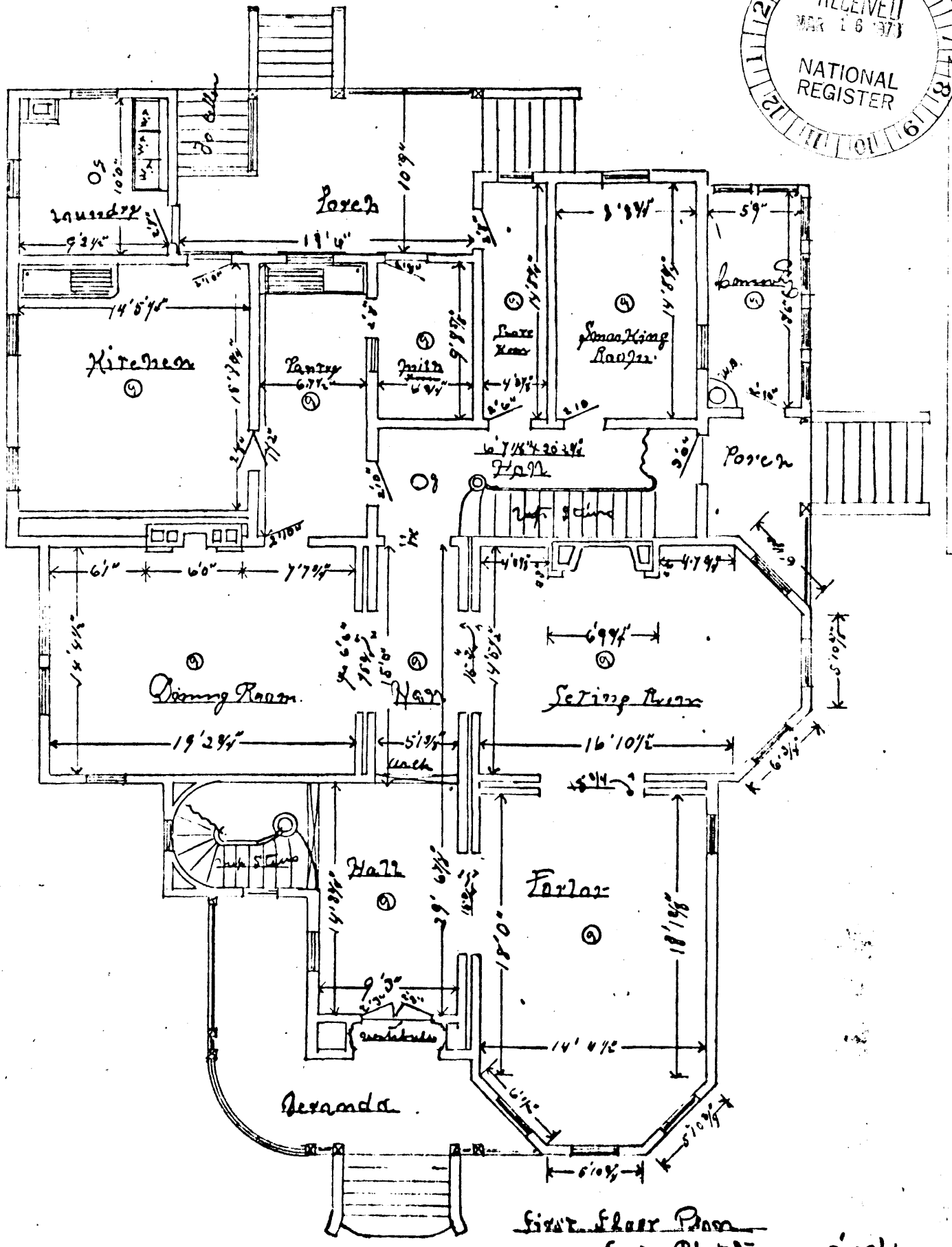
4. REQUIREMENTS

TO BE INCLUDED ON ALL MAPS

1. Property broundaries where required.
2. North arrow.
3. Latitude and longitude reference.

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First Floor Plan
Scale 1/4 in. to one foot
Geo. F. Pelick: Builder

Alfred Cohen Residence

Form 10-301
(Dec. 1968)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES

PROPERTY MAP FORM

(Type all entries - attach to or enclose with map)

STATE	
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FOR NPS USE ONLY	
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JUN 19 1973	

SEE INSTRUCTIONS

1. NAME

COMMON: Alfred H. Cohen Residence

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER:
1440 - 29th Avenue

CITY OR TOWN:
Oakland

STATE:	CODE	COUNTY:	CODE
California	06	Alameda	001

3. MAP REFERENCE

SOURCE: Builder's Floor Plan, in possession of Miss Edith Emelita Cohen, at above address.

SCALE: 1:96

DATE: 1884

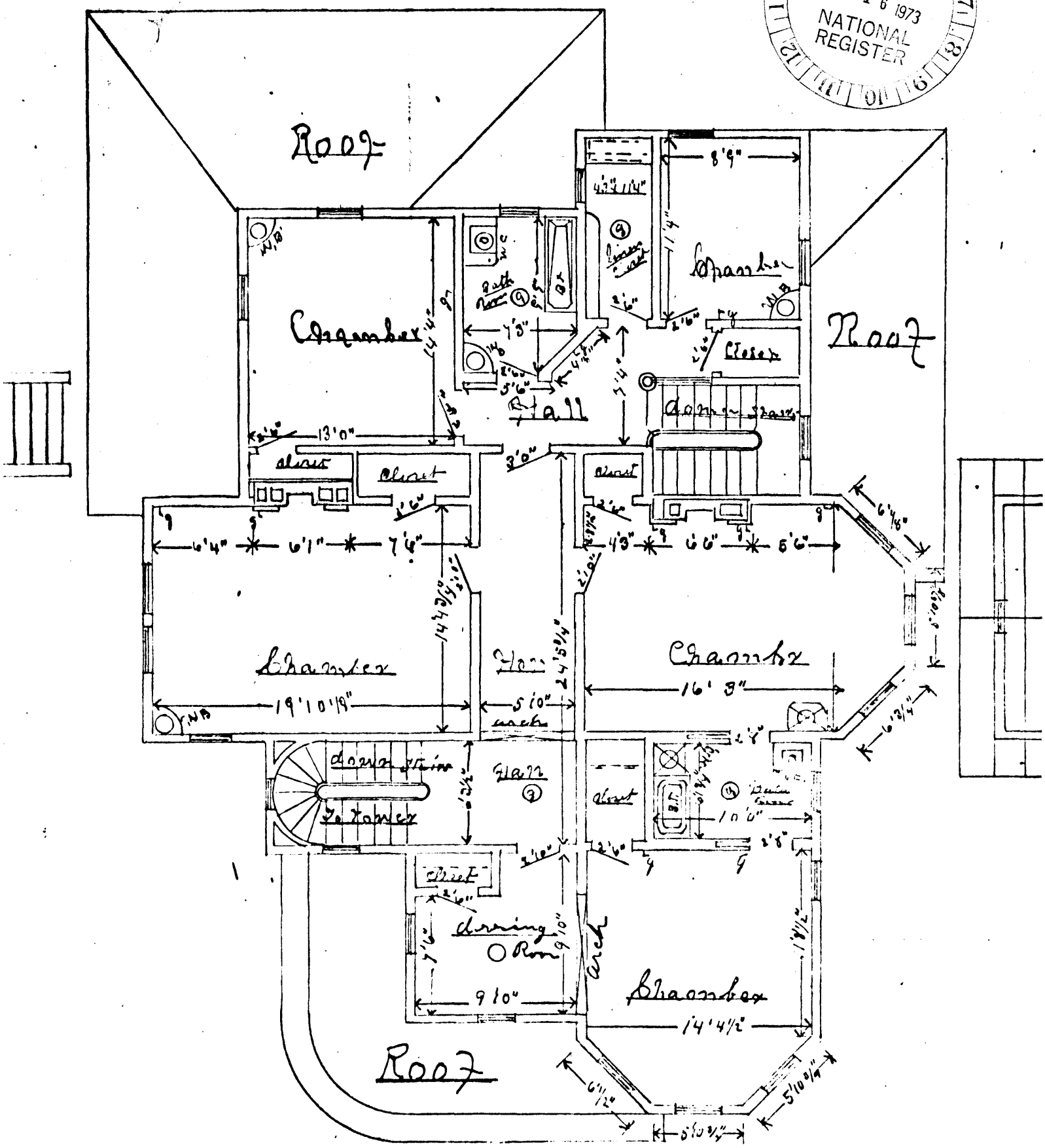
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TO BE INCLUDED ON ALL MAPS

1. Property broundaries where required.
2. North arrow.
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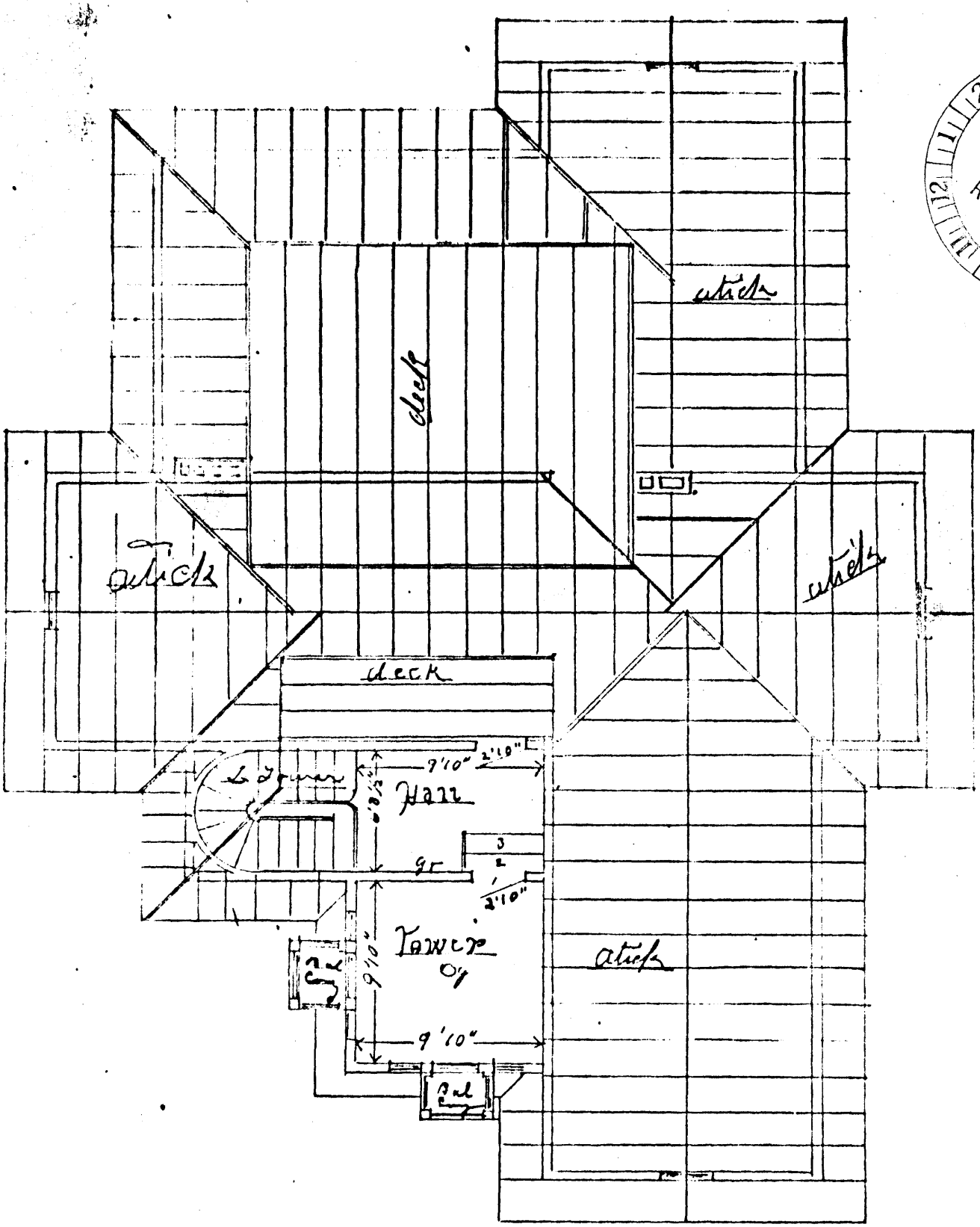
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Second Floor Plan

Scale 8 feet to one inch

Old
Hilton



Upper Floor Plan

Scale 1 foot to one inch

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ENTRY NUMBER	DATE
	JUN 19 1973

SEE INSTRUCTIONS

1. NAME

COMMON: Alfred H. Cohen Residence

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER: 1440 - 29th Avenue

CITY OR TOWN: Oakland

STATE:	CODE	COUNTY:	CODE
California	06	Alameda	001

3. PHOTO REFERENCE

PHOTO CREDIT: Oakland Tribune

DATE OF PHOTO: exact date not given, ca. 1970

NEGATIVE FILED AT: Oakland Tribune, Oakland, California

4. IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC.

Front of house, view looking southeast.

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SEE INSTRUCTIONS

NATIONAL REGISTER OF HISTORIC PLACES

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California	
COUNTY	
Alameda	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
JUN 19 1973	

1. NAME

COMMON: ALFRED H. COHEN RESIDENCE

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER:
1440 29th Ave.

CITY OR TOWN:
OAKLAND, CALIFORNIA

STATE:	CODE	COUNTY:	CODE
CALIFORNIA	006	ALAMEDA	001

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3. PHOTO REFERENCE

PHOTO CREDIT: THOMAS E. EDWARDS

DATE OF PHOTO: JANUARY 19th, 1973

NEGATIVE FILED AT: THOMAS E. EDWARDS RESIDENCE, 237 Bishop Ave. Richmond, Calif.

4. IDENTIFICATION

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a. Tower and detail of front facade.
Taken facing east.



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PROPERTY PHOTOGRAPH FORM

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STATE	
California	
COUNTY	
Alameda	
FOR NPS USE ONLY	
ENTRY NUMBER	DATE
	JUN 19 1973

SEE INSTRUCTIONS

1. NAME

COMMON: ALFRED H. COHEN RESIDENCE

AND/OR HISTORIC:

2. LOCATION

STREET AND NUMBER:
1440 29th Ave.

CITY OR TOWN:
OAKLAND

STATE:	CODE	COUNTY:	CODE
CALIFORNIA	006	ALAMEDA	001

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3. PHOTO REFERENCE

PHOTO CREDIT: THOMAS E. EDWARDS

DATE OF PHOTO: JANUARY 19th, 1973

NEGATIVE FILED AT: THOMAS E. EDWARDS RESIDENCE
237 BISHOP AVE., RICHMOND, CALIF.

4. IDENTIFICATION

DESCRIBE VIEW, DIRECTION, ETC.

d. Rear of house showing roof detail.
Taken facing north.

ATTACHMENT I

CORNERSTONE EARTH GROUP

TYPE OF SERVICES	Geotechnical Investigation and Geologic Hazards Evaluation
PROJECT NAME	Eres College Preparatory Academy
LOCATION	2956 International Boulevard, 3007 East 15th Street, and Derby Avenue Oakland, California
CLIENT	Aspire Public Schools
PROJECT NUMBER	729-4-1
DATE	January 19, 2016

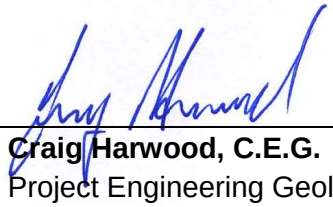


CORNERSTONE EARTH GROUP

Type of Services	**Geotechnical Investigation and Geologic Hazards Evaluation**
Project Name	**Eres College Preparatory Academy**
Location	**2956 International Boulevard, 3007 East 15th Street, and Derby Avenue Oakland, California**
Client	**Aspire Public Schools**
Client Address	**1001 22nd Avenue, Suite 300 Oakland, California**
Project Number	**729-4-1**
Date	**January 19, 2016**



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CORNERSTONE EARTH GROUP

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APPENDIX A: FIELD INVESTIGATION
APPENDIX B: LABORATORY TEST PROGRAM
APPENDIX C: LIQUEFACTION ANALYSES CALCULATIONS

Type of Services	**Geotechnical Investigation and Geologic Hazards Evaluation**
Project Name	**Eres College Preparatory Academy**
Location	**2956 International Boulevard, 3007 East 15th Street, and Derby Avenue Oakland, California**

SECTION 1: INTRODUCTION

This geotechnical investigation and geologic hazards evaluation report was prepared for the sole use of Aspire Public Schools for the Aspire Public Schools - Eres College Preparatory Academy in Oakland, California. The location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- Project plan titled, "Aspire Public Schools, Eres College Preparatory Academy, Site Plan," prepared by K2 Architecture, dated November 5, 2015.
- Project plan titled, "Test Fit, Sheet A402," prepared by K2 Architecture, not dated.
- Topographic survey, not titled, not dated.

1.1 PROJECT DESCRIPTION

The project site includes three parcels that are located at 2956 International Boulevard, 3007 East 15th Street, and Derby Avenue in Oakland, California. The proposed improvements include a 3-story, at-grade classroom building on a 0.8-acre site. The structure will be of steel-frame construction and have a footprint of approximately 17,950 square feet. Appurtenant parking, a drop-off and pick-up queue, a play area, utilities, landscaping and other improvements necessary for site development are also planned.

The site is bounded by Derby Avenue to the east, East 15th Street to the north, mixed-use developments to the south, and the Cohen Bray House and an apartment building to the west. The site is occupied by paved parking areas, and an active 2-story, multi-unit residential building is located in the northeast portion of the property.

Structural loads were not available at the time of this report and are anticipated to be typical of this type of structure. Grading is anticipated to include cuts/fills of 1 to 3 feet for construction of

the building pad and installation of utilities. Deeper excavations for construction of the drilled pier foundations are anticipated.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated November 11, 2015, and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of two borings drilled on December 7, 2015, with truck-mounted, hollow-stem auger drilling equipment and three Cone Penetration Tests (CPTs) advanced on December 2 and 9, 2015. The borings were drilled to depths of 30 and 50 feet; the CPTs were advance to depths of 50¾ to 62½ feet. Seismic shear wave velocity measurements were collected from CPT-2. Exploratory Boring EB-2 was advanced adjacent to CPT-2 for direct evaluation of physical samples to correlated soil behavior.

The borings and CPTs were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Site Plan and Geologic Map, Figure 2. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, washed sieve analyses, Plasticity Index tests, a triaxial compression test, and soil corrosion. Details regarding our laboratory program are included in Appendix B.

1.5 CORROSION EVALUATION

One sample from our borings at a depth of 3½ feet was tested for saturated resistivity, pH, and soluble sulfates and chlorides. In general, the on-site soils can be characterized as moderately corrosive to buried metal, and non-corrosive to buried concrete.

1.6 ENVIRONMENTAL SERVICES

Cornerstone Earth Group also provided environmental services for this project consisting of a review of the Phase I Environmental Site Assessment (ESA) prepared by Stantec Consulting Services, Inc. (2015). Based on the Phase I ESA, the environmental concerns at the site include oil, lead, and ground water contamination from off-site sources. We recommend that

Stantec Consulting Services, Inc. review this report, plans, and specifications, to confirm the issues are addressed.

SECTION 2: REGIONAL SETTING

2.1 GEOLOGIC SETTING

2.1.1 Regional Geologic Setting

The site is located within an alluvial plain in the east bay area a few miles west of the Berkeley Hills. This geomorphic feature represents one range of hills in a series of northwesterly-aligned mountains forming the Coast Ranges geomorphic province of California that stretches from the Oregon border to near Point Conception. In the San Francisco Bay area, most of the Coast Ranges have developed on a basement of tectonically mixed Cretaceous- and Jurassic-age (70- to 200-million years old) rocks of the Franciscan Complex. Younger sedimentary and volcanic units locally cap these basement rocks. Still younger surficial deposits that reflect geologic conditions of the last million years cover most of the Coast Ranges.

The bedrock geology of the area is associated with a series of oceanic crust and volcanic arc terranes that were accreted to the continent during Mesozoic and Cenozoic time, and further deformed by transpression along the Hayward Fault zone during the Cenozoic. The oldest mapped geologic units are rocks that make up the Jurassic Coast Range Ophiolite (Graymer and others, 1998). Additional units include the Late Jurassic-Early Cretaceous Franciscan Complex, the Late Jurassic-Early Cretaceous Knoxville Formation (KJk), the Late Cretaceous Great Valley Sequence, and numerous Tertiary sedimentary and volcanic units. Overlying the older geologic units in the area are Holocene alluvial fan deposits which have been subdivided by Witter (unpublished) into the following units: Qhc, Qhff, Qhf, and Qha. Qhc are modern channel deposits and are found within the banks of creeks. Qhff are fine-grained alluvial fan deposits exposed at the distal parts of fans. Qhf are alluvial fan deposits mapped along the majority of the west-southwest sloping east bay plain. Qha are undifferentiated alluvial deposits generally mapped within upland drainages and canyons.

Movement on the many splays of the San Andreas Fault system has produced the dominant northwest-oriented structural and topographic trend seen throughout the Coast Ranges today. This trend reflects the boundary between two of the Earth's major tectonic plates: the North American plate to the east and the Pacific plate to the west. The San Andreas Fault system and its major branching faults is about 40 miles wide in the San Francisco Bay area and extends from the San Gregorio Fault near the coastline to the Coast Ranges-Central Valley blind thrust at the western edge of the Great Central Valley as shown on the Regional Fault Map, Figure 3. The San Andreas Fault is the dominant structure in the system, nearly spanning the length of California, and capable of producing the highest magnitude earthquakes. Many other subparallel or branch faults within the San Andreas system are equally active and nearly as capable of generating large earthquakes. Right-lateral movement dominates on these faults but an increasingly large amount of thrust faulting resulting from compression across the system is now being identified also.

2.1.2 Local Geology

The cities of Oakland, Alameda and Berkeley are contiguous and occupy flatlands along the margin of the San Francisco Bay where extensive development (residential and commercial) has dominated the landscape for many decades. Quaternary age alluvium shed primarily from the Oakland Hills on the east has created a gentle, southwest-sloping alluvial plain adjacent to the eastern margin of the San Francisco Bay. Interfluvial basin deposits of Holocene age (last 11,000 years) and Pleistocene age (11,000 to 2 million years before present), consisting of coalescing alluvial fans and fluvial terraces, are mapped throughout this area. Alluvial fan sediment typically includes sand, gravel, silt, and clay, and is moderately to poorly sorted, and moderately to poorly bedded. Sediment clast size and general particle size typically decreases downslope from the fan apex. Pleistocene alluvial fans may be veneered or incised by thin unmapped Holocene alluvial fan deposits. Topographically higher, southeast-sloping Pleistocene alluvial fan surfaces (Qpf, Qof) at the base of the Berkeley Hills are incised by Holocene alluvial deposits (Qhf, Qha) that make their way to the historic shoreline of San Francisco Bay. The Pleistocene surfaces have been uplifted and are west of the active Hayward Fault zone. Along most of the bay margin areas in the southeastern portion of the Oakland East Quadrangle (CGS, 2003) artificial fill over Bay Mud (afbm) deposits extends from the historical shoreline to the present bay margin. Published geologic maps covering the general area of the site include those of; Radbruch and Case (1967), Radbruch (1969), Knudsen et al. (2000), Helley et al, (1994), the California Geological Survey (CGS, 2003), and Dibblee and Minch (2005). The published map of Radbruch (1969) is reproduced as Vicinity Geologic Map, Figure 4.

In the general area of the site, the various published maps show the site as Quaternary alluvial fan deposits (Qhf or Qu, depending on source). These deposits are characterized as: “Undifferentiated alluvial fan deposits” which includes two specific mapping units; Qtc (Temescal Formation), and “Qts” (alluvium derived from the San Antonio Formation). Composition and physical properties of the Qu unit varies. The Qu unit consists predominantly of Temescal Formation but also probably includes unrecognized San Antonio Formation and gravel, sand, and clay (Qg), as well as recent alluvium and colluvium, and artificial fill (Radbruch, 1969). Symbols for Qtc, Qts, and Qtb are shown (broken out as mapping units) in parentheses where these units can be positively identified (see Temescal Formation). The Temescal Formation (Qtc) occurs in flat valley bottoms and gentle slopes between San Francisco Bay and the Berkeley Hills. The unit also fills meandering channels cuts in underlying material. Radbruch further characterizes the Qtc unit further as follows; (The Qtc unit) “Comprises several presumably contemporaneous alluvial units of different origin, lithology, and physical properties. Qtc consists of irregularly bedded clay, silt, sand, and gravel with organic material and some Claremont chert; dark-yellowish-brown to olive-gray and is poorly consolidated. Qts, material apparently derived from erosion of the San Antonio Formation; consists of lenses of clay, silt, sand, and gravel with Claremont chert; yellowish brown; in places lithologically indistinguishable from San Antonio Formation. Its origin is assumed from topographic form and relatively lower compressive strength as indicated by one consolidation test (performed by others) on Sausal Creek. The San Antonio Formation is characterized by Radbruch as; “Clay, silt, sand, and gravel, and contains some pebbles soft; most firm. Most beds contain flakes and pebbles of white Claremont chert, some gravel almost entirely chert. Contains montmorillonite clay. Pale-

yellowish- brown to grayish-orange. Based on testing performed by others, the consolidation varies and some layers are loose and unconsolidated.

The California Geological Survey assigns the Qu unit with the mapping symbol “Qhf” (Quaternary alluvial fan deposits) and gives its age as Holocene as opposed to late Pleistocene of Radbruch (1969). We have also added an Af unit to our site specific map to address undocumented fill that was placed as previous site development. Based on a compilation of geotechnical tests performed in site investigations in the Oakland East Quadrangle, the California Geological Survey characterizes the Qhf unit as consisting of; 33% lean clay, 17% clayey sand, 15% clay-silt combinations, 11% silt and 24% other soil constituents (CGS, 2003).

2.2 REGIONAL SEISMICITY

The San Francisco Bay area is recognized by geologists and seismologists as one of the most seismically active regions in the United States. Significant earthquakes occurring in the Bay area are generally associated with crustal movement along well-defined, active fault zones of the San Andreas Fault system. A regional fault map is presented as Figure 4, illustrating the relative distances of the site to significant fault zones. The Historical Earthquake Map, Figure 5 of this report also shows regional faults with historical earthquake information superimposed. The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The San Andreas Fault generated the great San Francisco earthquake of 1906 and the Loma Prieta earthquake of 1989 and passes 15½ miles southwest of the proposed school site. Two other major active faults in the Bay area are the Hayward-Rodgers Creek Fault, and the Calaveras Fault. The Calaveras fault is located 12¼ miles northeast of the site and the Hayward Fault is located 2½ miles east. Table 1 lists all known active faults in order of increasing distance within 100 kilometers (62 miles) of the site. It is noted that the fault distances presented in Table 1 were determined from EZ Frisk and represent the rupture distance and may not be the distance to the surface expression of the fault that is shown on published geological maps and on-line resources such as Google Earth, etc. The seismic characteristics of some faults vary along its length so different segments of the same fault could be listed separately in the table.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Hayward-Rodgers Creek	2.5	4.2
Calaveras	12.3	19.6
Mt. Diablo Thrust	13.4	21.4
Northern San Andreas	15.5	25.0
Green Valley	15.7	25.1
San Gregorio	20.4	32.6

Table 1 continued on next page.

Table 1 (cont.): Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
Greenville	22.8	36.5
Monte Vista-Shannon	23.8	38.0
West Napa	26.8	42.9
Great Valley 5	27.4	43.8
Great Valley 4b, Gordon Valley	33.8	54.1
Point Reyes	35.2	56.3
Great Valley 7	35.8	57.2
Hunting Creek-Berryessa	46.9	75.0
Great Valley 4a, Trout Creek	49.6	79.3
Zayante-Vergeles	50.0	80.0
Great Valley 8	59.7	95.5
Monterey Bay-Tularcitos	59.9	95.8
Great Valley 3, Mysterious Ridge	60.6	96.9
Maacam-Garberville	60.9	97.5

The San Francisco Bay area region is one of the most seismically active areas in the Country. While seismologists cannot predict earthquake events, the U.S. Geological Survey's Working Group on California Earthquake Probabilities 2015 revises earlier estimates from their 2008 (2008, UCERF2) publication. Compared to the previous assessment issued in 2008, the estimated rate of earthquakes around magnitude 6.7 (the size of the destructive 1994 Northridge earthquake) has gone down by about 30 percent. The expected frequency of such events statewide has dropped from an average of one per 4.8 years to about one per 6.3 years. However, in the new study, the estimate for the likelihood that California will experience a magnitude 8 or larger earthquake in the next 30 years has increased from about 4.7% for UCERF2 to about 7.0% for UCERF3.

UCERF3 estimates that each region of California will experience a magnitude 6.7 or larger earthquake in the next 30 years. Additionally, there is a 63 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the San Francisco Bay area region between 2007 and 2036. During such an earthquake the danger of fault surface rupture at the site is slight, but very strong ground shaking would occur. The site is not located within 2 kilometers of an active or potentially active fault and therefore near source factors will not apply in the seismic design of buildings at the site.

2.3 HISTORICAL EARTHQUAKES

We reviewed and performed a data search of known historical earthquakes of magnitude 5 or greater within a 100-kilometer radius of the site using available published data from the

California Division of Mines and Geology (CDMG) computerized earthquake catalog of events through December 1999. The Historical Earthquake Map, Figure 5 of this report, shows the epicenters of these magnitude 5 or greater events. We also included data from Townley and Allen (1939) and the U.S. Geological Survey Earthquake Data Base System, giving 200 years of data in the search area. The results of our computer search indicated that about 94 known earthquakes of Richter Magnitude 5 or greater have occurred within 100 kilometers of the site between 1800 and December 1999.

Four relatively large magnitude earthquakes have occurred in the region during the above noted time period, including the Loma Prieta Earthquake of 1989 that was centered approximately 38 miles south-southeast of the site. The Historic Earthquakes Map, Figure 5 of this report, adopted from Toppozada & Others (2000) illustrates these historical earthquakes.

2.4 MAXIMUM PAST GROUND SHAKING

Very few observations of the 1868 Hayward earthquake record specific evidence for liquefaction in the region. However, Lawson (1908) reports that damage within the Oakland and Berkeley area was highly variable but considerable in areas underlain by alluvium versus areas underlain by pre-cenozoic formations. Lawson stated; “it seems probable that the severity of the shock was in reality somewhat greater in Oakland than in Berkeley. Chimneys fell very generally throughout the city; the upper parts of brick walls, gables, and cornices were in many cases thrown down (plate 122B) and cracks in walls were numerous. The underpinning of some few old frame houses caused these structures to collapse.”

SECTION 3: SITE CONDITIONS

3.1 RECENT SITE HISTORY AND AIR PHOTO REVIEW

We reviewed aerial photos taken during the period when the outlying areas of Oakland and Alameda made their greatest transition in terms of land use from agricultural to residential and commercial. We reviewed vertical black-and-white and natural color aerial photos taken between 1948 and 2012. The images viewed are listed in the “References” section of this report. Additionally we reviewed historic topographic maps published by the USGS.

We understand that research conducted by the project civil engineer (Underwood & Rosenblum, Inc.) through the county records department revealed that as early as 1860, a concrete culvert was constructed to convey storm water from the natural creek (Sausal Creek) just beyond the northeast property line, through the site and all the way to the San Francisco Bay. Early design plans (ca 1860) indicate the culvert appears to be a substantial thick walled, concrete arch structure, about 16 feet wide by about 9 feet high inside clear dimension, that probably follows the original trace of the creek (Underwood & Rosenblum). No other records are present which would indicate its exact path through the site but by comparing a variety of sources we were able to plot an approximate location shown on the Site Plan and Geologic Map, Figure 2. Historic topographic maps dating from as early as 1913 show a stream course trending southwesterly through the site and areas southwest but this may be merely indicating the path of the culvert. Tax records maps indicate the location of the upstream opening of the culvert.

The 1913 USGS topographic map indicates that Sausal Creek flowed through the central portion of the site and all the way to the San Francisco Bay. The earliest aerial photos reviewed from 1946 show that the area around the site had already experienced extensive commercial and residential development. The site contained buildings fronting the streets but it is unclear if the central portion of the site was paved at that time. By 1968 parking areas an access drives had been constructed which essentially completed development of the parcels. The site has remained essentially the same since that time.

3.2 SITE RECONNAISSANCE AND SURFACE DESCRIPTION

The site is occupied by paved parking areas, and an active 2-story, multi-unit residential building is located in the northeast portion of the site. The surface pavements consisted of asphalt concrete (AC) 1½ to 4½ inches thick underlain by aggregate base (AB) 3 to 4 inches thick. The topography of the site is relatively level. Based on the referenced topographic survey, the elevation of the site is from 48¼ feet Mean Sea Level (MSL) in the southern portion of the site to 51 feet MSL in the northern portion of the site.

3.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS

Our field investigation consisted of two exploratory borings (EB-1 and EB-2) and three CPTs (CPT-1 through CPT-3). Our explorations generally encountered undocumented fill underlain by alluvial and colluvial soil. The undocumented fill was encountered to depths of 3 to 3½ feet below the existing ground surface and generally consisted of loose silty sand, soft lean clay, and hard lean clay with sand. Undocumented fill may also be present as part of the previous culvert construction.

Below the undocumented fill, our borings and CPTs encountered alluvial and colluvial deposits ("Undifferentiated alluvial fan deposits", "Qu") to a depth of 62½ feet below the existing grades, the maximum depth explored. The alluvial and colluvial deposits encountered within our borings generally consisted of medium stiff high plasticity clay; very stiff to hard lean clay, lean clay with sand, and sandy lean clay; loose silty sand; and medium dense to dense poorly graded sand with clay and silt, and clayey sand. Clay was predominantly encountered within the upper 17 feet of EB-1 with clayey sand encountered below a depth of 17 feet. The soil encountered within EB-2 was predominantly clay with sand layers encountered at depths of 16 to 19½ feet and 25½ to 30 feet below the existing grades. The alluvial and colluvial deposits encountered in our CPTs generally consisted of very stiff clay, clayey silt to silty clay, silty sand to sandy silt, silty clay to clay, and minor layers of sandy silt to clayey silt. Our geologic cross sections A-A' and B-B' were generated from the site geologic map as well as data from our exploratory borings and CPTs (Figures 6 and 7).

3.4 PLASTICITY/EXPANSION POTENTIAL

We performed three Plasticity Index (PI) tests on representative samples. Test results were used to evaluate expansion potential of surficial soils, and the plasticity of the fines in potentially liquefiable layers. The results of the surficial PI test indicated a PI of 34, indicating high expansion potential to wetting and drying cycles.

3.5 IN-SITU MOISTURE CONTENTS

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from near optimum to 10 percent over the estimated laboratory optimum moisture.

3.6 SULFATE CONTENTS

Laboratory testing indicated that the soluble sulfate contents were 118 ppm, indicating negligible corrosion potential to buried concrete.

3.7 GROUND WATER

Ground water was encountered in our borings at depths of 20½ and 42 feet below current grades. Ground water was encountered at a depth of 25½ feet in EB-2 during drilling and was measured shortly after drilling at a depth of 42 feet. All measurements were taken at the time of drilling and may not represent the stabilized levels that can be higher than the initial levels encountered.

The historic high ground water level is mapped at a depth of 10 feet below current grades (CGS, 2003). Fluctuations in ground water levels occur due to many factors including seasonal fluctuation, underground drainage patterns, regional fluctuations, and other factors.

3.8 CORROSION SCREENING

We tested one sample collected from Boring EB-1 at a depth of 3½ feet for resistivity, pH, soluble sulfates, and chlorides. The laboratory test results are summarized in Table 2.

Table 2: Summary of Corrosion Test Results

Sample/Test Location Number	Depth (feet)	Soil pH	Minimum Resistivity (1) (ohm-cm)	Chloride (mg/kg)	Sulfate (% dry wt)
EB-1	3½	7.4	2,255	3	0.0118

Notes: (1) Laboratory resistivity measured at 100% saturation

Many factors can affect the corrosion potential of soil including moisture content, resistivity, permeability, and pH, as well as chloride and sulfate concentration. Typically, soil resistivity, which is a measurement of how easily electrical current flows through a medium (soil and/or water), is the most influential factor. In addition to soil resistivity, chloride and sulfate ion concentrations, and pH also contribute in affecting corrosion potential.

3.8.1 Preliminary Soil Corrosion Screening

Based on the laboratory test results summarized in Table 2, the soils are considered moderately corrosive to buried metallic improvements (Palmer, 1989). Other corrosion parameters (pH and chloride content) do not indicate a significant contribution to corrosion potential to buried

metallic structures. In accordance with the 2013 CBC, Chapter 19, Section 1904.5, alternative cementitious materials for sulfate exposure shall be in accordance with the following:

- ACI 318-08 - Table 4.2.1, and Table 4.3.1

Based on the laboratory test results, no cement type restriction is required, although, in our opinion, it is generally a good idea to include some sulfate resistance and to maintain a relatively low water-cement ratio. We have summarized applicable design values and parameters from ACI 318, Table 4.3.1 below in Table 3 for your information. We recommend the structural engineer and a corrosion engineer be retained to confirm the information provided and for additional recommendations, as required.

Table 3: Sulfate Soil Corrosion Design Values and Parameters (1)

Category	Water-Soluble Sulfate (SO4) in Soil (% by weight)	Class	Severity	Cementitious Materials (2)
S, Sulfate	< 0.10	S0	not applicable	no type restriction

Notes: (1) above values and parameters are from on ACI 318-08, Table 4.2.1 and Table 4.3.1
(2) cementitious materials are in accordance with ASTM C150, ASTM C595 and ASTM C1157

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT RUPTURE

As discussed above several significant faults are located within 100 kilometers of the site. The property is located in an area characterized as an elongate northwest-trending extension of the San Francisco Bay structural trough that is bounded on the east by the Diablo Range and on the west by the Santa Cruz Mountains. The nearest mapped fault to the site is a surface trace of the Hayward Fault located about 2½ miles east of the site. The area has been extensively studied over a period of many decades in terms of surface faulting.

Our study uncovered no compelling evidence suggesting a fault surface trace crosses the area of the Eres College Preparatory Academy; therefore, fault surface rupture hazard is not a significant geologic hazard at the site.

4.2 HISTORICAL GROUND FAILURES

Very few observations of the 1868 Hayward earthquake record specific evidence for liquefaction in the region. However, Lawson (1908) reports that damage within the Oakland and Berkeley area was highly variable but considerable in areas underlain by alluvium versus areas underlain by pre-cenozoic formations. Lawson stated; “it seems probable that the severity of the shock was in reality somewhat greater in Oakland than in Berkeley. Chimneys fell very generally throughout the city; the upper parts of brick walls, gables, and cornices were in many cases thrown down (plate 122B) and cracks in walls were numerous. The underpinning of some few old frame houses caused these structures to collapse.”

The main part of Oakland-Alameda-Berkeley and surrounding areas shook at Rossi-Forel intensity VIII (many chimneys fall) to IX (partial or complete collapse of some buildings). Witter et al., (2006) indicate four historical occurrences of ground deformation within the "Qhf" mapping unit within the region. These ground failures were concentrated close to the bay several miles north of the site. Youd and Hoose (1978) report that following the 1906 earthquake that an occurrence of lateral spreading and miscellaneous effects were document near the waterfront just west of the subject site; this damage included much destruction to the water mains within the systems of Oakland, Alameda, and Berkeley; "Breaks in the pipe lines invariably were found upon soft ground, or where the pipe lines passed from soft and yielding to more rigid foundation. The 24-inch steel pipe crossing the Twelfth Street dam at Lake Merritt was also snapped from the settling of the flood gates, but the 37½-in. pipe running parallel and slightly to the east, across the same soft foundation bed was only slightly deformed." Also, Lawson reported; "at Mills College… in the made ground [filled area] there *was* a drop of from 1 foot to several feet." At Alameda [there were] "damaged railroad tracks in the marsh. One of the new tracks of the Oakland Traction Company across Webster Street sunk about four feet and the rails are twisted, blocking traffic. On the Twelfth Street dam, a cast-iron pipe was broken and displaced over a foot; while the high pressure steel pipe paralleling it was practically undisturbed." No observations of liquefaction were recorded in the Los Gatos Quadrangle following the 1989 Loma Prieta earthquake (Tinsley and others, 1998).

4.3 LANDSLIDING

The site is essentially topographically flat and located at least 2 miles west of any slopes or mapped landslides (Radbruch and Case 1967; Radbruch 1969; Dibblee and Minch, 2005; California Geological Survey, 2003). Therefore, in our opinion, there is a low potential for landsliding impacting the site and planned school development.

4.4 LIQUEFACTION POTENTIAL

The site is within a State-designated Liquefaction Hazard Zone (CGS, Oakland East Quadrangle, 2003 (Figure 8)). Our field and laboratory programs addressed this issue by sampling potentially liquefiable layers to depths of at least 50 feet, performing visual classification on sampled materials, evaluating CPT correlations, and performing various tests to further classify the soil properties.

4.4.1 Background

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

4.4.2 Analysis

As discussed in the "Subsurface" section above, sand layers were encountered below the design ground water depth of 10 feet. Following the liquefaction analysis framework in the 2008 monograph, *Soil Liquefaction During Earthquakes* (Idriss and Boulanger, 2008), incorporating updates in *CPT and SPT Based Liquefaction Triggering Procedures* (Boulanger and Idriss, 2014), and in accordance with CDMG Special Publication 117A guidelines (CDMG, 2008) for quantitative analysis, these layers were analyzed for liquefaction triggering and potential post-liquefaction settlement. These methods compare the ratio of the estimated cyclic shaking (Cyclic Stress Ratio - CSR) to the soil's estimated resistance to cyclic shaking (Cyclic Resistance Ratio - CRR), providing a factor of safety against liquefaction triggering. Factors of safety less than or equal to 1.3 are considered to be potentially liquefiable and capable of post-liquefaction re-consolidation (i.e. settlement).

The CSR for each layer quantifies the stresses anticipated to be generated due to a design-level seismic event, is based on the peak horizontal acceleration generated at the ground surface discussed in the "Estimated Ground Shaking" section above, and is corrected for overburden and stress reduction factors as discussed in the procedure developed by Seed and Idriss (1971) and updated in the 2008 Idriss and Boulanger monograph.

The soil's CRR is estimated from the in-situ measurements from CPTs and laboratory testing on samples retrieved from our borings. Because of the very little presence of fine gravels, we did not make adjustments in the CPT tip pressures for our analysis. SPT "N" values obtained from hollow-stem auger borings were not used in our analyses, as the "N" values obtained are less reliable in sands below ground water. The tip pressures are corrected for effective overburden stresses, taking into consideration both the ground water level at the time of exploration and the design ground water level, and stress reduction versus depth factors. The CPT method utilizes the soil behavior type index (I_C) to estimate the plasticity of the layers. Selected soil samples collected from EB-2 that was advanced adjacent to CPT-2 were tested to evaluate grain size, as well as visually observed for confirmation of CPT soil behavior types.

In estimating post-liquefaction settlement at the site, we have implemented a depth weighting factor proposed by Cetin (2009). Following evaluation of 49 high-quality, cyclically induced, ground settlement case histories from seven different earthquakes, Cetin proposed the use of a weighting factor based on the depth of layers. The weighting procedure was used to tune the surface observations at liquefaction sites to produce a better model fit with measured data. Aside from the better model fit it produced, the rationale behind the use of a depth weighting factor is based on the following: 1) upward seepage, triggering void ratio redistribution, and resulting in unfavorably higher void ratios for the shallower sublayers of soil layers; 2) reduced induced shear stresses and number of shear stress cycles transmitted to deeper soil layers due to initial liquefaction of surficial layers; and 3) possible arching effects due to nonliquefied soil layers. All these may significantly reduce the contribution of volumetric settlement of deeper soil layers to the overall ground surface settlement (Cetin, 2009).

The results of our CPT analyses (CPT-1 through CPT-3) are presented on Figures 12A through 12C of this report. Calculations for these CPTs are attached as Appendix C.

4.4.3 Summary

Our analyses indicate that several layers could potentially experience liquefaction triggering that could result in post-liquefaction total settlement at the ground surface ranging from ½ to ¾-inches based on the Yoshimine (2006) method. As discussed in SP 117A, differential movement for level ground sites over deep soil sites will be about half of the total settlement. In our opinion, differential settlements are anticipated to be on the order of ½-inch between independent foundation elements, or over a horizontal distance of 30 feet.

4.4.4 Ground Rupture Potential

The methods used to estimate liquefaction settlements assume that there is a sufficient cap of non-liquefiable material to prevent ground rupture or sand boils. For ground rupture to occur, the pore water pressure within the liquefiable soil layer will need to be great enough to break through the overlying non-liquefiable layer, which could cause significant ground deformation and settlement. The work of Youd and Garris (1995) indicates that the 15-foot thick layer of non-liquefiable cap is sufficient to prevent ground rupture; therefore the above total settlement estimates are reasonable.

4.5 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form.

There are no open faces within 200 feet of the site where lateral spreading could occur; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.6 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soil encountered above the historic ground water level of 10 feet at the site were predominantly medium stiff to hard clay, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.7 FLOODING AND RESERVOIR INUNDATION

Based on our internet search of the Federal Emergency Management Agency (FEMA) flood map public database (2009), the portion of the site over the Sausal Creek culvert is located within Zone A, described as “Special Flood Hazard Areas Subject to Inundation by the 1% Annual Chance Flood,” the eastern portion of the site is located within Zone X (other flood areas), described as “Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood,” and the western portion of the site is located

within Zone X (other areas), described as “Areas determined to be outside the 0.2% annual chance floodplain.” We recommend the project civil engineer be retained to verify the base flood elevation, if appropriate.

4.8 SEISMICALLY INDUCED WAVES - TSUNAMIS/SEICHES

The terms tsunami or seiche are described as ocean waves or similar waves usually created by undersea fault movement or by a coastal or submerged landslide. Tsunamis may be generated at great distance from shore (far field events) or nearby (near field events). Waves are formed, as the displaced water moves to regain equilibrium, and radiates across the open water, similar to ripples from a rock being thrown into a pond. When the waveform reaches the coastline, it quickly raises the water level, with water velocities as high as 15 to 20 knots. The water mass, as well as vessels, vehicles, or other objects in its path create tremendous forces as they impact coastal structures. Tsunamis have affected the coastline along the Pacific Northwest during historic times. The Fort Point tide gauge in San Francisco recorded approximately 21 tsunamis between 1854 and 1964. The 1964 Alaska earthquake generated a recorded wave height of 7.4 feet and drowned eleven people in Crescent City, California. More recently the Santa Cruz harbor was damaged by the Tsunami that followed the 8.9 magnitude Japanese earthquake of March 11, 2011. For the case of a far-field event, the Bay area would have hours of warning; for a near field event, there may be only a few minutes of warning, if any.

A tsunami or seiche originating in the Pacific Ocean would lose much of its energy passing through San Francisco Bay. Based on the study of tsunami inundation potential for the San Francisco Bay Area (The Tsunami Modeling Working Group, 2013) areas most likely to be inundated are marshlands, tidal flats, and former bay margin lands that are now artificially filled, but are still at or below sea level, and are generally within 1½ miles of the shoreline. The site is approximately ½-mile inland (east) from the San Francisco Bay shoreline, and has an average elevation of approximately 50 feet above mean sea level. Based on the Tsunami Inundation Map For Emergency Planning, Oakland East Quadrangle (2009), the site is not located within a tsunami inundation zone. Therefore, the potential for inundation due to tsunami or seiche is considered low.

4.9 NATURALLY OCCURING ASBESTOS

Chrysotile and amphibole asbestos occur naturally in certain geologic settings in the San Francisco Bay area most commonly in serpentinite and other ultramafic rocks. These are igneous and metamorphic rocks with a high content of magnesium and iron minerals. The most common type of asbestos is chrysotile, which is commonly found in serpentinite rock formations. When disturbed by construction, grading, quarrying, or surface mining operations, asbestos-containing dust can be generated. Exposure to asbestos can result in lung cancer, mesothelioma, and asbestosis. In July 2001, the California Air Resources Board approved an Asbestos Airborne Toxic Control measure for Construction, Grading, Quarrying, and Surface Mining activities in areas where naturally occurring asbestos (NOA) will likely be found and to provide best dust mitigation measures and practices. These are mountainous areas or areas of shallow bedrock that could be encountered during construction. As already mentioned, Radbruch and Case (1967), Radbruch (1969), Helley and Graymer (1994), Knudsen et al.

(2000), Helley et al, (1994), the California Geological Survey ("CGS", 2003), and Dibblee and Minch (2005). have published the largest scale (1:24,000) geology maps of the region including subject site. The subject site is not underlain by ultramafic rocks nor is it located immediately adjacent to any known deposits of ultramafic rocks. These published geologic maps indicate the nearest mapped outcrop of ultramafic rock occurs an elongate, northwest trending band of ultramafic rock (gabbro an basalt) located approximately 4¾ miles northeast of the site. Our mapping and subsurface investigation of the subject site revealed only Holocene alluvial fan deposits in the immediate vicinity. These earth materials are very unlikely to contain serpentinite or other ultramafic rock with NOA. In our judgment, NOA should not be a hazard at the subject site.

4.10 VOLCANIC ERUPTION

The site is located over 200 miles from the nearest potentially or historically active volcano (at Mt. Lassen National Park). We conclude a volcanic eruption hazard does not exist at the project site.

SECTION 5: CBC SEISMIC DESIGN CRITERIA

We developed site-specific seismic design parameters in accordance with Chapters 16A and 18A of the 2013 California Building Code (CBC) and Chapters 11 and 21 of ASCE 7-10.

5.1 SITE CLASSIFICATION

As discussed in Section 3, our borings encountered undifferentiated Quaternary (Holocene and Pleistocene) alluvial fan deposits to a depth of 62½ feet, the maximum depth explored. Code-based site classification and ground motion attenuation relationships are based on the time-weighted average shear wave velocity of the top 100 feet (30 meters) of the soil profile, or V_{S30}.

Shear wave velocity (V_S) measurements were performed during CPT-2 to a depth of approximately 53 feet (16 meters), resulting in a time-averaged V_S of 253 meters per second for the top 16 meters of the soil profile. We estimated the average shear wave velocity for the top 30 meters of the profile (V_{S30}) to be approximately 301 m/s based on the Boore (2004) extrapolation method.

Additionally, we reviewed the results of three Seismic CPTs performed by the USGS between 1998 and 2001, designated CPTs OAK008 (V_{S30} 314 m/s, located approximately 0.1 miles to the southwest of the site), OAK098 (V_{S30} 286 m/s, located approximately 0.4 miles to the west of the site), and OAK099 (V_{S30} 280 m/s, located approximately 0.6 miles to the northwest of the site). Each CPT was located within the same geologic unit. Holzer, et al. (2005a) map the area as Holocene Alluvial Fan deposits. Holzer et al. also show CPT OAK009 as having approximately 5 meters of Holocene alluvial deposits over Pleistocene alluvial deposits, which is likely similar to the conditions at the site.

Wills et al. (2000) and Holzer, et al. (2005b) map the site as Site Class D. Based on the conditions encountered in our explorations, V_S measurements, and available geologic data, the site may be classified as Site Class D. Our site-specific ground motion hazard analysis used a V_{S30} of 300 m/s.

5.2 CODE-BASED SEISMIC DESIGN PARAMETERS

Code-based spectral acceleration parameters were determined based on mapped acceleration response parameters adjusted for the site conditions. Mapped Risk-Adjusted Maximum Considered Earthquake (MCE_R) spectral acceleration parameters (S_S and S_1) were calculated using the *U. S. Seismic Design Maps* on-line hazard calculator (USGS, 2013).

As discussed above, the site may be considered as Site Class D. The mapped acceleration parameters were adjusted for local site conditions based on the average soils conditions for the upper 100 feet (30 meters) of the soil profile. Code-based MCE_R spectral response acceleration parameters adjusted for site effects (S_{MS} and S_{M1}) and design spectral response acceleration parameters (S_{DS} and S_{D1}) are presented in Table 4.

Table 4: 2013 CBC Site Categorization and Site Coefficients (Not to be used for design, see below)

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.779100°
Site Longitude	-122.227390°
Risk Category	I, II, or III
Seismic Design Category	E
Short Period Mapped Spectral Acceleration – S_S	1.908g
1-second Period Mapped Spectral Acceleration – S_1	0.770g
Short-Period Site Coefficient – F_a	1.0
Long-Period Site Coefficient – F_v	1.5
Short Period MCE Spectral Response Acceleration Adjusted for Site Effects – S_{MS}	1.908g
1-second Period MCE Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.155g
Short Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.272g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.770g
Long-Period Transition – T_L	8 seconds
Site Coefficient F_{PGA}	1.0
PGA_M Equation 11.8-1	0.735g

In accordance with CBC Section 1613A.3.5, Risk Category I, II, or III structures with mapped spectral response acceleration parameter at the 1-second period (S_1) greater than 0.75, are assigned Seismic Design Category E. In accordance with CBC 1616A.1.3, Seismic Design Category E structures require a site-specific ground motion hazard analysis. *Site-specific seismic design parameters are presented in Table 7, Section 5.4 of this report.* ***The values in Table 4 should not be used for design.*** *Values are provided for determination of Seismic Design Category and comparison with minimum code requirements in our site-specific ground motion hazard analysis.*

5.3 SITE-SPECIFIC SEISMIC HAZARD ANALYSIS

We performed a site-specific hazard analysis in accordance with ASCE 7-10 Chapter 21.2 and 2013 CBC Section 1803A.6. Our analyses were performed using the computer program *EZ-Frisk, version 7.65* (Risk Engineering, 2015) and the 2008 USGS fault model (Petersen, et al., 2008).

Our analysis utilized the mean ground motions predicted by four of the Next Generation Attenuation (NGA) relationships: Boore-Atkinson (2008), Campbell-Bozorgnia (2008), Chiou-Youngs (2007), and Abrahamson-Silva (2008). Our analysis used the FEMA P-750 (2009) method for calculating the maximum rotated component of ground motions, which is based on Huang, et al. (2008).

5.3.1 Deterministic MCE_R

We performed deterministic seismic hazard analyses in accordance with ASCE 7-10 Section 21.2.2. The deterministic MCE_R acceleration response spectrum is defined as the largest 84th percentile ground motion in the direction of maximum horizontal response for each period for characteristic earthquakes on all known active faults within the region. Our analysis considered all known active faults within 100 kilometers of the site. As shown in Table 1, the site is located within 30 kilometers of five major fault sources. The largest deterministic ground motion resulted from a M_w 7.33 earthquake on the Hayward Fault.

The 84th percentile ground motion in the direction of maximum horizontal response for this event is presented on Figure 9 (green line). Spectral ordinates are tabulated in Table 5, Column 3.

ASCE 7-10 specifies that the deterministic MCE_R shall not be less than the Deterministic Lower Limit MCE response spectrum (ASCE 7-10 Figure 21.2-1). The Deterministic Lower Limit spectrum is presented on Figure 9 (blue line). Spectral ordinates are tabulated in Table 5, Column 4.

The deterministic MCE spectrum was calculated by taking the greater of Table 5, Columns 3 and 4. Spectral ordinates are tabulated in Table 5, Column 5. The deterministic MCE_R is presented graphically on Figure 9 (dashed black line).

5.3.2 Probabilistic MCE_R

We performed a probabilistic seismic hazard analysis (PSHA) in accordance with ASCE 7-10 Section 21.2.1. The probabilistic MCE acceleration response spectrum is defined as the 5 percent damped acceleration response spectrum having a 2 percent probability of exceedance in a 50 year period (2,475-year return period). Our PSHA considered all known active faults within 200 kilometers of the site as well as a gridded seismic source modeled by the USGS (2008). The probabilistic MCE spectrum was multiplied by Risk Coefficients (C_R) to determine the probabilistic MCE_R. We used Risk Coefficients (C_{RS} and C_{R1}) of 1.028 and 1.005, respectively, based on ASCE 7-10 Section 21.2.1.1 - Method 1 and the USGS on-line calculator.

The resulting probabilistic MCE_R is presented on Figure 10 (red line). Spectral ordinates are tabulated in Table 5, Column 6.

5.3.3 Site-Specific MCE_R

The site-specific MCE_R is defined by ASCE 7-10 Section 21.2.3 as the lesser of the deterministic and probabilistic MCE_R's at each period. The site-specific MCE_R spectrum was calculated by taking the lesser of the deterministic MCE_R and the probabilistic MCE_R. Spectral ordinates for the site-specific MCE_R are tabulated in Table 5, Column 7 and shown graphically on Figure 10 (dashed black line).

Table 5: Development of Site-Specific MCE_R Spectrum

Period (seconds)	CBC General Spectrum (g)	Largest 84th Percentile Deterministic (g)	Deterministic Lower Limit (g)	Deterministic MCE_R (g)	Probabilistic MCE_R (g)	Site-Specific MCE_R (g)
0.000	0.509	0.878	0.600	0.878	1.314	0.878
0.050	0.824	1.030	0.975	1.030	1.551	1.030
0.100	1.139	1.371	1.350	1.371	2.114	1.371
0.120	1.265	1.485	1.500	1.500	2.286	1.500
0.200	1.272	1.762	1.500	1.762	2.693	1.762
0.300	1.272	1.851	1.500	1.851	2.727	1.851
0.400	1.272	1.854	1.500	1.854	2.619	1.854
0.500	1.272	1.788	1.500	1.788	2.439	1.788
0.600	1.272	1.677	1.500	1.677	2.252	1.677
0.750	1.027	1.549	1.200	1.549	2.054	1.549
1.000	0.770	1.323	0.900	1.323	1.722	1.323
2.000	0.385	0.741	0.450	0.741	0.924	0.741
3.000	0.257	0.496	0.300	0.496	0.593	0.496
4.000	0.193	0.365	0.225	0.365	0.453	0.365
5.000	0.154	0.290	0.180	0.290	0.380	0.290

5.3.4 Design Response Spectrum

The site-specific Design Response Spectrum (DRS) is defined in ASCE 7-10 Section 21.3 as ⅔ of the site-specific MCE_R, but not less than 80% of the general design response spectrum. Spectral accelerations corresponding to ⅔ of the MCE_R are tabulated in Table 6, Column 2. Ordinates corresponding to 80% of the general Site Class D response spectrum are tabulated in Table 6, Column 3. Ordinates of the site-specific DRS are tabulated in Table 6, Column 4. Development of the site-specific DRS is presented graphically on Figure 11.

Table 6: Development of Site-Specific Design Response Spectrum

Period (seconds)	2/3 Site-Specific MCE_R (g)	80% CBC General Spectrum (g)	Design Response Spectrum (g)
0.000	0.585	0.407	0.585
0.050	0.687	0.659	0.687
0.100	0.914	0.911	0.914
0.120	1.000	1.012	1.012
0.200	1.175	1.018	1.175
0.300	1.234	1.018	1.234
0.400	1.236	1.018	1.236
0.500	1.192	1.018	1.192
0.600	1.118	1.018	1.118
0.750	1.033	0.821	1.033
1.000	0.882	0.616	0.882
2.000	0.494	0.308	0.494
3.000	0.331	0.205	0.331
4.000	0.244	0.154	0.244
5.000	0.194	0.123	0.194

5.4 DESIGN ACCELERATION PARAMETERS

Site-specific design acceleration parameters (S_{DS} and S_{D1}) were determined in accordance with Section 21.4 of ASCE 7-10. S_{DS} is defined as the design spectral acceleration at a period of 0.2 seconds, but not less than 90% of the spectral acceleration at any period greater than 0.2 seconds. S_{D1} is defined as the greater of the design spectral acceleration at a period of 1 second or two times the spectral acceleration at a period of 2 seconds.

Site-specific MCE_R spectral response acceleration parameters (S_{MS} and S_{M1}) are calculated as 1.5 times the S_{DS} and S_{D1} values, respectively, but not less than 80% of the code-based values presented in Table 4. Site-specific design acceleration parameters are summarized in Table 7.

When using the Equivalent Lateral Force Procedure, ASCE 7-10 Section 21.4 allows using the spectral acceleration at any period (T) in lieu of S_{D1}/T in Eq. 12.8-3. The site-specific spectral acceleration at any period may be calculated by interpolation of the spectral ordinates in Table 6, Column 4.

Table 7: Site-Specific Design Acceleration Parameters

Parameter	Value
S_{DS}	1.175
S_{D1}	0.988
S_{MS}	1.763
S_{M1}	1.481

5.5 MCE_G PEAK GROUND ACCELERATION

We calculated the MCE Geometric Mean Peak Ground Acceleration (MCE_G) in accordance with ASCE 7-10 Section 21.5. The MCE_G is calculated as the lesser of probabilistic and deterministic geometric mean PGA. The 2% in 50-year probabilistic geometric mean PGA is 1.162g. The deterministic MCE_G is considered the greater of the largest 84th percentile deterministic geometric mean PGA (0.798g) or one-half of the tabulated F_{PGA} value from ASCE 7-10 Table 11.8.1. For the site, F_{PGA} is 1.0 and one half of the F_{PGA} is 0.5g; therefore, the deterministic MCE_G is 0.798g. Additionally, the MCE_G may not be less than 80% of the mapped PGA_M determined from ASCE -10 Equation 11.8-1. The PGA_M for the site is 0.735g; 80% of PGA_M is 0.588g. Therefore, the MCE_G for the site may be considered 0.798g.

SECTION 6: CONCLUSIONS

6.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Potential for Liquefaction-Induced Settlement
- Presence of Undocumented Fill
- Culvert within Building Footprint
- Presence of Expansive Soil
- Soil Corrosion Potential

6.1.1 Potential for Liquefaction-Induced Settlement

As discussed, our liquefaction analysis indicates that there is a potential for liquefaction of localized sand layers during a significant seismic event. Although the potential for liquefied sands to vent to the ground surface through cracks in the surficial soil is low, our analysis indicates that liquefaction-induced settlement on the order of ½ to ¾-inch could occur, resulting in differential settlement of ½-inch between independent foundation elements. Foundations should be designed to tolerate the anticipated total and differential settlements. Based on our conversation with the design team, deep foundations to support the proposed building are being considered; however, the building foundations will need to be designed to tolerate total and differential settlement due to static loads and liquefaction-induced settlement. Detailed foundation recommendations are presented in the "Foundations" section.

6.1.2 Presence of Undocumented Fill

As discussed above, deep foundations are being considered for the proposed building in order for the building to span the culvert. We understand, as an alternative, that the building footprint may be adjusted so that the culvert is outside of the building footprint and the building will be 3 stories. If the culvert is outside proposed building footprint, the building may be supported on shallow spread footings. If shallow foundations are being considered, the undocumented fill encountered at the site should be mitigated as discussed in the following sections.

Undocumented fill was encountered to depths of 3 to 3½ feet below the existing ground surface within our borings and generally consisted of loose silty sand, soft lean clay, and hard lean clay with sand. Since the proposed structures can likely be supported on shallow foundations, we recommend that remedial grading include partial removal of undocumented fill within the building footprints. Recommendations for remedial grading are presented in the "Earthwork" section of this report.

6.1.3 Culvert within the Building Footprint

As discussed, the portion of Sausal Creek located within the project site consists of an arched concrete culvert. According to the referenced site plans, the western portion of the building will be located over the culvert. Based on the relatively shallow depth of the culvert, we recommend that the building foundation system be designed to span the culvert. We understand that deep foundations are being considered for the proposed building. Recommendations for drilled piers are provided in the "Foundations" section of this report.

6.1.4 Presence of Expansive Soil

Highly expansive surficial soils generally blanket the site. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned structures, slabs-on-grade should have sufficient reinforcement and be supported on a layer of non-expansive fill; footings should extend below the zone of seasonal moisture fluctuation. In addition, it is important to limit moisture changes in the surficial soil by using positive drainage

away from the building as well as limiting landscaping watering. Detailed grading and foundation recommendations addressing this concern are presented in the following sections.

6.1.5 Soil Corrosion Potential

Our testing indicates sulfate exposure is low and therefore no cement-type restrictions to buried concrete. The corrosion potential for buried metallic structures, such as metal pipes, is considered moderately corrosive. Based on the results of the preliminary soil corrosion screening, special requirements for corrosion control will likely be required to protect metal pipes and fittings.

6.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

6.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 7: EARTHWORK

7.1 SITE DEMOLITION, CLEARING AND PREPARATION

7.1.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements within the proposed development area. Demolition of existing improvements is discussed in detail below. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 3 to 6 inches below existing grade in vegetated areas.

7.1.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the "Compaction" section of this report.

7.1.3 Demolition of Existing Slabs, Foundations and Pavements

All slabs, foundations, and pavements should be completely removed from within planned building areas. Slabs, foundations, and pavements that extend into planned flatwork, pavement, or landscape areas may be left in place provided there is at least 3 feet of engineered fill overlying the remaining materials, they are shown not to conflict with new utilities, and that asphalt and concrete more than 10 feet square is broken up to provide subsurface drainage. A discussion of recycling existing improvements is provided later in this report.

7.1.4 Abandonment of Existing Utilities

With the exception of the creek culvert, all utilities should be completely removed from within planned building areas. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risks associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout. In general, the risk is relatively low for single utility lines less than 4 inches in diameter, and increases with increasing pipe diameter.

7.2 REMOVAL OF EXISTING FILLS

As discussed, undocumented fill was encountered to depths of 3 to 3½ feet below the existing grades. If the building will be supported on shallow foundations, all fills should be completely removed from within building areas and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. If the building is supported on drilled piers, our office should evaluate and provide recommendations for removal of undocumented fill. Provided the fills meet the "Material for Fill" requirements below, the fills may be reused when backfilling the excavations. Based on review of the samples collected from our borings, it appears that the fill may be reused. If materials are encountered that do not meet the requirements, such as debris, wood, trash,

those materials should screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

Fills extending into planned pavement and flatwork areas may be left in place provided they are determined to be a low risk for future differential settlement and that the upper 12 to 18 inches of fill below pavement subgrade is re-worked and compacted as discussed in the "Compaction" section below. In our opinion, the fills encountered at this site are not acceptable to be left in place.

7.3 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 10 feet at the site may be classified as OSHA Soil Type B materials. A Cornerstone representative should be retained to confirm the preliminary site classification.

Excavations performed during site demolition and fill removal should be sloped at 1:1 (horizontal:vertical) within the upper 5 feet below building subgrade. Excavations extending more than 5 feet below building subgrade and excavations in pavement and flatwork areas should be slope at a 1:1 inclination unless the OSHA soil classification indicates that slope should not exceed 1.5:1.

7.4 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soil with high fines contents such as clay and silty soil, can become unstable due to high moisture content, whether from high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

As discussed in the "Subsurface" section in this report, the in-situ moisture contents are near optimum to 10 percent over the estimated laboratory optimum in the upper 10 feet of the soil profile. The contractor should anticipate drying the soils prior to reusing them as fill. In addition, repetitive rubber-tire loading will likely de-stabilize the soils.

There are several methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

7.4.1 Scarification and Drying

The subgrade may be scarified to a depth of 6 to 12 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

7.4.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthethic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

7.4.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

7.5 MATERIAL FOR FILL

7.5.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

7.5.2 Re-Use of On-Site Site Improvements

We anticipate that significant quantities of asphalt concrete (AC) grindings and aggregate base (AB) will be generated during site demolition. If the AC grindings are mixed with the underlying AB to meet Class 2 AB specifications, they may be reused within the new pavement and flatwork structural sections. AC/AB grindings may not be reused within the building area. Laboratory testing will be required to confirm the grindings meet project specifications. Due to the existing alligator cracking of the AC pavements, it is likely that the grinding operation will leave significant oversize chunks and won't meet the Class 2 AB gradation requirements but may meet Caltrans subbase requirements. Depending on the quantities of oversized material, the grindings may still be used within the structural section; however, the pavement design will need to be modified to account for the difference, typically resulting in the addition of about 1 inch to the structural section.

7.5.3 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the building area. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

7.5.4 Non-Expansive Fill Using Lime Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the high clay content and PI of the on-site soil materials, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. It has been our experience that for high PI clayey soil and bedrock materials will likely need to be mixed with at least 4 percent quicklime (CaO) or approved equivalent to adequately reduce the PI of the on-site soils to 15 or less. If this option is considered, additional laboratory tests should be performed during initial site grading to further evaluate the optimum percentage of quicklime required.

7.6 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization

are provided in the "Subgrade Stabilization Measures" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

Table 8: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	93	>3
	Low Expansion Soils	95	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

7.6.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

7.7 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in

private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

7.8 SITE DRAINAGE

Ponding should not be allowed adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 1 to 2 percent towards suitable discharge facilities; landscape areas should slope at least 2 to 3 percent. Roof runoff should be directed away from building areas.

7.9 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project's drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and is expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.

- Locally, seasonal high ground water is mapped at a depth of 10 feet, and therefore is expected to be within 10 feet of the base of the infiltration measure.

- The site has a known geotechnical hazard consisting of soils subject to liquefaction; therefore, stormwater infiltration facilities may not be feasible.

- In our opinion, infiltration locations within 10 feet of the building would create a geotechnical hazard.

7.9.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

7.9.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.
- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

7.9.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.

- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

7.9.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback

between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the "Retaining Walls" section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

7.10 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are moderately to highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation,

- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes,

- Regulating the amount of water distributed to lawns or planter areas by using irrigation timers, and

- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 8: FOUNDATIONS

8.1 SUMMARY OF RECOMMENDATIONS

As discussed, the proposed layout of the building footprint will require the foundation system to span the culvert located below a portion of the building. We understand that the proposed structure will be supported on deep foundations in order to span the culvert. We also understand that the building footprint may be adjusted away from the culvert. As an alternative, the proposed 3-story, steel-frame building may be supported on shallow spread footings provided that the culvert is not within the building footprint. Recommendations for shallow foundations and drilled piers are provided in the following sections.

8.2 SEISMIC DESIGN CRITERIA

The 2013 California Building Code (CBC) "Seismic Coefficients," the recommended Project Design Response Spectrum, and recommended revisions to the CBC Seismic Coefficients are presented in Section 5, "CBC Seismic Design Criteria," of this report. That section including Figures 9 through 11, should be referred to for applicable seismic design criteria and values.

8.3 SHALLOW FOUNDATIONS

8.3.1 Spread Footings (For 3-Story Building not spanning the culvert)

Spread footings should bear on natural, undisturbed soil or engineered fill, be at least 18 inches wide, and extend at least 24 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil. The deeper footing embedment is due to the presence of highly expansive soils, and is intended to embed the footing below the zone of significant seasonal moisture fluctuation, reducing the potential for differential movement.

Footings constructed to the above dimensions and in accordance with the "Earthwork" recommendations of this report are capable of supporting maximum allowable bearing pressures of 2,000 psf for dead loads, 3,000 psf for combined dead plus live loads, and 4,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

8.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we assumed the typical loading in the following table.

Table 9: Assumed Structural Loading

Foundation Area	Range of Assumed Loads
Interior Isolated Column Footing	275 to 325 kips
Exterior Isolated Column Footing	275 to 325 kips
Perimeter Strip Footing	2 to 4 kips per lineal foot

Based on the above loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of ½-inch, with about ¼-inch of post-construction differential settlement between adjacent foundation elements. In addition we estimate that differential seismic movement will be on the order of ½-inch between independent foundation elements, resulting in a total estimated differential footing movement of ¾-inch

between foundation elements, assumed to be on the order of 30 feet. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading, and verify the settlement estimates above.

8.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.35 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 400 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

8.3.4 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

8.4 DEEP FOUNDATIONS

8.4.1 Drilled Piers

The proposed structural loads may be supported on drilled, cast-in-place, straight-shaft friction piers. The piers should have a minimum diameter of 18 inches. Adjacent piers centers should be spaced at least three diameters apart, otherwise, a reduction for group effects may be required. As discussed, pier foundations may be used to span the building over the existing creek culvert. Piers should be spaced at least three pier diameters from the existing culvert. For piers located less than three pier diameters from the culvert, a reduction in the allowable vertical pier capacities shown on Figure 13 in the upper 10 feet of the pier may be required. Grade beams should span between piers and/or pier caps in accordance with structural requirements. Conventional slabs-on-grade may be used provided the subgrade soils are

prepared in accordance with the “Earthwork” section and that the estimated seismic differential movement is acceptable.

7.4.2.1 Vertical Capacity and Estimated Settlement

As no significantly thick, dense sand layer was encountered during our investigation that would provide adequate end bearing support, vertical capacity is based on frictional resistance. We evaluated the allowable vertical capacities for 18- and 24-inch diameter drilled piers and present the results in Figure 13. As shown in the figure, we have assumed that the top of pile/bottom of pile cap occurs at 3 feet below existing site grades. The allowable capacity is for dead plus live loads; dead loads should not exceed two-thirds of the allowable capacities. The allowable capacities may be increased by one-third for wind and seismic loads. Uplift loads should not exceed 75 percent of the allowable downward vertical capacity under seismic loading. Gross capacity of the piles should be less than the structural capacity of the piles.

Total settlement of individual piers or pier groups of four or less should not exceed ½-inch to mobilize static capacities and post-construction differential settlement over a horizontal distance of 30 feet should not exceed ¼-inch due to static loads.

7.4.1.2 Lateral Capacity

Lateral load resistance is developed by the soil’s resistance to pile bending. The magnitude of the shear and bending moment developed within the pier are dependent on the pier stiffness, embedment length, the fixity of the pier into the pier cap (free or fixed-head conditions), the surrounding soil properties, the tolerable lateral deflection, and yield moment capacity of the pier.

We utilized the computer program L-Pile to model the load-deflection (p-y) curves representing the soil conditions surrounding the pier, and estimate the ultimate lateral load capacity of the pier. The following table presents the probable response of the piers under short-term loading conditions; the structural engineer should apply an appropriate factor of safety on the shears and moments presented. Pier stiffnesses (EI) of 1.1×10^9 lb-in^2 and 3.6×10^9 lb-in^2 have been assumed in our analysis for 18- and 24-inch piers, respectively. These stiffnesses included a 30 percent reduction to account for cracking. We assumed a concrete compressive strength of 3,000 psi for the concrete modulus calculations. If the pier stiffness varies by less than 20 percent of our assumed stiffness, the lateral load parameters below may be interpolated by multiplying the values by the ratio of the different pier stiffness values. We should be retained to re-evaluate the lateral load capacity for piles with a stiffness significantly different from what was assumed.

Table 10: Ultimate Lateral Load Capacity

Pile Type	Fixity Condition	Lateral Deflection (inches)	Maximum Shear (kips)	Maximum Moment (kip-feet)	Depth to Maximum Moment (feet)	Depth to Zero Moment (feet)
18-inch Round	Free-Head	0.25	26.8	60.7	4.5	14.5
		0.50	37.3	97.9	5.0	16.6
24-inch Round	Free-Head	0.25	43.1	124.6	5.5	20.0
		0.50	59.6	197.7	6.1	24.4
18-inch Round	Fixed-Head	0.25	54.2	157.1	0	16.5
		0.50	76.1	250.0	0	20.0
24-inch Round	Fixed-Head	0.25	86.9	316.9	0	24.0
		0.50	121.1	500.0	0	32.4

The above lateral capacities are for single piers and may not be representative of piles in groups. Group effects, including the layout of the piers within a group, can significantly reduce the overall lateral capacity. Groups of 2 or less do not need to have a group reduction. For pier groups of 3-by-3 or smaller a pier group efficiency of 75 percent of the sum of the individual piers may be used. For larger groups, we should be retained to pier layout and structural loads to evaluate what appropriate group efficiency reduction factors should be applied to the different group conditions.

7.4.1.3 Passive Resistance against Pier Caps and Grade Beams

As lateral deflection of pier-supported structures will be limited by the pier deflection, development of the full allowable passive pressures against grade beams will not occur. We should be consulted regarding appropriate reductions in passive pressures acting against grade beams.

7.4.1.4 Construction Considerations

The excavation of all drilled shafts should be observed by a Cornerstone representative to confirm the soil profile, verify that the piers extend the minimum depth into suitable materials and that the piers are constructed in accordance with our recommendations and project requirements. The drilled shafts should be straight, dry, and relatively free of loose material before reinforcing steel is installed and concrete is placed. If ground water cannot be removed from the excavations prior to concrete placement, drilling slurry or casing may be required to stabilize the shaft and the concrete should be placed using a tremie pipe, keeping the tremie pipe below the surface of the concrete to avoid entrapment of water or drilling slurry in the concrete.

Due to the loose nature of some of the cleaner sand layers, the use of drilling slurry and/or casing of each drilled shaft may be required.

SECTION 9: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

9.1 INTERIOR SLABS-ON-GRADE

As the Plasticity Index (PI) of the surficial soil is 34, the proposed slabs-on-grade should be supported on at least 24 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the "Earthwork" section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the "Interior Slabs Moisture Protection Considerations" section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness.

9.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of ½- to ¾-inch crushed rock with less than 5 percent passing the No. 200 sieve, should be placed below the vapor retarder and consolidated in place with vibratory equipment. The capillary break rock may be considered as the upper 4 inches of the non-expansive fill recommended above.
- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.
- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.
- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869 and F710 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

9.3 EXTERIOR FLATWORK

Exterior concrete flatwork subject to pedestrian and/or occasional light pick up loading should be at least 4 inches thick and supported on at least 12 inches of non-expansive fill overlying subgrade prepared in accordance with the "Earthwork" recommendations of this report. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the "Vehicular Pavements" section below. To help reduce the potential for uncontrolled shrinkage cracking, adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Flatwork should be isolated from adjacent foundations or retaining walls except where limited sections of structural slabs are included to help span irregularities in retaining wall backfill at the transitions between at-grade and on-structure flatwork.

SECTION 10: VEHICULAR PAVEMENTS

10.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on experience in the vicinity of the site and engineering judgment considering the variable surface conditions.

Table 11: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	12.5	16.0
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress

through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will be use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb.

10.2 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduce to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or “Deep-Root Moisture Barriers” that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 11: RETAINING WALLS

11.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 12: Recommended Lateral Earth Pressures

Wall Condition	Lateral Earth Pressure*	Additional Surcharge Loads
Unrestrained – Cantilever Wall	45 pcf	⅓ of vertical loads at top of wall
Restrained – Braced Wall	45 pcf + 8H** psf	½ of vertical loads at top of wall

* Lateral earth pressures are based on an equivalent fluid pressure for level backfill conditions
** H is the distance in feet between the bottom of footing and top of retained soil

If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the

portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

11.2 SEISMIC LATERAL EARTH PRESSURES

Section 1802A.2.7 of the 2013 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. At this time, we are not aware of any retaining walls for the project. However, minor landscaping walls (i.e. walls 6 feet or less in height) may be proposed. In our opinion, design of these walls for seismic lateral earth pressures in addition to static earth pressures is not warranted for low retaining wall heights.

11.3 WALL DRAINAGE

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

11.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

11.5 FOUNDATIONS

Retaining walls may be supported on a continuous spread footing designed in accordance with the recommendations presented in the “Foundations” section of this report.

SECTION 12: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Aspire Public Schools specifically to support the design of the Aspire Public Schools - Eres College Preparatory Academy project in Oakland, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and ground water conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Aspire Public Schools may have provided Cornerstone with plans, reports and other documents prepared by others. Aspire Public Schools understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone’s control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that

conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

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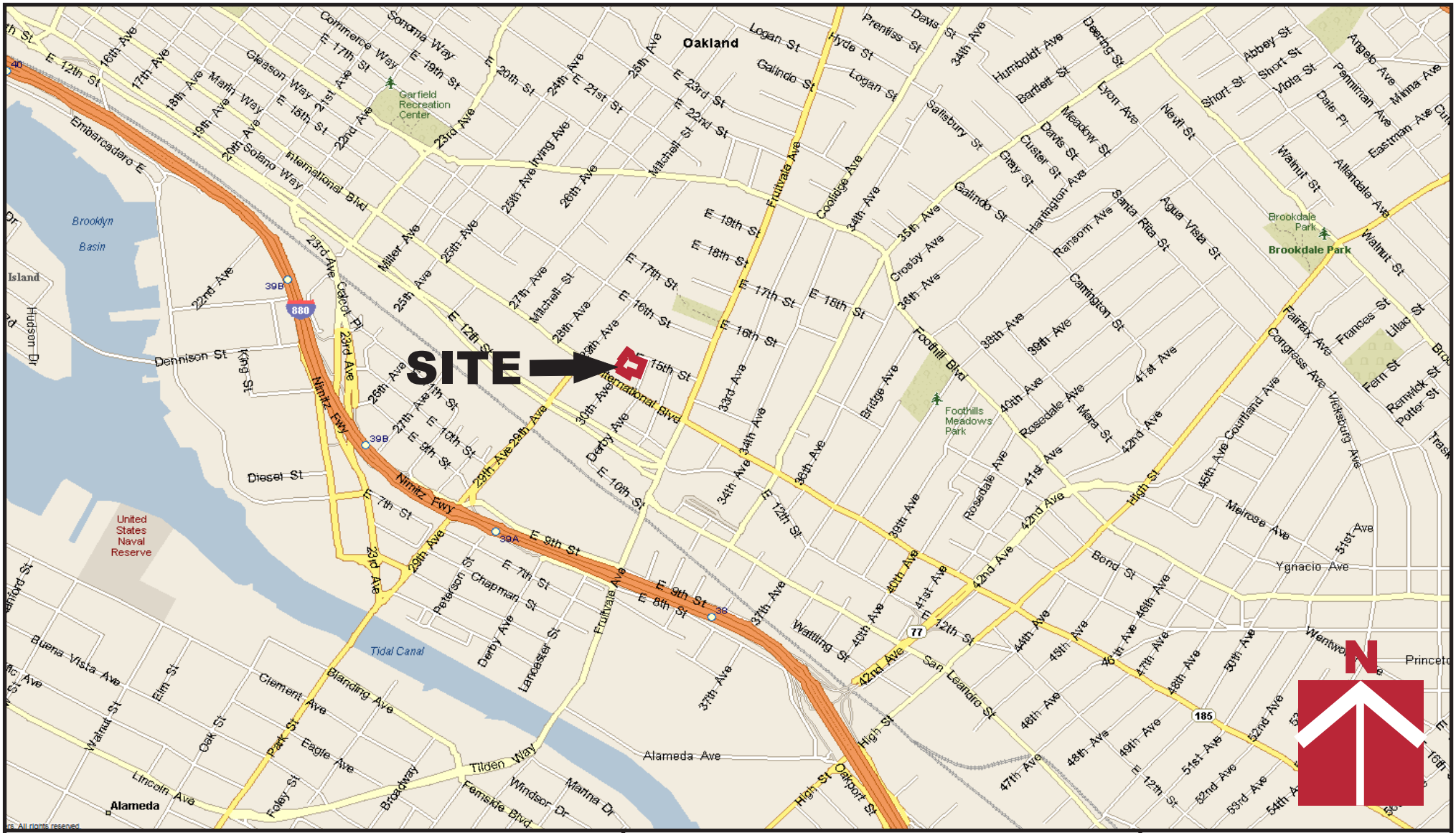
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Aerial Photos Reviewed

Date	Type
1948	vertical black & white
1953	vertical black & white
1956	vertical black & white
1960	vertical black & white
1968	vertical black & white
1980	vertical black & white
1987	vertical black & white
1993	vertical black & white
1998	vertical black & white
2002	vertical black & white
2005	vertical black & white
2009	vertical black & white
2010	vertical black & white
2012	vertical black & white



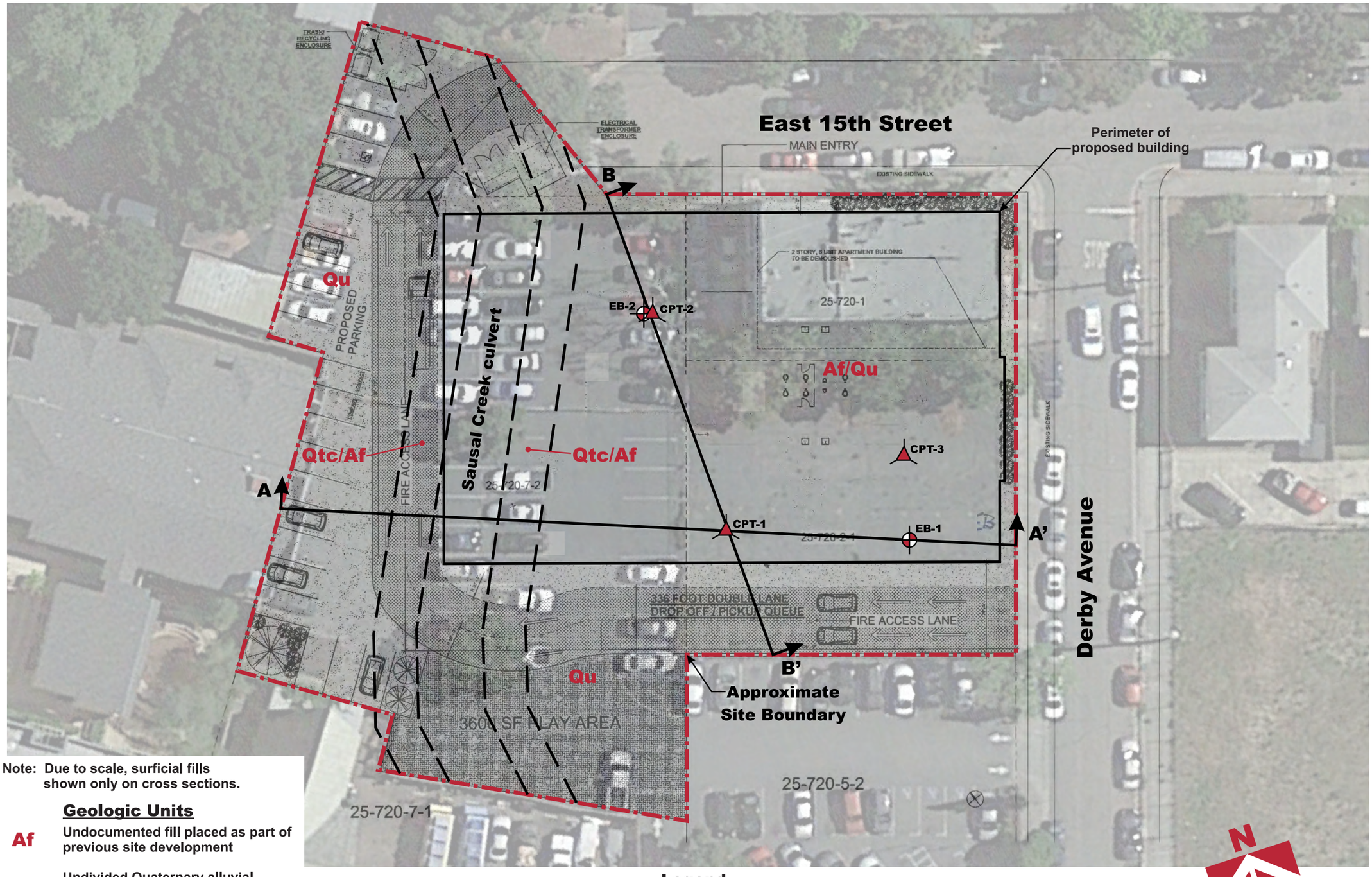
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CORNERSTONE EARTH GROUP

Vicinity Map

Eres College Preparatory Academy
Oakland, CA

Project Number	729-4-1
Figure Number	Figure 1
Date	December 2015
Drawn By	RRN



Note: Due to scale, surficial fills shown only on cross sections.

Geologic Units

Af Undocumented fill placed as part of previous site development

Qu Undivided Quaternary alluvial and colluvial deposits (Holocene and Pleistocene)

Qtc Temescal formation: Stream channel deposits (Holocene) broken out of Qu locally

Legend

- Approximate location of exploratory boring (EB)
- Approximate location of cone penetration test (CPT)
- Approximate location of Sausal Creek culvert
- A A' Approximate location of cross section

N

0 30 60

APPROXIMATE SCALE (FEET)

Base by Google Earth, dated 5/11/2015
Overlay by K2A Architecture, Eres College Preparatory Academy, "Site Plan", undated

Project Number 729-4-1

Figure Number Figure 2

Drawn By RRN

Date December 2015

Site Plan and Geologic Map

Eres College Preparatory Academy
Oakland, CA

CORNERSTONE EARTH GROUP



Geologic Units

Qhaf Artificial fill

Qu Undivided Quaternary alluvial and colluvial deposits (Holocene and Pleistocene), locally broken out information:
Qtc: Temescal formation
Qts: Alluvium derived from San Antonio formation

Explanation

Contact- dashed where approximate, dotted where concealed

Base: USGS, Aeral and Engineering Geology of the Oakland East Quadrangle, California, by Radbruch, 1969

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Vicinity Geologic Map

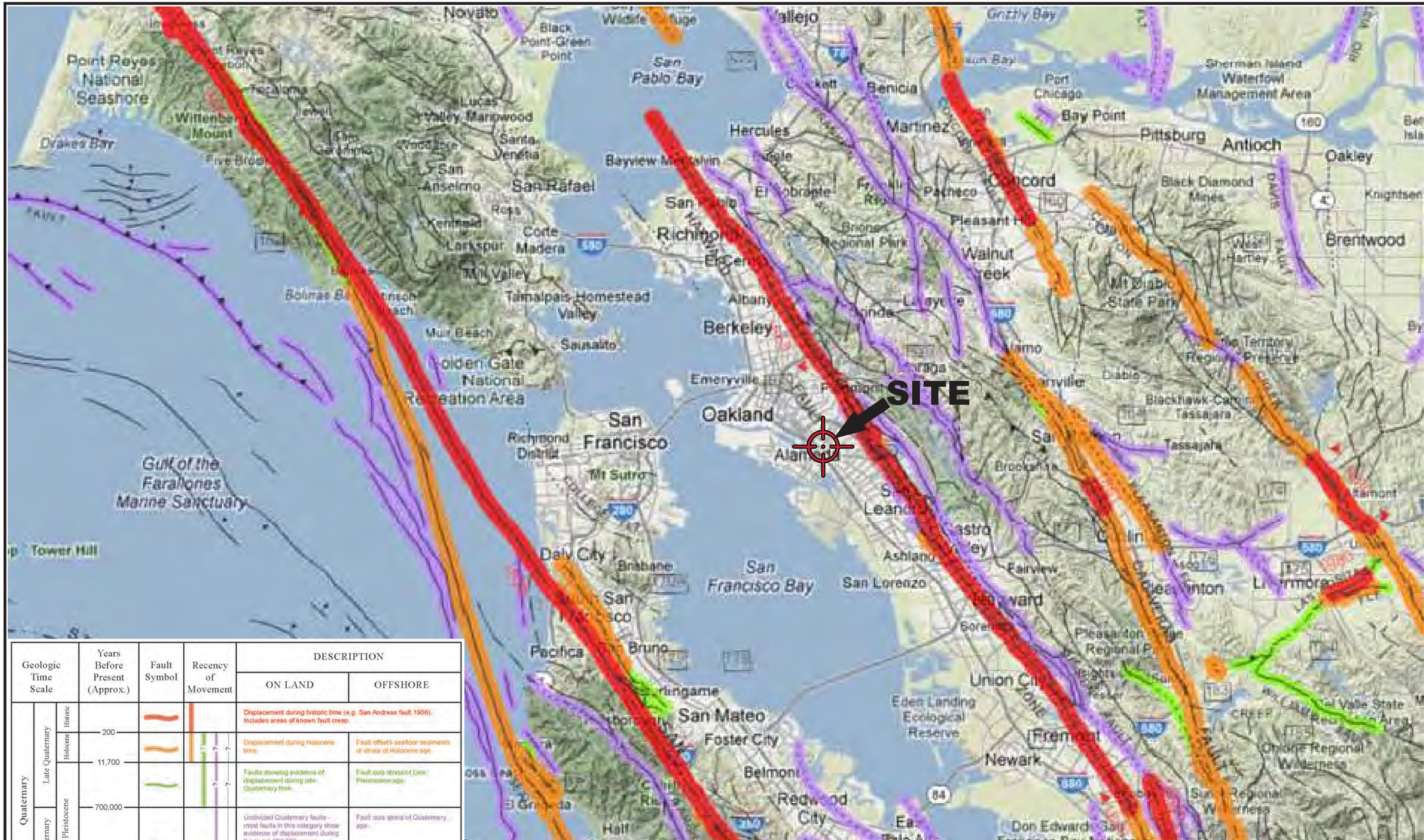
Eres College Preparatory Academy
Oakland, CA

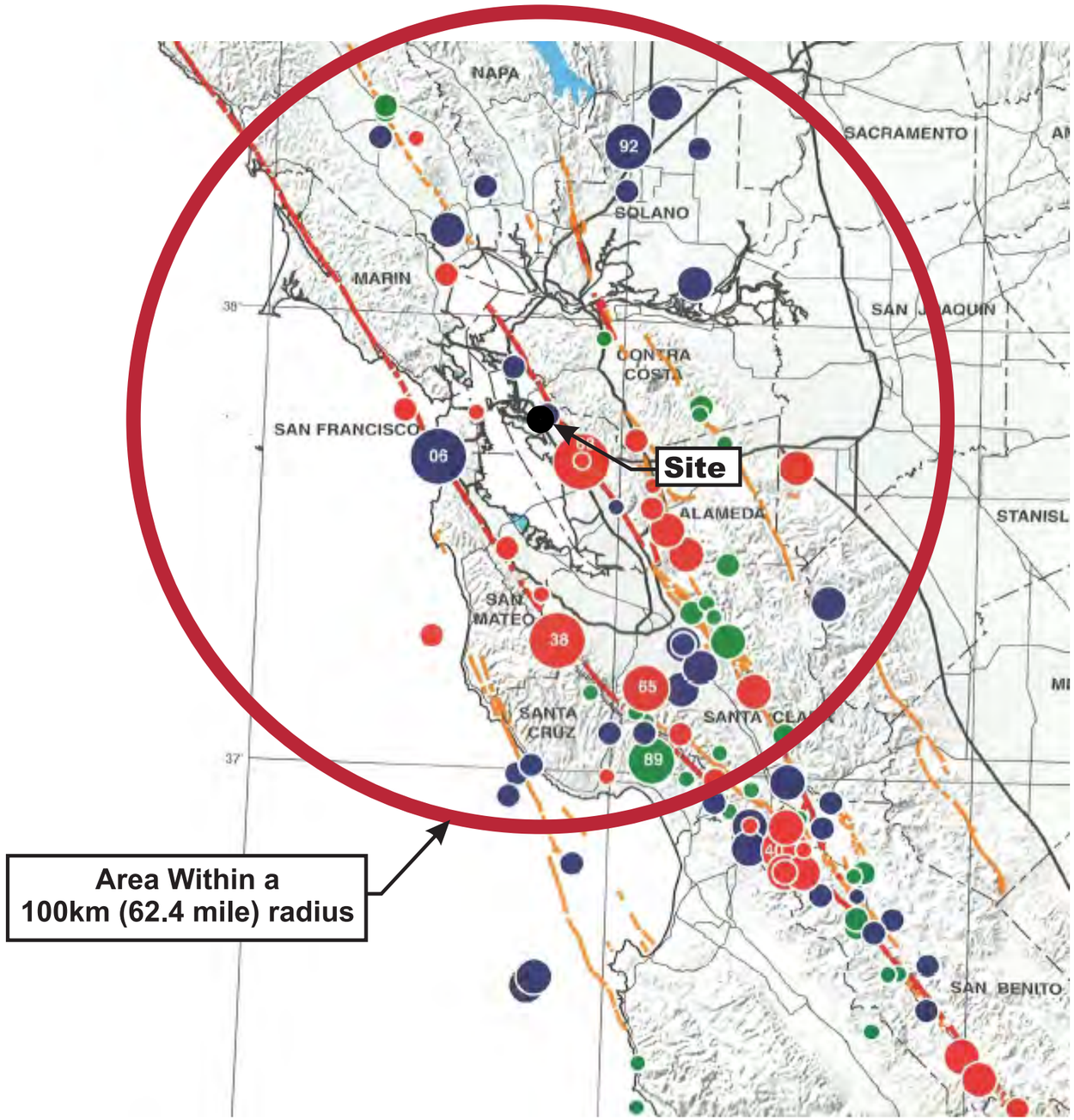
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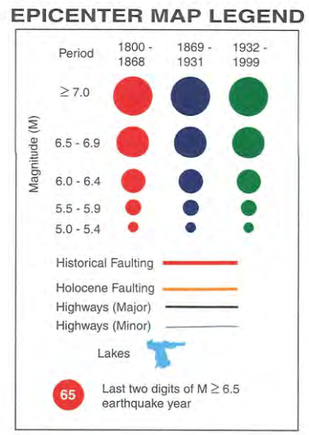
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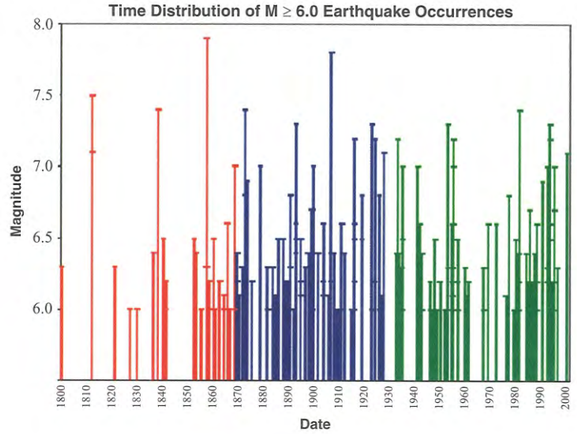
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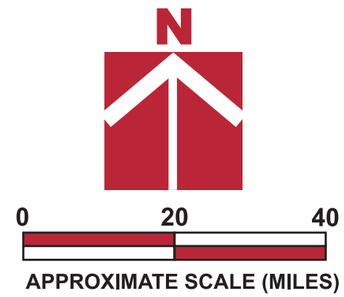
Drawn By: RRN


SITE
Point Reyes National Seashore
Drakes Bay
Gulf of the Farallones Marine Sanctuary
Tower Hill
Novato
Black Point-Green Point
San Pablo Bay
Vallejo
Benicia
Martinez
Hercules
Pittsburg
Bay Point
Antioch
Oakley
Brentwood
Concord
Pacheco
Pleasant Hill
Walnut Creek
Black Diamond Mines
Mt Diablo State Park
Sherman Island Waterfowl Management Area
Port Chicago
Grizzly Bay
San Rafael
San Anselmo
Larkspur
Corte Madera
Mill Valley
Tamalpais-Homestead Valley
Muir Beach
Sausalito
Golden Gate National Recreation Area
Berkeley
Albany
Richmond
El Cerrito
Emeryville
Oakland
Alameda
San Francisco
Richmond District
Mt Sutro
Daly City
Brisbane
San Francisco Bay
San Lorenzo
Ashland
Fairview
Pacifica
San Bruno
San Mateo
Foster City
Belmont
Redwood City
Menlo Park
Palo Alto
Half Moon Bay
Purisima Creek Redwoods Open Space Preserve
Tunitas
Eden Landing Ecological Reserve
Union City
Fremont
Newark
Don Edwards San Francisco Bay National Wildlife Refuge
Milpitas
Livermore
Tassajara
Blackhawk
Diablo
Knightsen
Clayton
Mt Diablo State Park
Round Valley Regional Preserve
Ohlone Regional Wilderness
Pleasanton Ridge Regional Park
Briones Regional Park
Las Trampas Regional Wilderness
Wildcat Canyon Regional Park
Tilden Regional Park
Sibley Volcanic Regional Preserve
Redwood Regional Park
Anthony Chabot Regional Park
Lake Chabot
Lafayette
Moraga
Orinda
Alamo
Danville
San Ramon
Dublin
Pleasanton
Livermore
Sunnyvale
Los Altos
Mountain View
Palo Alto
Menlo Park
Redwood City
Foster City
San Mateo
Burlingame
Millbrae
Brisbane
Daly City
Pacifica
Half Moon Bay
Tunitas
Purisima Creek Redwoods Open Space Preserve
Eden Landing Ecological Reserve
Don Edwards San Francisco Bay National Wildlife Refuge
Milpitas
Fremont
Newark
Union City
Pleasanton
Livermore
Dublin
San Ramon
Danville
Alamo
Lafayette
Moraga
Orinda
Clayton
Knightsen
Oakley
Brentwood
Antioch
Pittsburg
Bay Point
Port Chicago
Sherman Island Waterfowl Management Area
Grizzly Bay
Suisun Bay
Benicia
Martinez
Hercules
Pacheco
Concord
Pleasant Hill
Walnut Creek
Black Diamond Mines
Mt Diablo State Park
Round Valley Regional Preserve
Ohlone Regional Wilderness
Pleasanton Ridge Regional Park
Briones Regional Park
Las Trampas Regional Wilderness
Wildcat Canyon Regional Park
Tilden Regional Park
Sibley Volcanic Regional Preserve
Redwood Regional Park
Anthony Chabot Regional Park
Lake Chabot
Tassajara
Blackhawk
Diablo
Mountain View
Los Altos
Sunnyvale
Milpitas
Fairview
San Lorenzo
Ashland
Brisbane
Daly City
Pacifica
San Bruno
Burlingame
Millbrae
San Mateo
Foster City
Belmont
Redwood City
Menlo Park
Palo Alto
Half Moon Bay
Purisima Creek Redwoods Open Space Preserve
Tunitas
Eden Landing Ecological Reserve
Don Edwards San Francisco Bay National Wildlife Refuge









From: T. Toppozada & Others (2000)

Project Number 729-4-1

Figure Number Figure 5

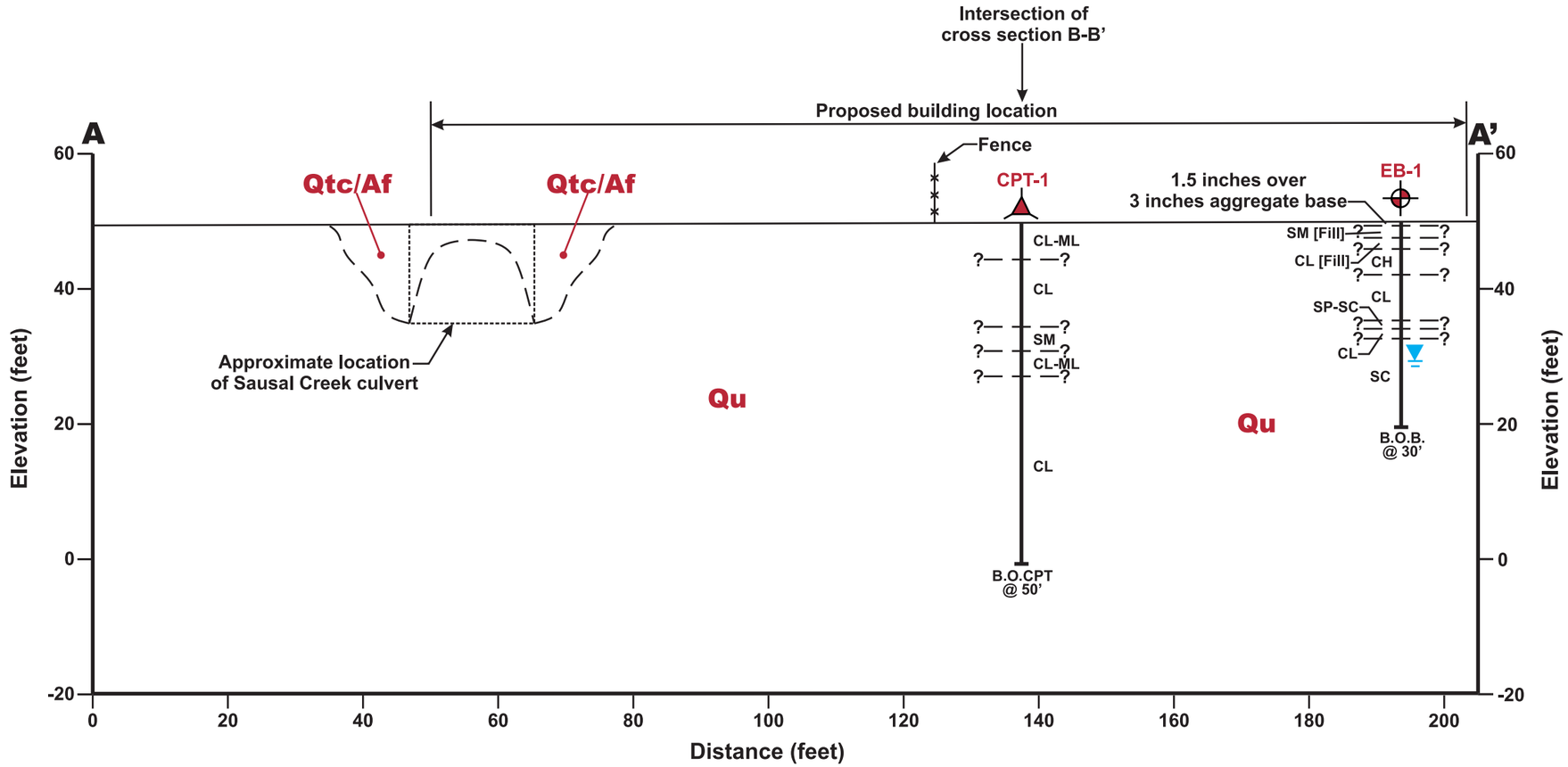
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Date December 2015

Historical Earthquakes Map

Eres College Preparatory Academy
Oakland, CA

CORNERSTONE EARTH GROUP



Section A-A'

(View Looking Northeast)
1"=20' H:V

Symbols

	Approximate location of exploratory boring (EB)
	Approximate location of cone penetration test (CPT)
CL	Lean Clay or sandy clay
CH	Fat Clay
CL-ML	Lean Clay with Silt
SC	Clayey Sand
SM	Silty Sand
SP-SC	Poorly Graded Sand with Clay
	Approximate ground water depth at time of drilling; actual depth may vary

Geologic Units

Af	Undocumented fill placed as part of previous site development
Qu	Undivided Quaternary alluvial and colluvial deposits (Holocene and Pleistocene)
Qtc	Temescal formation: Stream channel deposits (Holocene) broken out of Qu locally

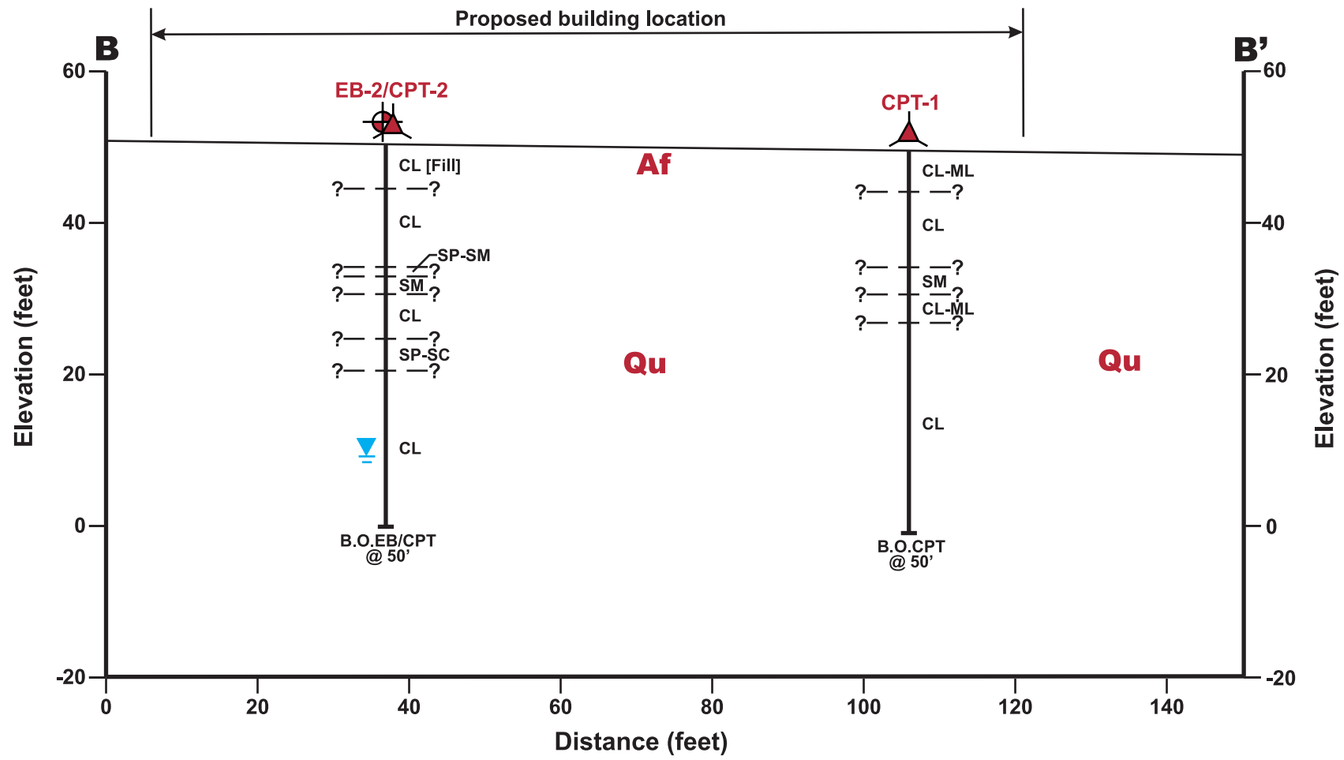
Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

Project Number 729-4-1
Figure Number Figure 6
Drawn By RRN
Date December 2015

Geologic Cross Section A-A'

Eres College Preparatory Academy
Oakland, CA

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Section B-B'

(View Looking East)
1"=20' H:V

Symbols

	Approximate location of exploratory boring (EB)
	Approximate location of cone penetration test (CPT)
CL	Lean Clay or sandy clay
CL-ML	Lean Clay with Silt
SC	Clayey Sand
SM	Silty Sand
SP-SC	Poorly Graded Sand with Clay
SP-SM	Poorly Graded Sand with Silt
	Approximate ground water depth at time of drilling; actual depth may vary

Geologic Units

Af	Undocumented fill placed as part of previous site development
Qu	Undivided Quaternary alluvial and colluvial deposits (Holocene and Pleistocene)
Qtc	Temescal formation: Stream channel deposits (Holocene) broken out of Qu locally

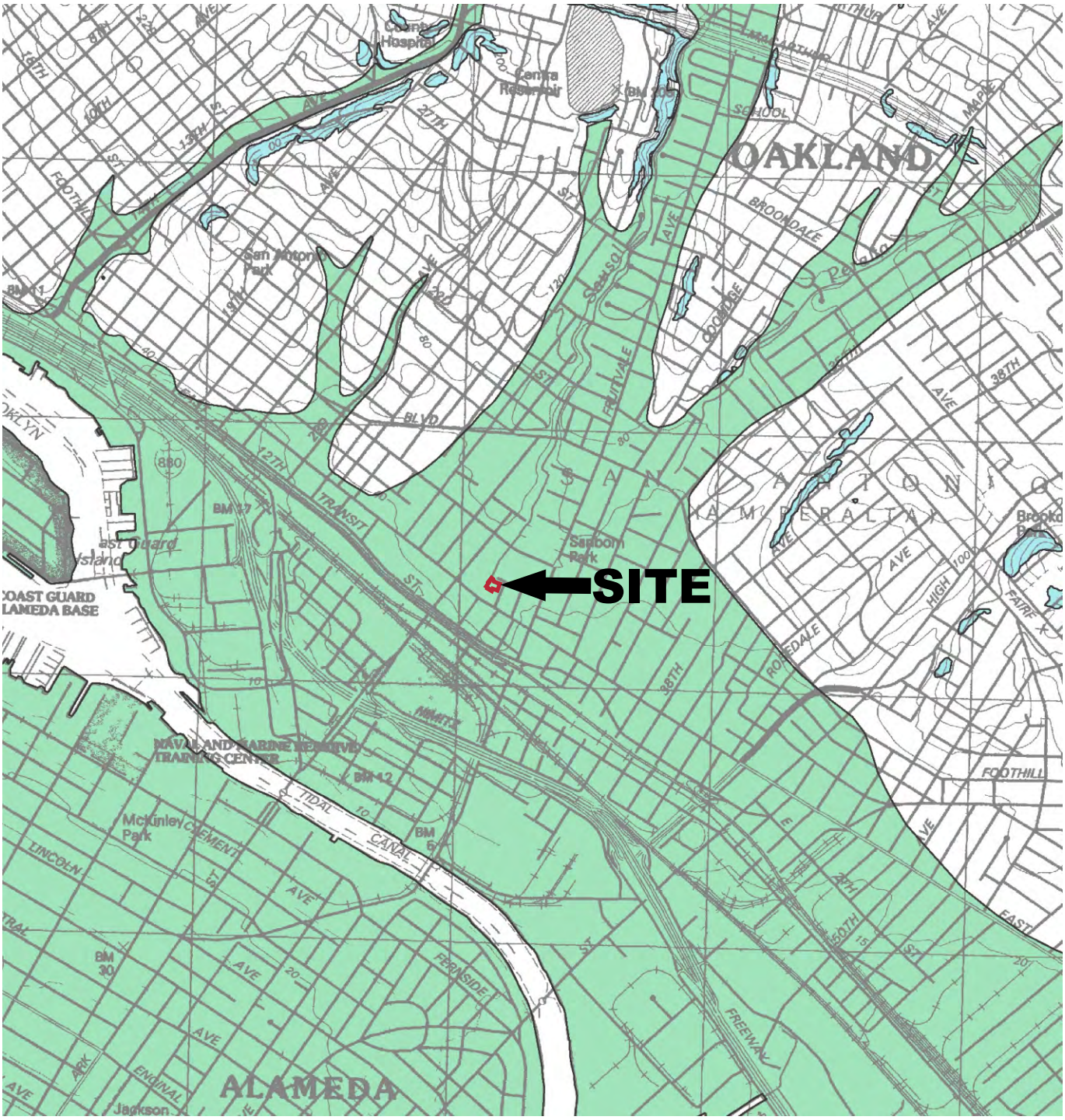
Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

Project Number 729-4-1
Figure Number Figure 7
Drawn By RRN
Date December 2015

Geologic Cross Section B-B'

Eres College Preparatory Academy
Oakland, CA

CORNERSTONE EARTH GROUP



Explanation

Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

N

0 2000 4000

APPROXIMATE SCALE (FEET)

Base by State of California, Seismic Hazard Zones.

CORNERSTONE EARTH GROUP

Seismic Hazard Map

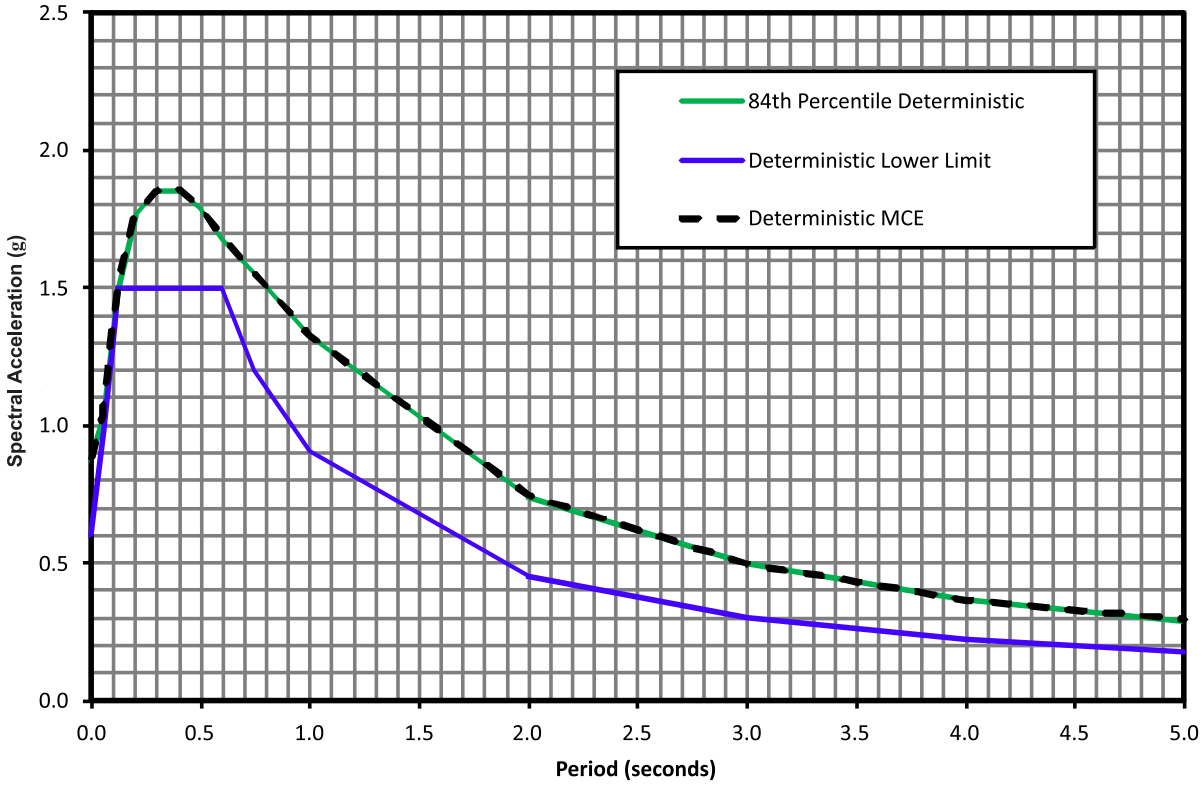
Eres College Preparatory Academy
Oakland, CA

Project Number: 729-4-1

Figure Number: Figure 8

Date: December 2015

Drawn By: RRN



The Deterministic Maximum Considered Earthquake (MCE_R) is defined as the greater of the following at all periods:

- The largest 84th percentile ground motion froma characteristic earthquake on all known active faults, or
- The Deterministic Lower Limit MCE Spectrum – ASCE 7–10, Figure 21.2–1.

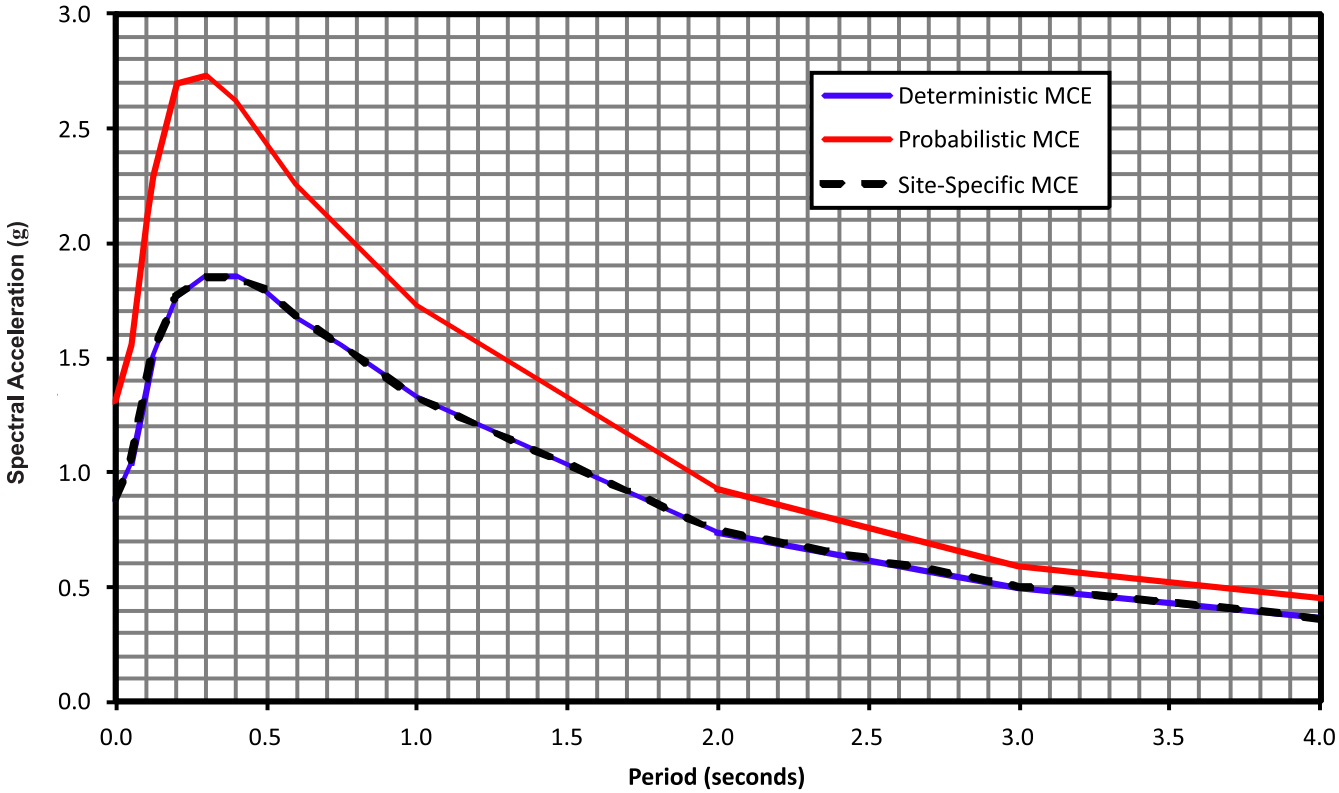
Spectral ordinates are presented in Table 5.

CORNERSTONE EARTH GROUP

Deterministic MCE

Eres College Preparatory Academy
Oakland, CA

Project Number	429-4-1
Figure Number	Figure 9
Date	December 2015
Drawn By	RRN



The Site-Specific Maximum Considered Earthquake is defined as the lesser of the following at all periods:

- Deterministic MCE_R – developed on Figure 9 or
- Probabilistic MCE_R – defined as the 2,475-year ground motion.

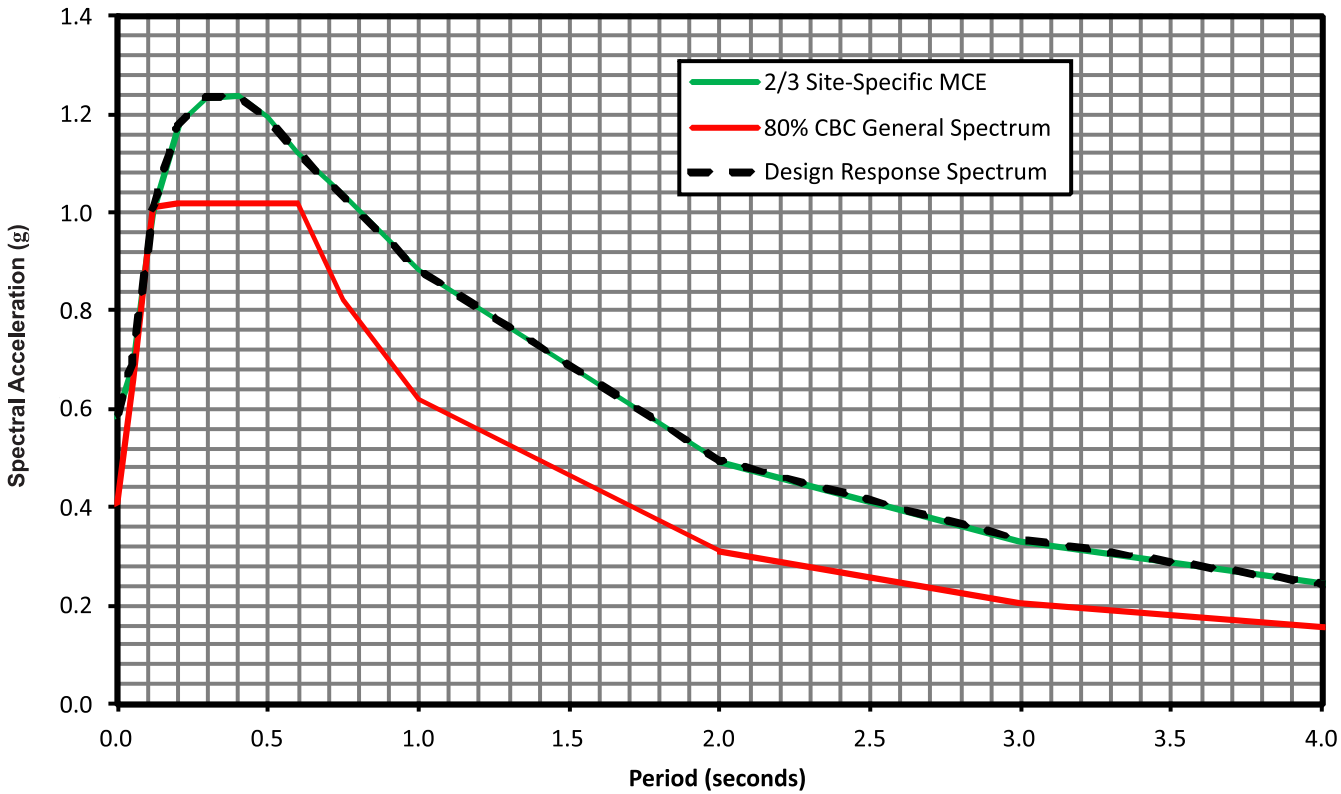
Spectral ordinates are presented in Table 5.

CORNERSTONE EARTH GROUP

Site-Specific MCE

Eres College Preparatory Academy
Oakland, CA

Project Number	429-4-1
Figure Number	Figure 10
Date	December 2015
Drawn By	RRN



The Site-Specific Design Response Spectrum is defined as the greater of the following at all periods:

- 2/3 of the Site-Specific MCE_R – developed on Figure 10, or
- 80% of the CBC General Spectrum.

Spectral ordinates are presented in Table 6.

CORNERSTONE EARTH GROUP

Design Response Spectrum

Eres College Preparatory Academy
Oakland, CA

Project Number	429-4-1
Figure Number	Figure 11
Date	December 2015
Drawn By	RRN

CORNERSTONE EARTH GROUP

FIGURE 12A

CPT NO. 1

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PROJECT/CPT DATA

Project Title	**Eres College Preparatory**
Project No.	**729-4-1**
Project Manager	**NSD**

SEISMIC PARAMETERS

Controlling Fault	**Hayward**	
Earthquake Magnitude (Mw)	**7.1**	
PGA (Amax)	**0.798**	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	**20**
Design Water Depth (feet)	**10**
Ave. Unit Weight Above GW (pcf)	**125**
Ave. Unit Weight Below GW (pcf)	**120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM	10	FEET
	0.01	(Inches)
LIQUEFACTION SETTLEMENT FROM	50	FEET
	0.41	(Inches)
TOTAL SEISMIC SETTLEMENT	**0.4**	**INCHES**

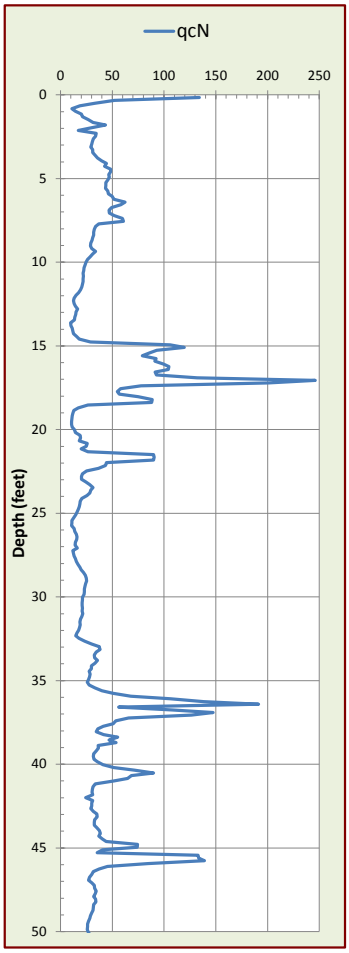
POTENTIAL LATERAL DISPLACEMENT

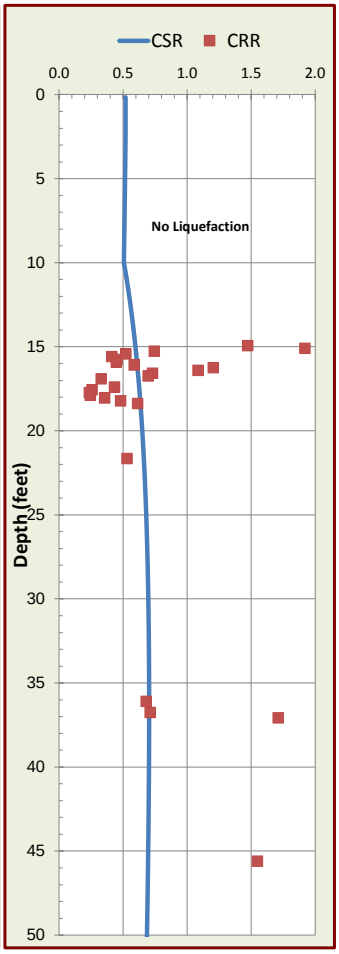
LDI[2]	0.24	L/H	223.3
LDI[1] Corrected for Distance	0.02	(4 < L/H < 40)	

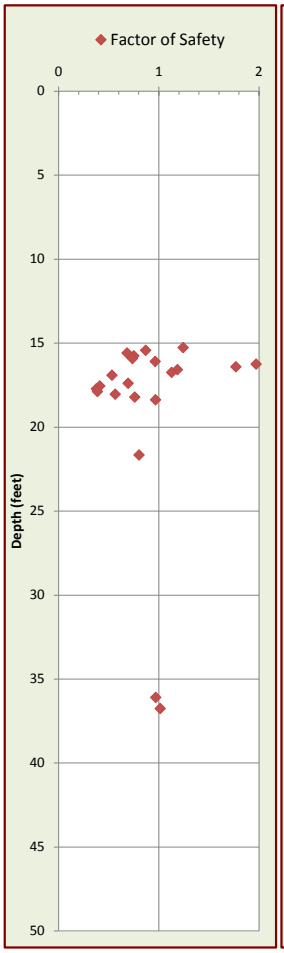
EXPECTED RANGE OF DISPLACEMENT

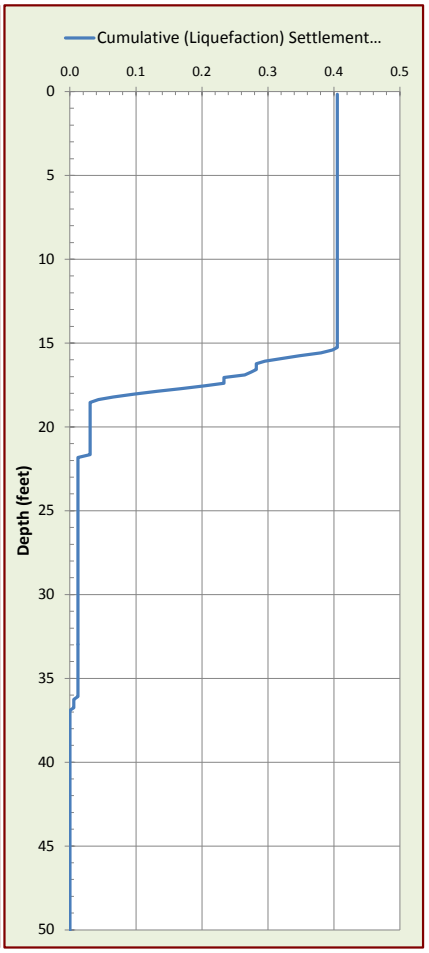
0.0 to **0.0** feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.









CORNERSTONE EARTH GROUP

FIGURE 12B

CPT NO. 2

© 2014 Cornerstone Earth Group, Inc.

PROJECT/CPT DATA

Project Title	**Eres College Preparatory**
Project No.	**729-4-1**
Project Manager	**NSD**

SEISMIC PARAMETERS

Controlling Fault	**Hayward**	
Earthquake Magnitude (Mw)	**7.1**	
PGA (Amax)	**0.798**	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	**20**
Design Water Depth (feet)	**10**
Ave. Unit Weight Above GW (pcf)	**125**
Ave. Unit Weight Below GW (pcf)	**120**

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM	10	FEET
	0.00	(Inches)
LIQUEFACTION SETTLEMENT FROM	50	FEET
	0.66	(Inches)
TOTAL SEISMIC SETTLEMENT	**0.7**	**INCHES**

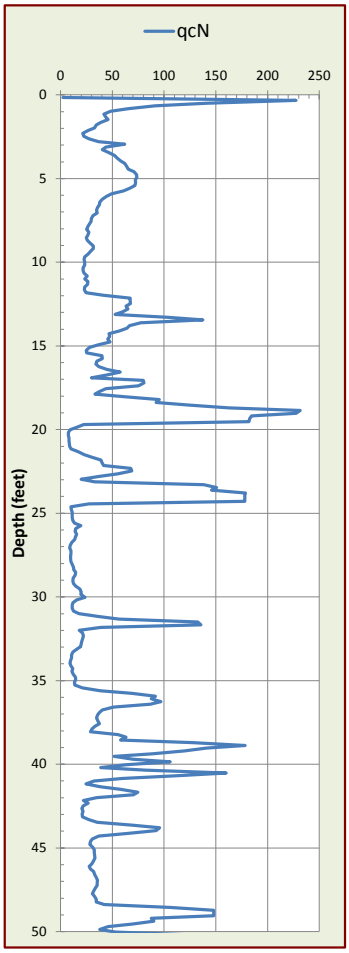
POTENTIAL LATERAL DISPLACEMENT

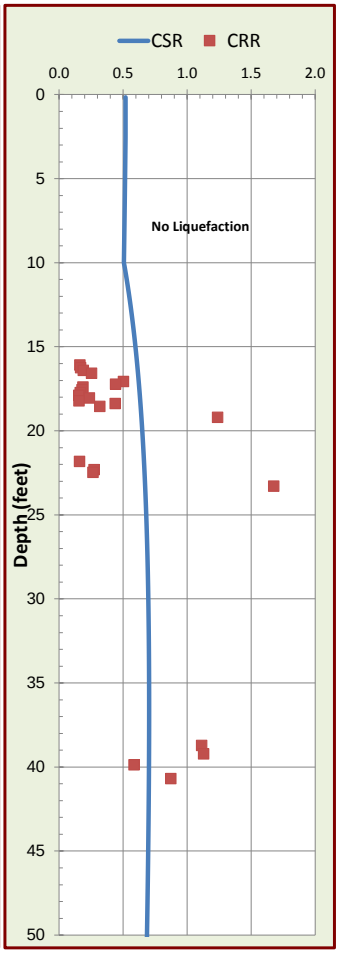
LDI[2]	0.65	L/H	223.3
LDI[1] Corrected for Distance	0.05	(4 < L/H < 40)	

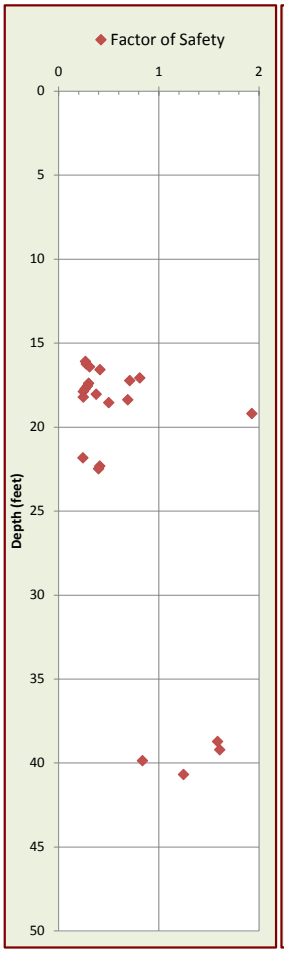
EXPECTED RANGE OF DISPLACEMENT

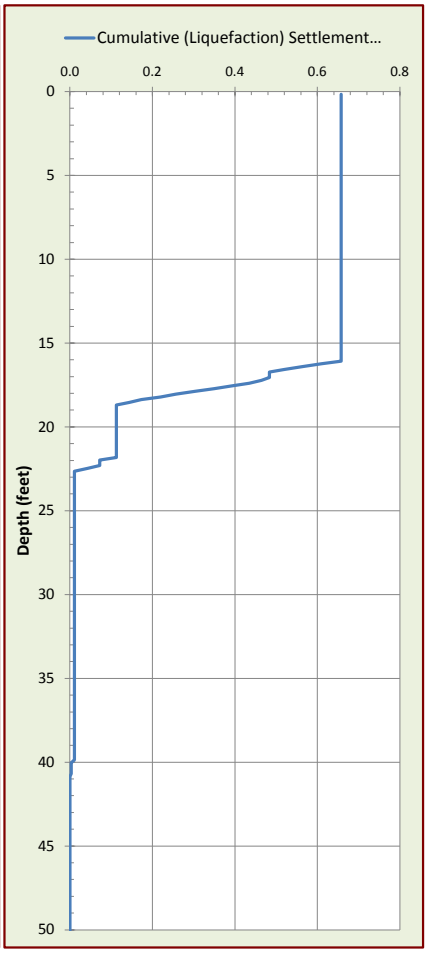
0.0 to **0.1** feet

[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.









CORNERSTONE EARTH GROUP

FIGURE 12C

CPT NO. 3

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PROJECT/CPT DATA

Project Title	Aspire Public Schools - Eres College F
Project No.	729-4-1
Project Manager	NSD

SEISMIC PARAMETERS

Controlling Fault	Hayward	
Earthquake Magnitude (Mw)	7.1	
PGA (Amax)	0.798	(g)

SITE SPECIFIC PARAMETERS

Ground Water Depth at Time of Drilling (feet)	20
Design Water Depth (feet)	10
Ave. Unit Weight Above GW (pcf)	125
Ave. Unit Weight Below GW (pcf)	120

CPT ANALYSIS RESULTS

DRY SAND SETTLEMENT FROM	10	FEET
	0.14	(Inches)
LIQUEFACTION SETTLEMENT FROM	50	FEET
	0.37	(Inches)
TOTAL SEISMIC SETTLEMENT	**0.5**	**INCHES**

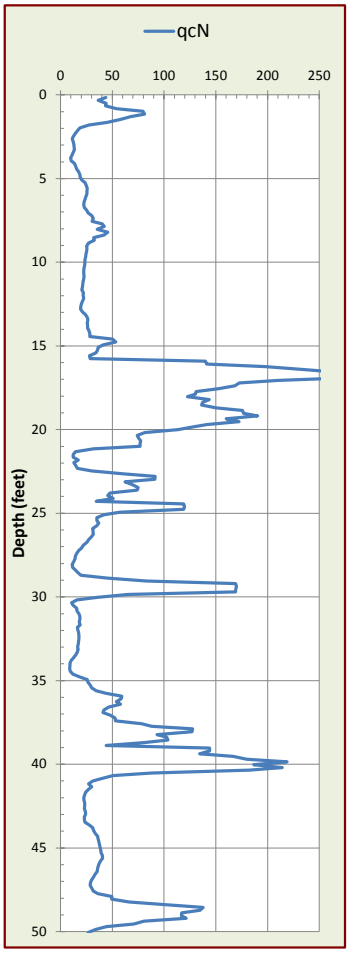
POTENTIAL LATERAL DISPLACEMENT

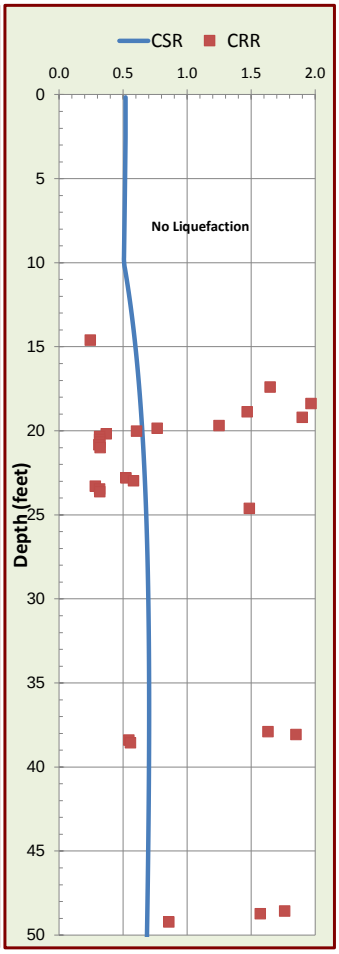
LDI^2	0.26	L/H	223.3
$LDI^1_{\text{Corrected for Distance}}$	0.02	(4 < L/H < 40)	

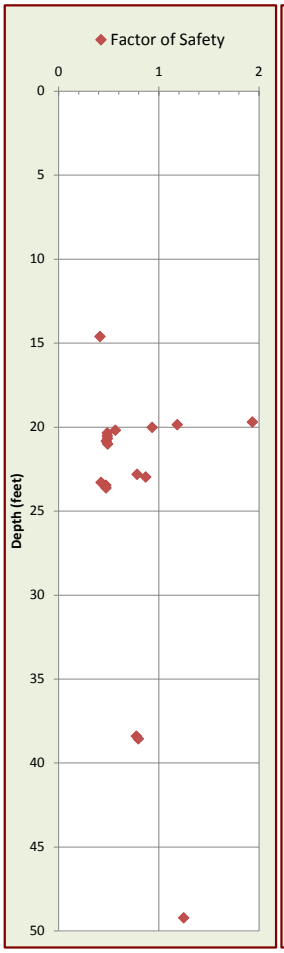
EXPECTED RANGE OF DISPLACEMENT

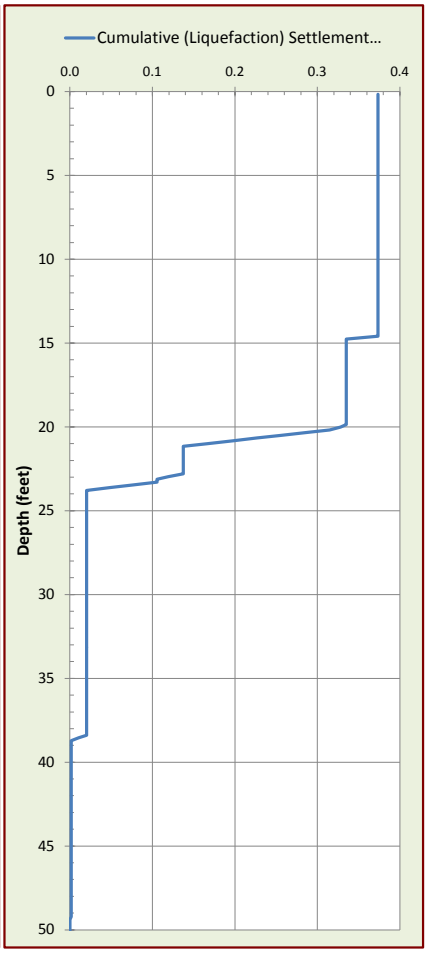
0.0 to 0.0 feet

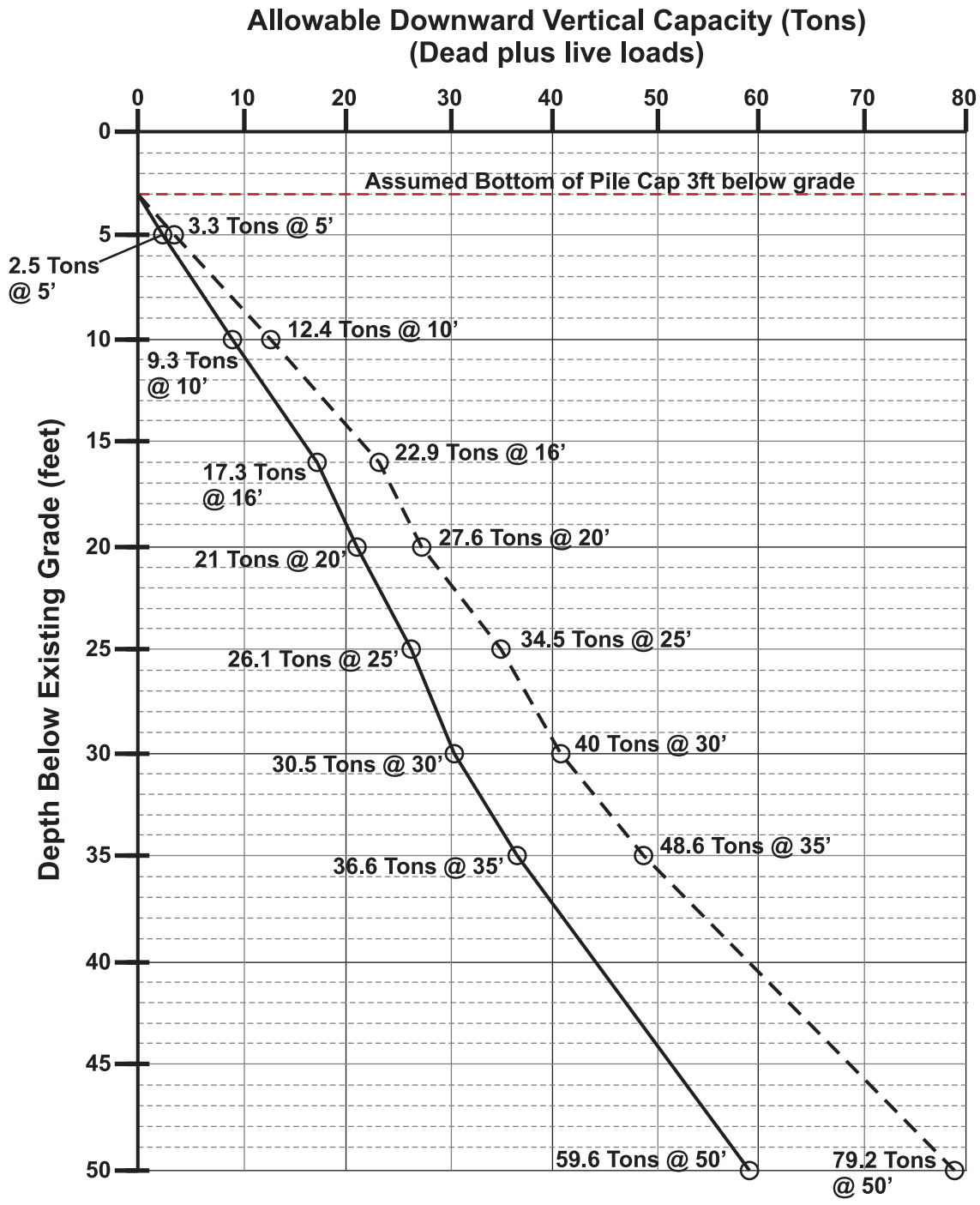
[1]Not Valid for L/H Values < 4 and > 40.
[2]LDI Values Only Summed to 2H Below Grade.











Legend

18 Inch Diameter Drilled Pier

24 Inch Diameter Drilled Pier

CORNERSTONE EARTH GROUP

Vertical Pile Capacity

Eres College Preparatory Academy
Oakland, CA

Project Number: 729-4-1

Figure Number: Figure 13

Date: December 2015

Drawn By: RRN

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using truck-mounted, hollow-stem auger drilling equipment and 20-ton truck-mounted Cone Penetration Test equipment. Two 8-inch-diameter exploratory borings were drilled on December 7, 2015, to depths of 30 to 50 feet. Three CPT soundings were also performed in accordance with ASTM D 5778-95 (revised, 2002) on December 4 and 9, 2015, to depths ranging from 50¾ to 62½ feet. The approximate locations of exploratory borings and CPTs are shown on the Site Plan and Geologic Map, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring and CPT logs, as well as a key to the classification of the soil, are included as part of this appendix.

Boring and CPT locations were approximated using existing site boundaries and other site features as references. Boring and CPT elevations were based on interpolation of plan contours. The locations and elevations of the borings and CPTs should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

The CPT involved advancing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance at the cone tip (q_c) and along the friction sleeve (f_s) at approximately 5-centimeter intervals. Based on the tip resistance and tip to sleeve ratio (R_f), the CPT classified the soil behavior type and estimated engineering properties of the soil, such as equivalent Standard Penetration Test (SPT) blow count, internal friction angle within sand layers, and undrained shear strength in silts and clays. A pressure transducer behind the tip of the CPT cone measured pore water pressure (u_2). Graphical logs of the CPT data is included as part of this appendix.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring and CPT logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring and CPT locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition,

any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

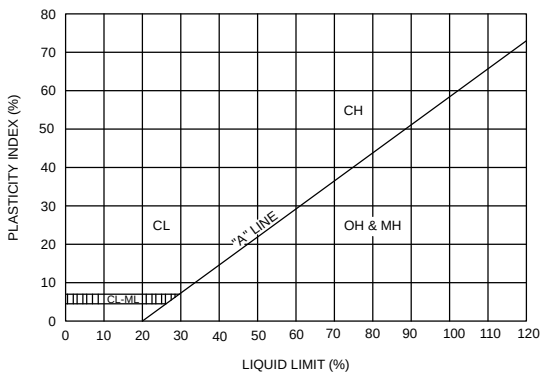
SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW		SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	-	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)		-	
RV	-	R-VALUE	UU		UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE		-	
	-	WATER LEVEL			

PLASTICITY CHART



PENETRATION RESISTANCE
(RECORDED AS BLOWS / FOOT)

SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number A-1

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Eres College Preparatory Academy
PROJECT NUMBER 729-4-1
PROJECT LOCATION 2956 International Blvd., Oakland, CA

DATE STARTED 12/7/15 **DATE COMPLETED** 12/7/15
GROUND ELEVATION 48.9 FT +/- **BORING DEPTH** 30 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc.
LATITUDE 37.779012° **LONGITUDE** -122.227237°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger
GROUND WATER LEVELS:
LOGGED BY PKM
▽ **AT TIME OF DRILLING** 20.5 ft.
NOTES
▼ **AT END OF DRILLING** 20.5 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE
48.9	0	1½ inches asphalt concrete over 3 inches aggregate base						
48.7		**Silty Sand (SM) [Fill]**						
48.5		loose, moist, brown, fine sand	10	MC-1B	94	19		
46.9		**Lean Clay (CL) [Fill]**						
		soft, moist, brown, fine sand, moderate plasticity	8	MC-2B	84	34	34	
45.4		**Fat Clay (CH)**						
	5	medium stiff to stiff, moist, dark gray brown, some fine sand, high plasticity	21	MC-3B	102	22		
		Liquid Limit = 56, Plastic Limit = 22						
41.4		**Lean Clay (CL)**						
		very stiff, moist, brown, some fine sand, moderate plasticity	29	MC-4B	101	23		
	10							
34.4		**Poorly Graded Sand with Clay (SP-SC)**	41	MC-5B	117	8		
	15	medium dense, moist, brown, fine to coarse sand, some fine subangular to subrounded gravel	30	SPT				
33.4		**Lean Clay with Sand (CL)**						
31.7		very stiff, moist, brown, fine sand, moderate plasticity	34	SPT				
		Clayey Sand (SC)						
	20	dense to medium dense, moist, brown, fine to coarse sand, trace (<5%) fine (<¾") subangular to subrounded gravel	26	MC-8B	111	17		
			35	MC-9B	122	13		
	25							
22.9								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

Continued Next Page

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 1/18/16 11:30 - P:\DRAFTING\GINT FILES\729-4-1 ASPIRE ERES PREP.GPJ

BORING NUMBER EB-1

CORNERSTONE EARTH GROUP

PROJECT NAME Eres College Preparatory Academy

PROJECT NUMBER 729-4-1

PROJECT LOCATION 2956 International Blvd., Oakland, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf (○ HAND PENETROMETER, △ TORVANE, ● UNCONFINED COMPRESSION, ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL; 1.0 2.0 3.0 4.0)
22.9			**Clayey Sand (SC)** dense to medium dense, moist, brown, fine to coarse sand, trace (<5%) fine (<¾") subangular to subrounded gravel							
				51	MC-10B	120	16			
18.9	30		Bottom of Boring at 30.0 feet.							
	35									
	40									
	45									
	50									
	55									

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 1/18/16 11:30 - P:\DRAFTING\GINT FILES\729-4-1 ASPIRE ERES PREP.GPJ

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Eres College Preparatory Academy
PROJECT NUMBER 729-4-1
PROJECT LOCATION 2956 International Blvd., Oakland, CA

DATE STARTED 12/7/15 **DATE COMPLETED** 12/7/15
GROUND ELEVATION 50.2 FT +/- **BORING DEPTH** 50 ft.
DRILLING CONTRACTOR Exploration Geoservices, Inc. **LATITUDE** 37.779340° **LONGITUDE** -122.227408°
DRILLING METHOD Mobile B-53, 8 inch Hollow-Stem Auger **GROUND WATER LEVELS:**
LOGGED BY PKM ▽ **AT TIME OF DRILLING** 25.5 ft.
NOTES ▼ **AT END OF DRILLING** 42 ft.

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
50.2	0	4½ inches asphalt concrete over 4 inches aggregate base							
49.9									
49.5		**Lean Clay with Sand (CL) [Fill]** hard, moist, dark brown and brown mottled, fine to coarse sand, moderate plasticity	30	MC-1B	111	13			>4.5
47.2		**Sandy Lean Clay (CL)** very stiff, moist, brown, fine to coarse sand, low plasticity	12	MC-2B	88	13		64	
	5		14	MC-3	105	12			
44.2		**Lean Clay (CL)** hard, moist, brown, some fine sand, moderate plasticity							
42.2		**Sandy Lean Clay (CL)** hard, moist, brown, fine to coarse sand, low plasticity	20	MC-4B	111	14			>4.5
	10		21	MC-5B	107	17			
38.2		**Lean Clay with Sand (CL)** very stiff, moist, brown, fine sand, moderate plasticity Liquid Limit = 47, Plastic Limit = 16	31	MC-6B	104	21	31		
	15		23	MC-7B	101	12			
34.2		**Poorly Graded Sand with Silt (SP-SM)** medium dense, moist, brown, fine to coarse sand							
33.2		**Silty Sand (SM)** loose, moist, brown, fine to medium sand	10	SPT-8		17		22	
30.7		**Lean Clay (CL)** medium stiff, moist, brown, some fine sand, moderate plasticity	9	SPT					
	20	Liquid Limit = 43, Plastic Limit = 16	15	MC-10B	97	26	27		
			15	MC-11B	101	25			
24.7	25	▽							
24.2									

Continued Next Page

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 1/18/16 11:30 - P:\DRAFTING\GINT FILES\729-4-1 ASPIRE ERES PREP.GPJ

BORING NUMBER EB-2

CORNERSTONE EARTH GROUP

PROJECT NAME Eres College Preparatory Academy

PROJECT NUMBER 729-4-1

PROJECT LOCATION 2956 International Blvd., Oakland, CA

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX, %	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
24.2		**Poorly Graded Sand with Clay (SP-SC)** medium dense, moist, brown, fine to coarse sand, trace (<5%) fine (<¾") subangular to subrounded gravel							
			49	MC-12B	126	10			
20.5	30	**Lean Clay (CL)** very stiff, moist, brown with gray mottles, some fine sand, moderate plasticity							
			23	MC-13B	102	23			3.0
	35								
		becomes hard	74	MC-14B	109	18			>4.5
	40								
8.2		**Sandy Lean Clay (CL)** hard, moist, brown with gray mottles, fine sand, low plasticity							
			32	SPT					>4.5
	45								
			61	MC-16B	113	18			>4.5
0.7									
0.2	50	**Lean Clay (CL)** hard, moist, brown, some fine to medium sand, moderate plasticity							
		Bottom of Boring at 50.0 feet.							
	55								

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

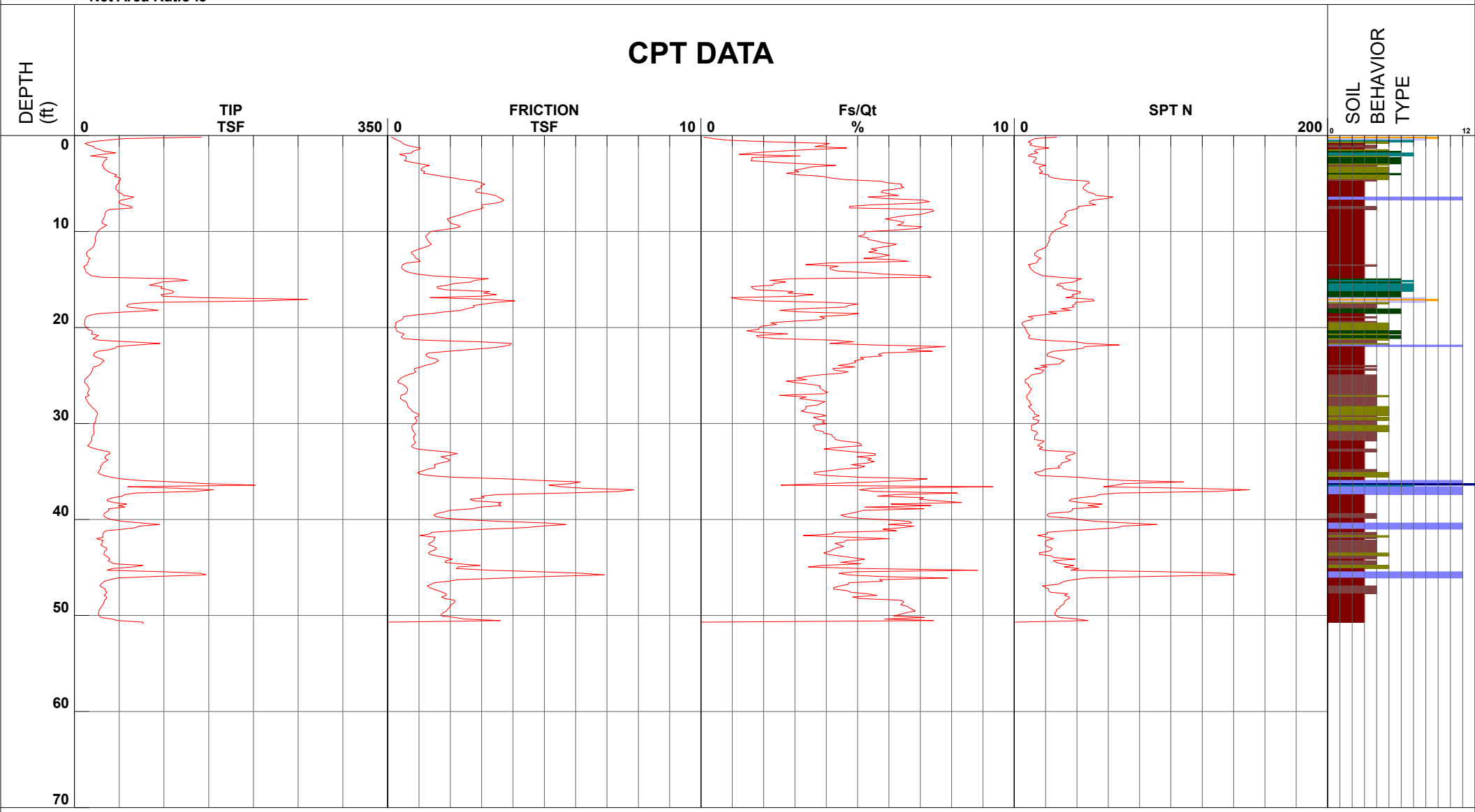
CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 1/18/16 11:30 - P:\DRAFTING\GINT FILES\729-4-1 ASPIRE ERES PREP.GPJ

Cornerstone Earth Group

Project	Aspire Eres College	Operator	CB-JB	Filename	SDF(291).cpt
Job Number	729-4-1	Cone Number	DDG1281	GPS	
Hole Number	CPT-01	Date and Time	12/9/2015 7:25:12 AM	Maximum Depth	50.85 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

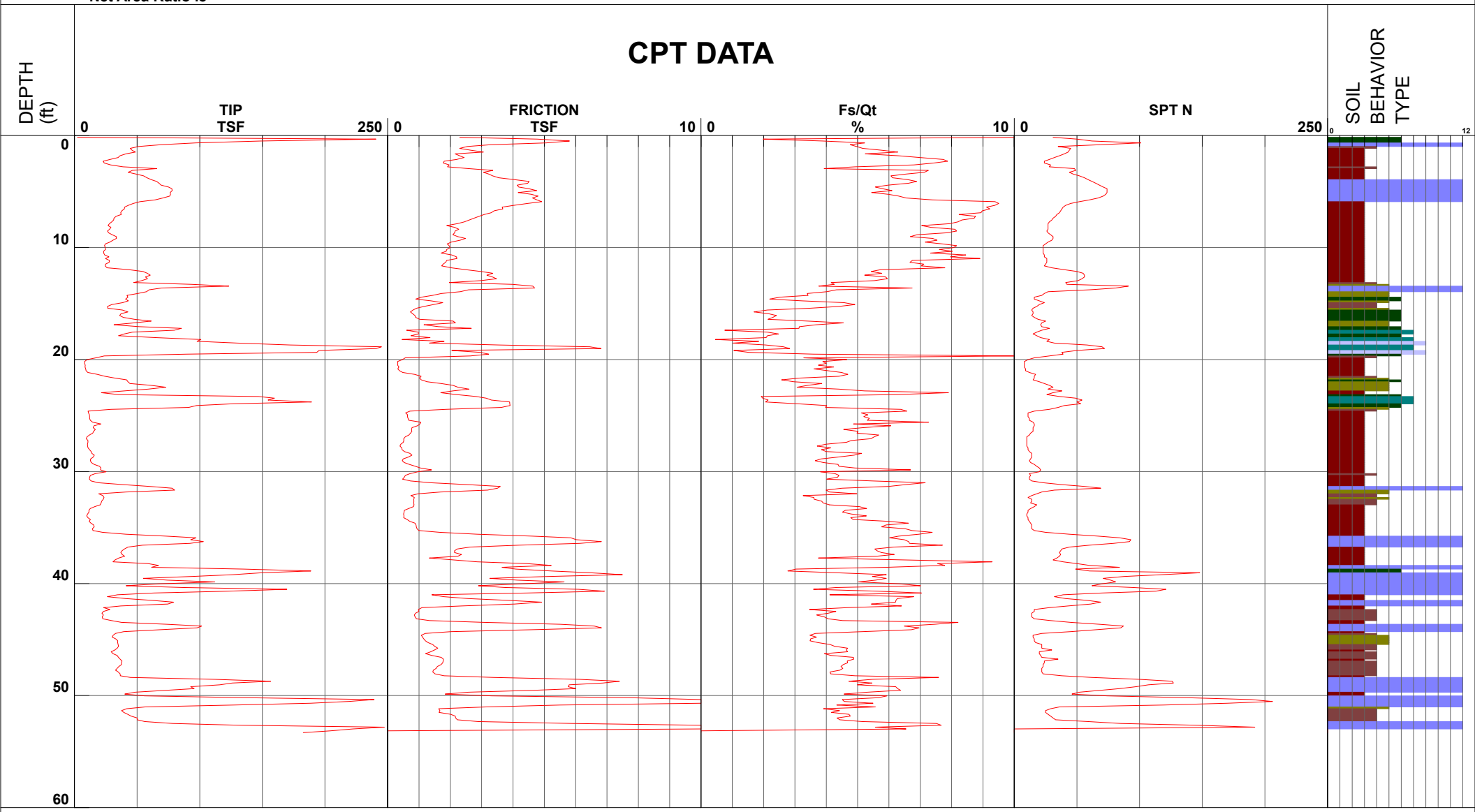
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Aspire Eres College	Operator	CB-JB	Filename	SDF(256).cpt
Job Number	729-4-1	Cone Number	DDG1281	GPS	
Hole Number	CPT-02	Date and Time	12/2/2015 1:44:06 PM	Maximum Depth	53.31 ft
EST GW Depth During Test		53.31 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

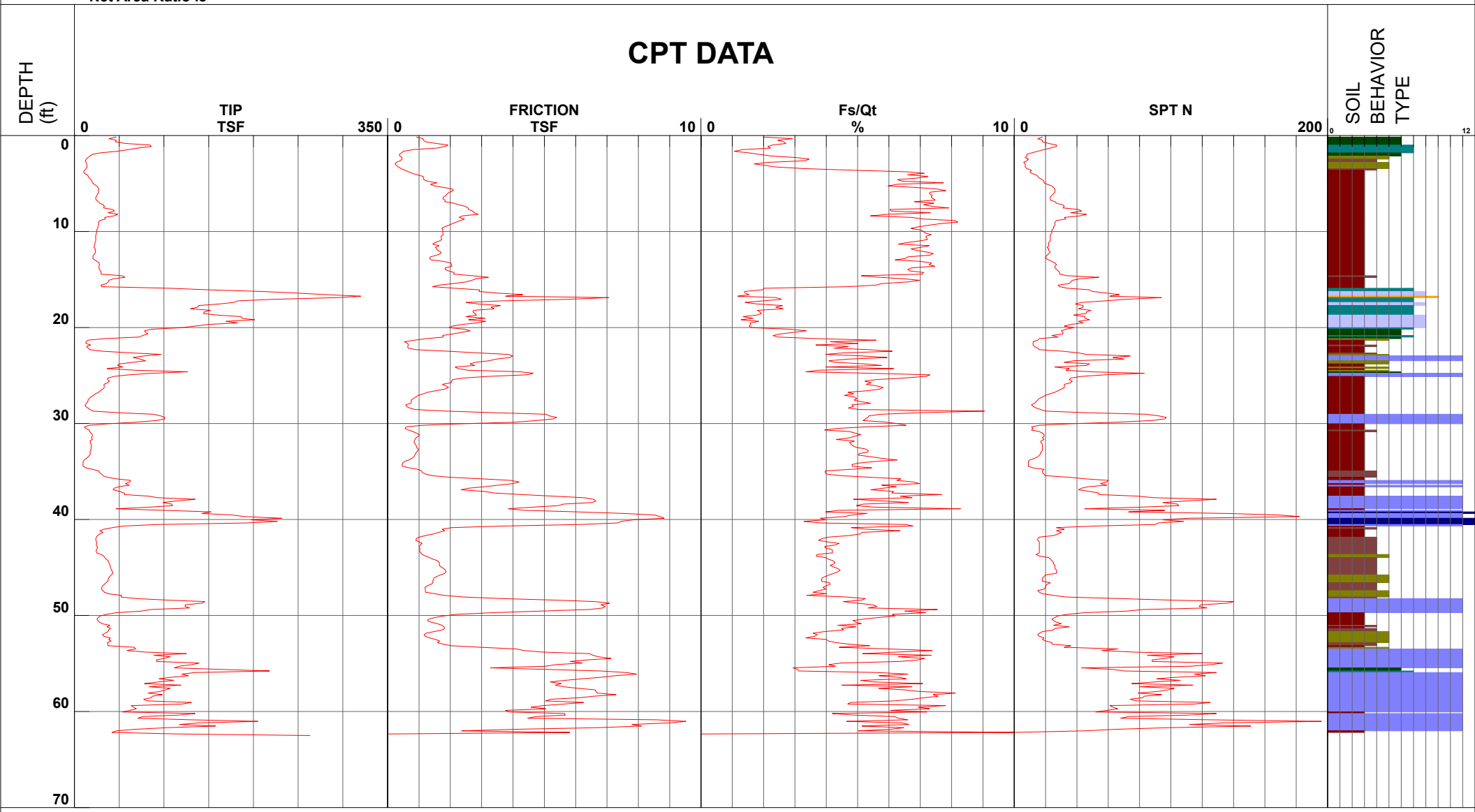
S*Soil behavior type and SPT based on data from UBC-1983

Cornerstone Earth Group

Project	Aspire Eres College	Operator	CB-JB	Filename	SDF(292).cpt
Job Number	729-4-1	Cone Number	DDG1281	GPS	
Hole Number	CPT-03	Date and Time	12/9/2015 8:14:00 AM	Maximum Depth	62.50 ft
EST GW Depth During Test		14.00 ft			

Net Area Ratio .8

CPT DATA



1 - sensitive fine grained
2 - organic material
3 - clay
4 - silty clay to clay
5 - clayey silt to silty clay
6 - sandy silt to clayey silt
7 - silty sand to sandy silt
8 - sand to silty sand
9 - sand
10 - gravelly sand to sand
11 - very stiff fine grained (*)
12 - sand to clayey sand (*)

Cone Size 10cm squared

S*Soil behavior type and SPT based on data from UBC-1983

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 22 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 21 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

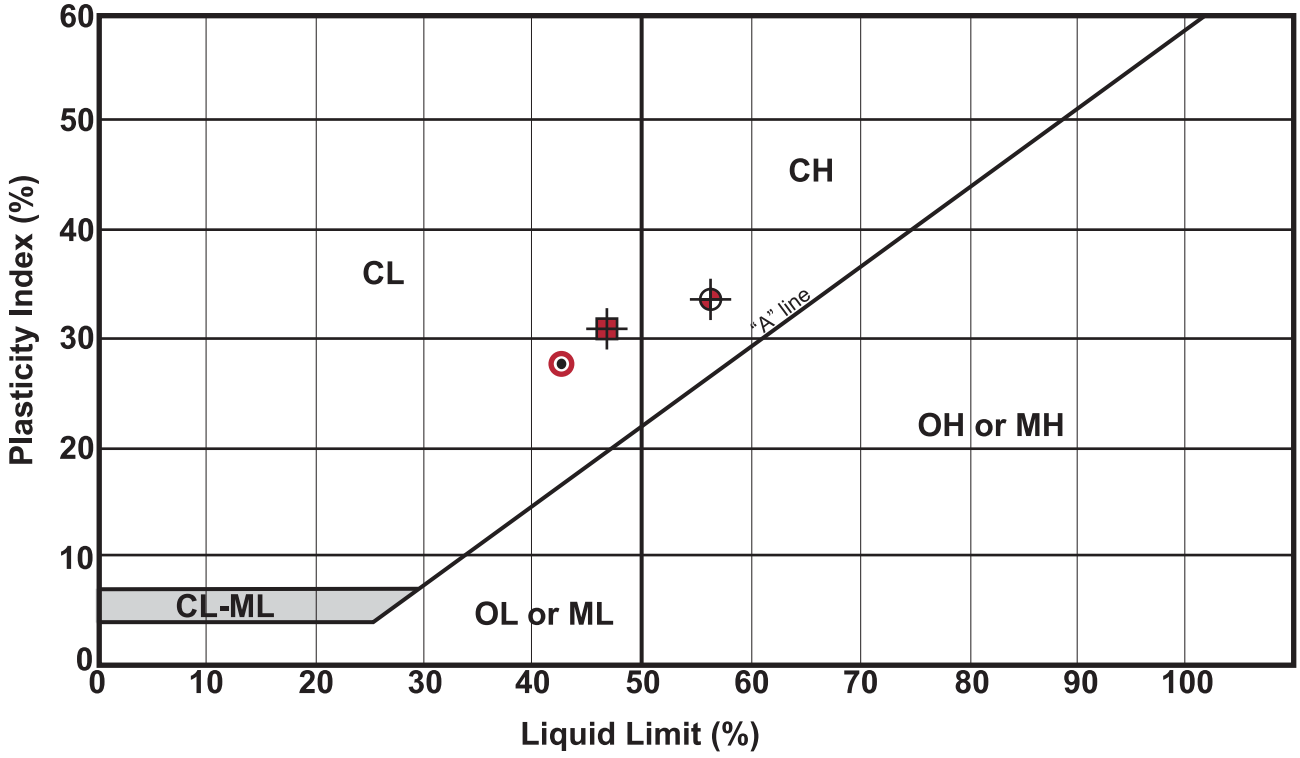
Washed Sieve Analyses: The percent soil fraction passing the No. 200 sieve (ASTM D1140) was determined on two samples of the subsurface soils to aid in the classification of these soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: Three Plasticity Index determinations (ASTM D4318) were performed on samples of the subsurface soils to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of these tests are shown on the boring logs at the appropriate sample depths.

Undrained-Unconsolidated Triaxial Shear Strength: The undrained shear strength was determined on one relatively undisturbed sample by unconsolidated-undrained triaxial shear strength testing (ASTM D2850). The results of this test are included as part of this appendix.

Corrosion: One soluble sulfate determination (ASTM D4327), one resistivity test (ASTM G57), one chloride determination (ASTM D4327), and one pH determination (ASTM G51) were performed on a sample of the subsurface soil. Results of these tests are attached in this appendix.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-1	4.0	34	56	22	34	—	Fat Clay (CH)
⊞	EB-2	14.0	21	47	16	31	—	Lean Clay with Sand (CL)
◎	EB-2	22.0	26	43	16	27	—	Lean Clay (CL)

CORNERSTONE EARTH GROUP

Plasticity Index Testing Summary

Eres College Preparatory Academy
Oakland, CA

Project Number: 729-4-1

Figure Number: Figure B1

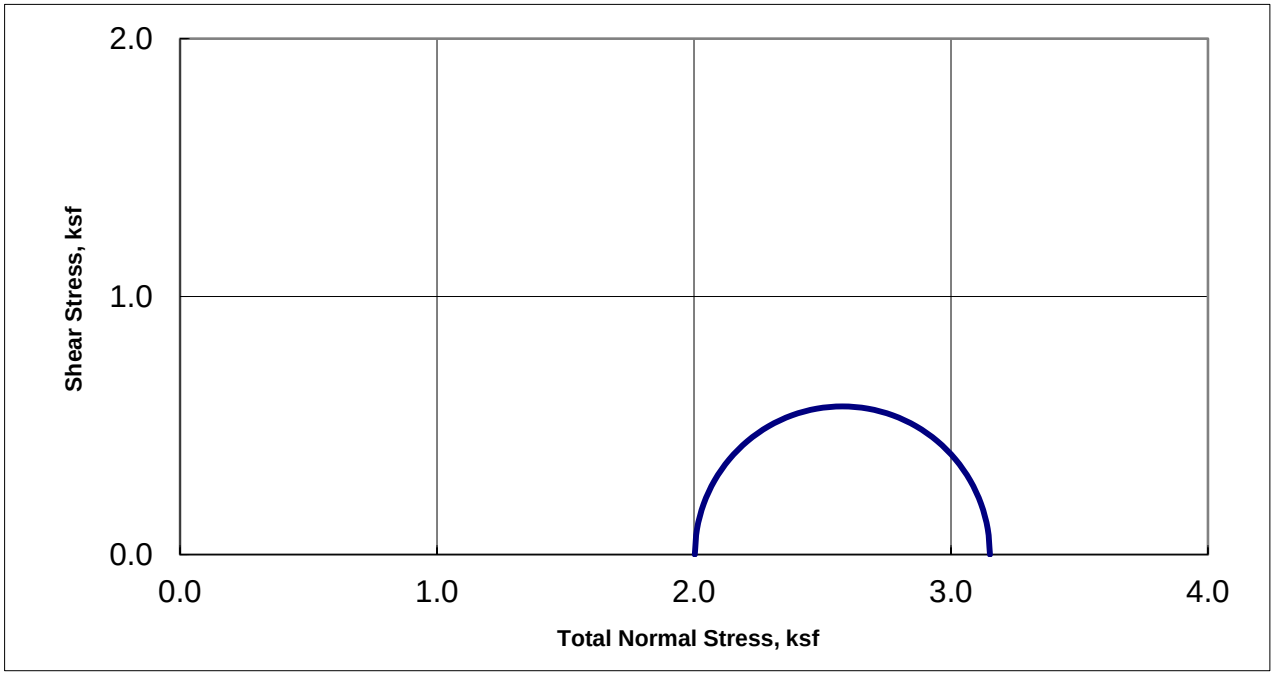
Date: December 2015

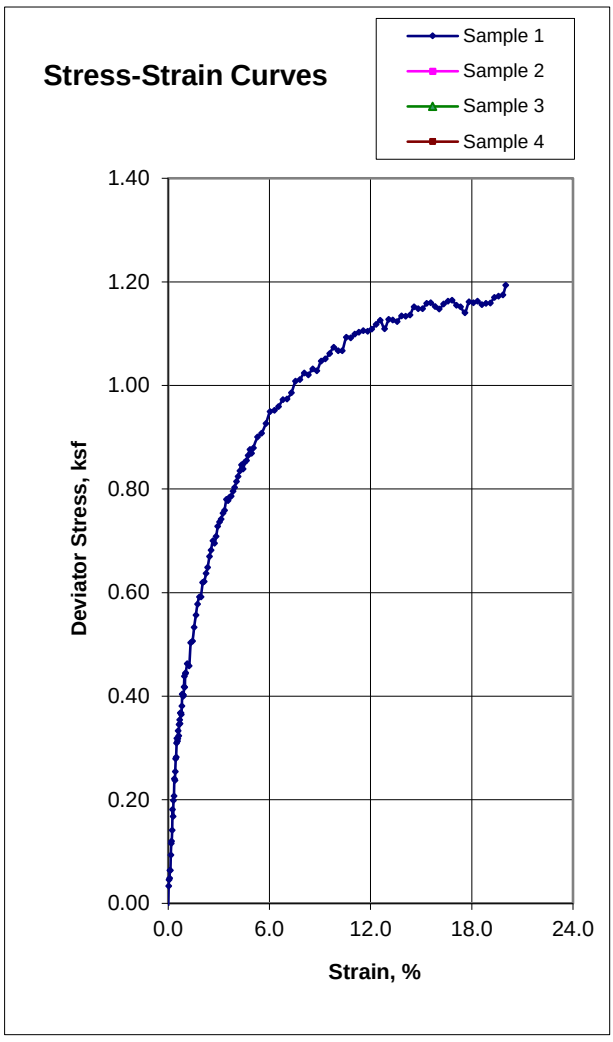
Drawn By: FLL

Cooper Testing Labs, Inc.
937 Commercial Street
Palo Alto, CA 94303

Unconsolidated-Undrained Triaxial Test

ASTM D2850





Sample Data	1	2	3	4
Moisture %	25.3			
Dry Den,pcf	101.2			
Void Ratio	0.727			
Saturation %	97.6			
Height in	5.02			
Diameter in	2.41			
Cell psi	13.9			
Strain %	15.00			
Deviator, ksf	1.149			
Rate %/min	1.00			
in/min	0.050			
Job No.:	640-916			
Client:	Cornerstone Earth Group			
Project:	Aspire Oakland Eres - 729-4-1			
Boring:	EB-2			
Sample:	11B			
Depth ft:	24.5			

Visual Soil Description	
Sample #	
1	Olive Brown Clayey SAND w/ Gravel
2	
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

Corrosivity Tests Summary

CTL # 640-923 **Date:** 12/22/2015 **Tested By:** PJ **Checked:** PJ

Client: Cornerstone Earth Group **Project:** Apire Eres Oakland **Proj. No:** 729-4-1

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP (Redox)		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%				Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
EB-1	2A	3.5	-	-	2,255	3	118	0.0118	7.4	-	-	-	32.8	Dark Brown Sandy CLAY

APPENDIX C: LIQUEFACTION ANALYSES CALCULATIONS

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.80

Total Settlement: 0.41 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.160	142.040	0.126	20.0	20.0	1380.821	0.089	0.37		Unsaturated	0.0			134.25	1.70	228.23	228.23	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	55.040	0.211	41.3	41.3	372.457	0.384	1.21		Unsaturated	0.0			52.02	1.70	88.44	88.44	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	35.240	0.312	61.3	61.3	195.604	0.886	1.66		Unsaturated	0.0			33.31	1.70	56.62	56.62	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	19.690	0.431	82.5	82.5	94.055	2.193	2.16		Unsaturated	36.0			18.61	1.70	31.64	78.54	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	11.780	0.483	102.5	102.5	50.369	4.117	2.55		Unsaturated	66.8			11.13	1.70	18.93	74.46	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	15.200	0.595	122.5	122.5	59.469	3.928	2.48		Unsaturated	61.7			14.37	1.70	24.42	80.40	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	21.570	0.782	143.8	143.8	77.959	3.639	2.38		Unsaturated	53.4			20.39	1.70	34.66	91.08	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	22.490	1.045	163.8	163.8	76.135	4.663	2.47		Unsaturated	60.4			21.26	1.70	36.14	95.10	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	28.470	0.986	185.0	185.0	90.711	3.474	2.32		Unsaturated	48.7			26.91	1.70	45.75	103.31	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	33.190	0.794	205.0	205.0	100.475	2.399	2.17		Unsaturated	36.7			31.37	1.70	53.33	105.75	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	45.940	0.777	225.0	225.0	132.833	1.696	1.98		Unsaturated	21.3			43.42	1.70	73.82	110.01	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	30.930	0.377	246.3	246.3	85.356	1.225	2.02		Unsaturated	24.6			29.23	1.70	49.70	87.94	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	18.040	0.570	266.3	266.3	47.714	3.185	2.49		Unsaturated	61.8			17.05	1.70	28.99	86.30	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	36.390	0.593	287.5	287.5	92.943	1.635	2.08		Unsaturated	29.1			34.40	1.70	58.47	104.52	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	36.010	0.586	307.5	307.5	88.903	1.634	2.09		Unsaturated	30.2			34.04	1.70	57.86	105.09	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	33.610	0.538	327.5	327.5	80.355	1.608	2.12		Unsaturated	32.4			31.77	1.70	54.00	102.75	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	32.570	0.779	348.8	348.8	75.423	2.404	2.26		Unsaturated	43.6			30.78	1.70	52.33	109.10	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	32.010	1.054	368.8	368.8	72.058	3.311	2.37		Unsaturated	52.8			30.26	1.70	51.43	112.17	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	30.920	1.330	390.0	390.0	67.644	4.329	2.48		Unsaturated	61.2			29.22	1.70	49.68	112.65	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	32.920	1.157	410.0	410.0	70.247	3.535	2.40		Unsaturated	55.0			31.12	1.70	52.90	114.86	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	32.940	1.079	430.0	430.0	68.615	3.297	2.39		Unsaturated	53.8			31.13	1.70	52.93	114.46	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	35.510	1.060	451.3	451.3	72.218	3.004	2.34		Unsaturated	50.3			33.56	1.70	57.06	118.29	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	37.900	1.185	471.3	471.3	75.436	3.147	2.34		Unsaturated	50.4			35.82	1.70	60.90	123.21	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	41.930	1.145	492.5	492.5	81.665	2.747	2.28		Unsaturated	45.1			39.63	1.70	67.37	128.74	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	46.870	1.470	512.5	512.5	89.524	3.153	2.29		Unsaturated	46.4			44.30	1.70	75.31	139.47	1.00	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	45.060	1.757	533.8	533.8	84.297	3.922	2.38		Unsaturated	53.6			42.59	1.70	72.40	139.12	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	51.160	2.125	553.8	553.8	94.013	4.177	2.37		Unsaturated	52.8			48.36	1.70	82.20	151.26	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	51.360	2.388	573.8	573.8	92.705	4.676	2.41		Unsaturated	56.2			48.54	1.69	81.80	152.10	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	49.300	2.825	595.0	595.0	87.344	5.765	2.50		Unsaturated	63.2			46.60	1.67	77.83	149.34	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	49.820	2.970	615.0	615.0	86.806	5.998	2.52		Unsaturated	64.4			47.09	1.65	77.60	149.39	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	48.260	3.093	636.3	636.3	82.637	6.451	2.56		Unsaturated	67.4			45.61	1.64	74.60	146.33	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	46.480	2.970	656.3	656.3	78.330	6.435	2.57		Unsaturated	68.5			43.93	1.63	71.48	142.57	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	46.400	3.006	676.3	676.3	77.012	6.526	2.58		Unsaturated	69.3			43.86	1.61	70.60	141.61	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	46.160	2.870	697.5	697.5	75.418	6.265	2.57		Unsaturated	68.6			43.63	1.59	69.54	140.08	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	48.320	2.804	717.5	717.5	77.849	5.846	2.54		Unsaturated	66.0			45.67	1.57	71.65	142.17	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	48.990	2.825	738.8	738.8	77.776	5.810	2.54		Unsaturated	65.9			46.30	1.55	71.75	142.27	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	53.000	3.163	758.8	758.8	83.057	6.011	2.53		Unsaturated	65.4			50.09	1.52	76.05	147.68	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	54.510	3.437	778.8	778.8	84.321	6.350	2.54		Unsaturated	66.6			51.52	1.50	77.17	149.43	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	66.100	3.532	800.0	800.0	100.993	5.375	2.44		Unsaturated	58.2			62.48	1.45	90.51	163.96	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	61.650	3.617	820.0	820.0	92.982	5.906	2.49		Unsaturated	62.5			58.27	1.45	84.41	157.60	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.730	52.160	3.706	841.3	841.3	93.271	7.163	2.56		Unsaturated	67.8			49.30	1.47	72.25	143.40	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.890	49.730	3.625	861.3	861.3	87.423	7.354	2.59		Unsaturated	69.9			47.00	1.46	68.65	139.25	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.050	50.000	3.443	881.3	881.3	86.483	6.946	2.57		Unsaturated	68.5			47.26	1.45	68.42	138.64	0.99	0.511	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.220	54.780	2.999	902.5	902.5	78.628	5.519	2.52		Unsaturated	64.2			51.78	1.42	73.61	144.22	0.99	0.511	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.380	63.440	3.005	922.5	922.5	90.154	4.771	2.43		Unsaturated	57.3			59.96	1.39	83.30	154.44	0.98	0.511	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.550	64.400	3.053	943.8	943.8	90.476	4.776	2.43		Unsaturated	57.3			60.87	1.38	83.75	154.99	0.98	0.510	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.710	39.200	2.895	963.8	963.8	80.349	7.476	2.61		Unsaturated	72.1			37.05	1.43	53.10	119.61	0.98	0.510	1.098	n.a.	n.a.	n.a.	0.00	0.00
7.870	35.890	2.669	983.8	983.8	71.966	7.539	2.65		Unsaturated	74.7			33.92	1.43	48.55	114.21	0.98	0.510	1.091	n.a.	n.a.	n.a.	0.00	0.00
8.040	34.540	2.493	1005.0	1005.0	67.736	7.323	2.65		Unsaturated	75.2			32.65	1.42	46.45	111.57	0.98	0.510	1.087	n.a.	n.a.	n.a.	0.00	0.00
8.200	33.910	2.379	1025.0	1025.0	65.166	7.123	2.65		Unsaturated	75.2			32.05	1.41	45.28	110.07	0.98	0.509	1.083	n.a.	n.a.	n.a.	0.00	0.00
8.370	34.030	2.203	1046.3	1046.3	64.051	6.574	2.63		Unsaturated	73.4			32.16	1.40	45.04	109.44	0.98	0.509	1.081	n.a.	n.a.	n.a.	0.00	0.00
8.530	33.000	2.035	1066.3	1066.3	60.899	6.267	2.63		Unsaturated	73.3			31.19	1.39	43.41	107.31	0.98	0.509	1.077	n.a.	n.a.	n.a.	0.00	0.00
8.690	32.330	1.904	1086.3	1086.3	58.526	5.989	2.62		Unsaturated	73.0			30.56	1.38	42.24	105.74	0.98	0.508	1.074	n.a.	n.a.	n.a.	0.00	0.00
8.860	31.120	1.935	1107.5	1107.5	55.199	6.330	2.66		Unsaturated	75.7			29.41	1.37	40.39	103.82	0.98	0.508	1.071	n.a.	n.a.	n.a.	0.00	0.00
9.020	30.550	1.982	1127.5	1127.5	53.191	6.610	2.68		Unsaturated	77.7			28.88	1.36	39.36	102.81	0.98	0.508	1.068	n.a.	n.a.	n.a.	0.00	0.00
9.190	31.780	2.046	1148.8	1148.8	54.330	6.556	2.68		Unsaturated	77.0			30.04	1.35	40.50	104.17	0.98	0.507	1.067	n.a.	n.a.	n.a.	0.00	0.00
9.350	35.980	2.260	1168.8	1168.8	60.570	6.386	2.64		Unsaturated	73.9			34.01	1.33	45.15	109.67	0.98	0.507	1.068	n.a.	n.a.	n.a.	0.00	0.00
9.510	32.870	2.319	1188.8	1188.8	54.302	7.184	2.71		Unsaturated	79.5			31.07	1.32	41.13	105.38	0.98	0.507	1.064	n.a.	n.a.	n.a.	0.00	0.00
9.680	30.160	2.095	1210.0	1210.0	48.851	7.088	2.73		Unsaturated	81.5			28.51	1.32	37.61	101.10	0.98	0.506	1.060	n.a.	n.a.	n.a.	0.00	0.00
9.840	27.560	1.728	1230.0	1230.0	43.813	6.413	2.73		Unsaturated	81.4			26.05	1.32	34.27	96.74	0.98	0.506	1.056	n.a.	n.a.	n.a.	0.00	0.00
10.010	26.030	1.370	1251.3	1251.3	40.606	5.391	2.70		Clay	78.8			24.60	1.15	n.a.	n.a.	0.98	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.170	25.010	1.312	1271.3	1271.3	38.347	5.384	2.71		Clay	80.1			23.64	1.14	n.a.	n.a.	0.97	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.330	24.250	1.264	1291.3	1291.3	36.561	5.353	2.73		Clay	81.1			22.92	1.14	n.a.	n.a.	0.97	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.500	23.920	1.206	1312.5	1312.5	35.450	5.184	2.73		Clay	81.1			22.61	1.13	n.a.	n.a.	0.97	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.80

Total Settlement: 0.41 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.660	23.050	1.234	1332.5	1332.5	33.597	5.511	2.76		Clay	83.9			21.79	1.13	n.a.	n.a.	0.97	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.830	23.560	1.260	1353.8	1353.8	33.807	5.505	2.76		Clay	83.7			22.27	1.13	n.a.	n.a.	0.97	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.990	23.210	1.302	1373.8	1373.8	32.791	5.782	2.78		Clay	85.7			21.94	1.12	n.a.	n.a.	0.97	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.150	22.970	1.332	1393.8	1393.8	31.961	5.979	2.80		Clay	87.1			21.71	1.12	n.a.	n.a.	0.97	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.320	22.380	1.401	1415.0	1415.0	30.633	6.462	2.84		Clay	90.1			21.15	1.11	n.a.	n.a.	0.97	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.480	21.650	1.315	1435.0	1435.0	29.174	6.284	2.84		Clay	90.6			20.46	1.11	n.a.	n.a.	0.97	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.650	20.560	1.184	1456.3	1456.3	27.237	5.970	2.85		Clay	91.0			19.43	1.10	n.a.	n.a.	0.97	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.810	18.510	1.008	1476.3	1476.3	24.077	5.672	2.87		Clay	92.9			17.50	1.10	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.980	15.780	0.890	1497.5	1497.5	20.075	5.918	2.94		Clay	98.5			14.91	1.10	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	14.100	0.758	1517.5	1517.5	17.583	5.682	2.97		Clay	100.0			13.33	1.09	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	13.420	0.765	1537.5	1537.5	16.457	6.047	3.01		Clay	100.0			12.68	1.09	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.470	13.780	0.831	1558.8	1558.8	16.681	6.393	3.03		Clay	100.0			13.02	1.08	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.630	15.200	0.874	1578.8	1578.8	18.256	6.066	2.98		Clay	100.0			14.37	1.08	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.800	17.400	0.907	1600.0	1600.0	20.750	5.463	2.91		Clay	95.8			16.45	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.960	15.810	0.998	1620.0	1620.0	18.519	6.653	3.00		Clay	100.0			14.94	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.120	15.730	1.043	1640.0	1640.0	18.183	6.997	3.02		Clay	100.0			14.87	1.07	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	14.720	0.602	1661.3	1661.3	16.722	4.334	2.91		Clay	96.2			13.91	1.07	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	14.170	0.476	1681.3	1681.3	15.857	3.567	2.88		Clay	93.4			13.39	1.06	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	10.470	0.460	1702.5	1702.5	11.300	4.784	3.07		Clay	100.0			9.90	1.06	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	10.810	0.445	1722.5	1722.5	11.552	4.473	3.05		Clay	100.0			10.22	1.06	n.a.	n.a.	0.96	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	11.870	0.492	1742.5	1742.5	12.624	4.471	3.02		Clay	100.0			11.22	1.05	n.a.	n.a.	0.96	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	12.770	0.554	1763.8	1763.8	13.481	4.662	3.01		Clay	100.0			12.07	1.05	n.a.	n.a.	0.96	0.583	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	13.300	0.692	1783.8	1783.8	13.912	5.573	3.05		Clay	100.0			12.57	1.05	n.a.	n.a.	0.96	0.586	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	16.460	0.968	1805.0	1805.0	17.238	6.220	3.01		Clay	100.0			15.56	1.04	n.a.	n.a.	0.96	0.588	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	19.070	1.379	1825.0	1825.0	19.899	7.594	3.02		Clay	100.0			18.02	1.04	n.a.	n.a.	0.96	0.590	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	30.570	2.245	1845.0	1845.0	32.138	7.573	2.87		Clay	92.9			28.89	1.04	n.a.	n.a.	0.96	0.593	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	112.220	3.212	1866.3	1866.3	112.003	2.887	2.20		Sand	39.0			106.07	1.05	110.96	178.84	0.96	0.595	1.026	0.693	1.474	2.48	0.00	0.00
15.090	126.540	2.784	1886.3	1886.3	125.734	2.217	2.08		Sand	29.5			119.60	1.04	124.53	184.25	0.95	0.597	1.025	0.866	1.922	3.22	0.00	0.00
15.260	98.300	2.659	1907.5	1907.5	96.908	2.731	2.22		Sand	40.9			92.91	1.04	96.68	162.63	0.95	0.600	1.019	0.400	0.745	1.24	0.00	0.01
15.420	91.220	2.116	1927.5	1927.5	89.382	2.345	2.20		Sand	38.9			86.22	1.04	89.50	152.15	0.95	0.602	1.015	0.303	0.522	0.87	0.01	0.02
15.580	83.560	1.919	1947.5	1947.5	81.366	2.323	2.22		Sand	41.0			78.98	1.03	81.73	144.08	0.95	0.604	1.013	0.254	0.412	0.68	0.02	0.03
15.750	97.820	1.574	1968.8	1968.8	94.888	1.625	2.07		Sand	28.4			92.46	1.03	95.21	147.59	0.95	0.606	1.011	0.273	0.454	0.75	0.02	0.02
15.910	96.430	1.593	1988.8	1988.8	93.045	1.670	2.08		Sand	29.6			91.14	1.03	93.48	147.12	0.95	0.608	1.010	0.271	0.447	0.74	0.02	0.03
16.080	105.170	1.859	2010.0	2010.0	101.017	1.784	2.08		Sand	29.1			99.40	1.02	101.43	156.08	0.95	0.610	1.009	0.334	0.588	0.96	0.01	0.01
16.240	110.850	3.268	2030.0	2030.0	105.990	2.975	2.23		Sand	41.1			104.77	1.02	106.37	174.83	0.95	0.612	1.008	0.596	1.206	1.97	0.00	0.00
16.400	110.130	3.060	2050.0	2050.0	104.771	2.804	2.21		Sand	39.8			104.09	1.01	105.31	172.48	0.95	0.614	1.006	0.548	1.086	1.77	0.00	0.00
16.570	96.810	3.468	2071.3	2071.3	91.497	3.620	2.33		Sand	49.6			91.50	1.01	92.26	162.49	0.95	0.616	1.004	0.398	0.730	1.19	0.01	0.01
16.730	98.190	2.997	2091.3	2091.3	92.361	3.085	2.28		Sand	45.2			92.81	1.00	93.23	161.24	0.95	0.618	1.002	0.384	0.697	1.13	0.01	0.01
16.900	139.610	1.350	2112.5	2112.5	131.067	0.974	1.81		Sand	8.1			131.96	1.00	132.05	135.73	0.95	0.620	1.000	0.217	0.330	0.53	0.02	0.03
17.060	260.430	3.253	2132.5	2132.5	244.195	1.254	1.71		Sand	0.0			246.15	1.00	245.63	245.63	0.95	0.621	0.998	78.788	172.929	278.26	0.00	0.00
17.220	212.290	4.054	2152.5	2152.5	197.935	1.920	1.91		Sand	15.6			200.65	1.00	199.67	233.45	0.95	0.623	0.995	22.532	49.315	79.13	0.00	0.00
17.390	82.230	3.440	2173.8	2173.8	75.669	4.239	2.44		Sand	58.0			77.72	0.99	76.87	146.48	0.94	0.625	0.996	0.267	0.433	0.69	0.02	0.03
17.550	61.500	3.080	2193.8	2193.8	56.071	5.099	2.58		Sand	69.7			58.13	0.98	57.20	124.42	0.94	0.627	0.995	0.182	0.257	0.41	0.03	0.04
17.720	58.220	2.733	2215.0	2215.0	52.761	4.786	2.58		Sand	69.5			55.03	0.98	53.89	120.11	0.94	0.629	0.994	0.171	0.236	0.38	0.03	0.04
17.880	59.930	2.763	2235.0	2235.0	54.088	4.697	2.57		Sand	68.5			56.64	0.98	55.26	121.63	0.94	0.630	0.993	0.175	0.243	0.39	0.03	0.04
18.040	79.390	2.503	2255.0	2255.0	71.656	3.198	2.36		Sand	52.0			75.04	0.97	73.05	139.31	0.94	0.632	0.991	0.231	0.356	0.56	0.02	0.03
18.210	93.660	2.349	2276.3	2276.3	84.315	2.539	2.24		Sand	42.3			88.53	0.97	85.96	150.29	0.94	0.633	0.988	0.290	0.480	0.76	0.02	0.02
18.370	57.340	1.817	2296.3	2296.3	50.984	3.233	2.47		Sand	60.6	88		88.00	0.97	85.24	158.03	0.94	0.635	0.986	0.352	0.613	0.97	0.01	0.01
18.540	27.890	1.405	2317.5	2317.5	23.069	5.255	2.86		Clay	92.2			26.36	0.98	n.a.	n.a.	0.94	0.637	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.700	18.200	0.847	2337.5	2337.5	14.572	4.974	3.00		Clay	100.0			17.20	0.97	n.a.	n.a.	0.94	0.638	n.a.	n.a.	n.a.	n.a.	0.00	0.00
18.860	13.500	0.510	2357.5	2357.5	10.453	4.135	3.06		Clay	100.0			12.76	0.97	n.a.	n.a.	0.94	0.640	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.030	12.530	0.494	2378.8	2378.8	9.535	4.360	3.11		Clay	100.0			11.84	0.97	n.a.	n.a.	0.94	0.641	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.190	11.890	0.452	2398.8	2398.8	8.913	4.232	3.12		Clay	100.0			11.24	0.97	n.a.	n.a.	0.94	0.643	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.360	11.520	0.331	2420.0	2420.0	8.521	3.214	3.07		Clay	100.0			10.89	0.97	n.a.	n.a.	0.94	0.644	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.520	11.390	0.253	2440.0	2440.0	8.336	2.485	3.02		Clay	100.0			10.77	0.96	n.a.	n.a.	0.94	0.645	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.690	11.330	0.273	2461.3	2461.3	8.207	2.698	3.04		Clay	100.0			10.71	0.96	n.a.	n.a.	0.93	0.647	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	12.010	0.232	2481.3	2481.3	8.681	2.155	2.97		Clay	100.0			11.35	0.96	n.a.	n.a.	0.93	0.648	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	14.240	0.260	2501.2	2500.6	10.389	2.001	2.89		Clay	93.9			13.46	0.96	n.a.	n.a.	0.93	0.650	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	15.090	0.271	2521.6	2510.4	11.018	1.959	2.86		Clay	91.8			14.26	0.96	n.a.	n.a.	0.93	0.651	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	20.210	0.289	2540.8	2519.6	15.034	1.525	2.69		Clay	78.1			19.10	0.95	n.a.	n.a.	0.93	0.652	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	20.390	0.370	2561.2	2529.4	15.110	1.936	2.74		Clay	82.4			19.27	0.95	n.a.	n.a.	0.93	0.653	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	19.330	0.524	2580.4	2538.6	14.212	2.907	2.86		Clay	92.1			18.27	0.95	n.a.	n.a.	0.93	0.655	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	27.370	0.475	2599.6	2547.8	20.465	1.821	2.62		Clay	72.4			25.87	0.95	n.a.	n.a.	0.93	0.656	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	24.040	0.434	2620.0	2557.6	17.774	1.908	2.68		Clay	77.4	25		25.00	0.95	n.a.	n.a.	0.93	0.657	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No.	1

PGA (A_{max})	0.80

Total Settlement:	0.41	(Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.160	21.290	0.501	2639.2	2566.8	15.560	2.508	2.79		Clay	86.6			20.12	0.95	n.a.	n.a.	0.93	0.658	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	27.930	1.160	2659.6	2576.6	20.647	4.360	2.85		Clay	90.7			26.40	0.95	n.a.	n.a.	0.93	0.659	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	60.450	2.926	2678.8	2585.8	45.719	4.950	2.63		Clay	73.8	90		90.00	0.95	n.a.	n.a.	0.93	0.661	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	95.740	3.945	2698.0	2595.0	80.562	4.180	2.42		Sand	56.3			90.49	0.92	83.46	154.25	0.93	0.662	0.966	0.319	0.530	0.80	0.01	0.02
21.820	70.370	3.906	2718.4	2604.8	52.987	5.659	2.63		Clay	73.7	90		90.00	0.95	n.a.	n.a.	0.92	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	46.890	3.660	2737.6	2614.0	34.828	8.040	2.87		Clay	92.6			44.32	0.95	n.a.	n.a.	0.92	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	46.030	3.226	2758.0	2623.8	34.035	7.224	2.84		Clay	90.4			43.51	0.94	n.a.	n.a.	0.92	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	38.730	2.556	2777.2	2633.1	28.364	6.844	2.88		Clay	93.4			36.61	0.94	n.a.	n.a.	0.92	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	26.550	1.964	2796.4	2642.3	19.038	7.808	3.04		Clay	100.0			25.09	0.94	n.a.	n.a.	0.92	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	22.560	1.313	2816.8	2652.1	15.951	6.206	3.03		Clay	100.0			21.32	0.94	n.a.	n.a.	0.92	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	21.570	1.224	2836.0	2661.3	15.145	6.074	3.04		Clay	100.0			20.39	0.94	n.a.	n.a.	0.92	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	21.540	1.244	2856.4	2671.1	15.059	6.185	3.05		Clay	100.0			20.36	0.94	n.a.	n.a.	0.92	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	25.740	1.310	2875.6	2680.3	18.134	5.389	2.95		Clay	99.0			24.33	0.94	n.a.	n.a.	0.92	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	30.020	1.559	2894.8	2689.5	21.247	5.457	2.90		Clay	95.1			28.37	0.94	n.a.	n.a.	0.92	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.460	33.190	1.625	2915.2	2699.3	23.512	5.122	2.85		Clay	91.1			31.37	0.94	n.a.	n.a.	0.92	0.673	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.620	30.960	1.530	2934.4	2708.5	21.778	5.189	2.88		Clay	93.3			29.26	0.94	n.a.	n.a.	0.92	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.790	29.920	1.414	2954.8	2718.3	20.927	4.970	2.88		Clay	93.4			28.28	0.94	n.a.	n.a.	0.92	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	27.160	1.188	2974.0	2727.5	18.825	4.627	2.89		Clay	94.5			25.67	0.94	n.a.	n.a.	0.91	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	21.670	1.064	2993.2	2736.7	14.743	5.273	3.01		Clay	100.0			20.48	0.93	n.a.	n.a.	0.91	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	20.280	0.852	3013.6	2746.5	13.670	4.539	3.00		Clay	100.0			19.17	0.93	n.a.	n.a.	0.91	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	19.960	0.852	3032.8	2755.7	13.386	4.618	3.01		Clay	100.0			18.87	0.93	n.a.	n.a.	0.91	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	19.280	0.903	3053.2	2765.5	12.839	5.088	3.05		Clay	100.0			18.22	0.93	n.a.	n.a.	0.91	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	18.120	0.811	3072.4	2774.8	11.953	4.892	3.06		Clay	100.0			17.13	0.93	n.a.	n.a.	0.91	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	17.030	0.646	3091.6	2784.0	11.124	4.175	3.04		Clay	100.0			16.10	0.93	n.a.	n.a.	0.91	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	15.460	0.523	3112.0	2793.8	9.954	3.763	3.06		Clay	100.0			14.61	0.93	n.a.	n.a.	0.91	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	13.680	0.416	3131.2	2803.0	8.644	3.434	3.08		Clay	100.0			12.93	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	11.520	0.387	3151.6	2812.8	7.071	3.889	3.18		Clay	100.0			10.89	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	11.580	0.315	3170.8	2822.0	7.083	3.148	3.13		Clay	100.0			10.95	0.93	n.a.	n.a.	0.91	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	11.440	0.344	3190.0	2831.2	6.955	3.498	3.16		Clay	100.0			10.81	0.93	n.a.	n.a.	0.91	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	13.780	0.478	3210.4	2841.0	8.571	3.925	3.12		Clay	100.0			13.02	0.93	n.a.	n.a.	0.90	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	14.710	0.557	3229.6	2850.2	9.189	4.250	3.11		Clay	100.0			13.90	0.92	n.a.	n.a.	0.90	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	16.310	0.607	3250.0	2860.0	10.269	4.130	3.07		Clay	100.0			15.42	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	17.010	0.643	3269.2	2869.2	10.717	4.182	3.06		Clay	100.0			16.08	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	16.440	0.632	3288.4	2878.4	10.280	4.271	3.08		Clay	100.0			15.54	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	15.410	0.610	3308.8	2888.2	9.525	4.435	3.11		Clay	100.0			14.57	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	14.770	0.564	3328.0	2897.4	9.047	4.305	3.12		Clay	100.0			13.96	0.92	n.a.	n.a.	0.90	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	17.140	0.420	3348.4	2907.2	10.640	2.713	2.95		Clay	99.0			16.20	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	12.780	0.416	3367.6	2916.4	7.609	3.749	3.15		Clay	100.0			12.08	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	13.250	0.404	3388.0	2926.2	7.898	3.492	3.12		Clay	100.0			12.52	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	14.050	0.477	3407.2	2935.5	8.412	3.861	3.12		Clay	100.0			13.28	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	15.280	0.586	3426.4	2944.7	9.214	4.322	3.12		Clay	100.0			14.44	0.92	n.a.	n.a.	0.90	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	16.290	0.605	3446.8	2954.5	9.861	4.154	3.08		Clay	100.0			15.40	0.92	n.a.	n.a.	0.89	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	17.740	0.643	3466.0	2963.7	10.802	4.019	3.04		Clay	100.0			16.77	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	19.720	0.640	3486.4	2973.5	12.091	3.558	2.97		Clay	100.0			18.64	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	21.290	0.690	3505.6	2982.7	13.100	3.530	2.94		Clay	98.4			20.12	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	23.380	0.748	3524.8	2991.9	14.451	3.459	2.90		Clay	95.3			22.10	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	25.280	0.779	3545.2	3001.7	15.663	3.312	2.86		Clay	92.1			23.89	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	26.380	0.874	3564.4	3010.9	16.339	3.554	2.87		Clay	92.5			24.93	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	26.740	0.989	3584.8	3020.7	16.518	3.964	2.89		Clay	94.5			25.27	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	25.690	1.000	3604.0	3029.9	15.768	4.185	2.92		Clay	97.0			24.28	0.91	n.a.	n.a.	0.89	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	24.920	0.871	3623.2	3039.1	15.207	3.770	2.91		Clay	95.7			23.55	0.91	n.a.	n.a.	0.89	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	24.560	0.885	3643.6	3048.9	14.916	3.891	2.92		Clay	96.9			23.21	0.91	n.a.	n.a.	0.89	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	24.470	0.941	3662.8	3058.1	14.805	4.158	2.94		Clay	98.6			23.13	0.91	n.a.	n.a.	0.89	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	24.090	0.909	3683.2	3067.9	14.504	4.086	2.95		Clay	98.7			22.77	0.91	n.a.	n.a.	0.88	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	22.390	0.875	3702.4	3077.2	13.349	4.258	2.99		Clay	100.0			21.16	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	22.560	0.784	3721.6	3086.4	13.413	3.788	2.95		Clay	99.3			21.32	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	22.010	0.768	3742.0	3096.2	13.009	3.815	2.97		Clay	100.0			20.80	0.90	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	22.140	0.779	3761.2	3105.4	13.048	3.845	2.97		Clay	100.0			20.93	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	22.340	0.791	3781.6	3115.2	13.129	3.868	2.97		Clay	100.0			21.12	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	22.100	0.836	3800.8	3124.4	12.930	4.140	2.99		Clay	100.0			20.89	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	22.760	0.866	3820.0	3133.6	13.307	4.151	2.98		Clay	100.0			21.51	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	21.690	0.883	3840.4	3143.4	12.579	4.468	3.02		Clay	100.0			20.50	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	20.380	0.830	3859.6	3152.6	11.705	4.496	3.05		Clay	100.0			19.26	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	19.840	0.824	3880.0	3162.4	11.321	4.602	3.06		Clay	100.0			18.75	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.80

Total Settlement: 0.41 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.660	20.140	0.841	3899.2	3171.6	11.471	4.622	3.06		Clay	100.0			19.04	0.90	n.a.	n.a.	0.88	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.820	19.580	0.863	3918.4	3180.8	11.079	4.896	3.09		Clay	100.0			18.51	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	18.430	0.897	3938.8	3190.6	10.318	5.448	3.14		Clay	100.0			17.42	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	16.930	0.839	3958.0	3199.8	9.345	5.612	3.18		Clay	100.0			16.00	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	15.440	0.764	3978.4	3209.6	8.382	5.681	3.22		Clay	100.0			14.59	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	18.760	0.790	3997.6	3218.8	10.414	4.711	3.10		Clay	100.0			17.73	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	24.630	0.933	4016.8	3228.1	14.016	4.123	2.96		Clay	99.9			23.28	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	31.900	1.360	4037.2	3237.9	18.458	4.552	2.90		Clay	94.6			30.15	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	39.610	1.927	4056.4	3247.1	23.148	5.128	2.86		Clay	91.5			37.44	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	40.370	2.217	4076.8	3256.9	23.539	5.783	2.89		Clay	93.9			38.16	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	36.510	2.010	4096.0	3266.1	21.103	5.833	2.92		Clay	96.9			34.51	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	34.610	1.699	4115.2	3275.3	19.878	5.218	2.91		Clay	95.8			32.71	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	34.860	1.866	4135.6	3285.1	19.964	5.689	2.93		Clay	97.7			32.95	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	37.840	1.987	4154.8	3294.3	21.712	5.555	2.90		Clay	95.0			35.77	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	35.060	1.924	4175.2	3304.1	19.958	5.835	2.94		Clay	98.3			33.14	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	31.660	1.663	4194.4	3313.3	17.845	5.626	2.97		Clay	100.0			29.92	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	31.480	1.493	4213.6	3322.5	17.681	5.081	2.94		Clay	98.3			29.75	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	29.460	1.517	4234.0	3332.3	16.411	5.547	2.99		Clay	100.0			27.84	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	30.240	1.494	4253.2	3341.5	16.827	5.315	2.97		Clay	100.0			28.58	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	29.560	1.262	4273.6	3351.3	16.366	4.602	2.94		Clay	98.1			27.94	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	28.520	1.116	4292.8	3360.5	15.696	4.230	2.93		Clay	97.3			26.96	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	27.240	0.950	4312.0	3369.8	14.888	3.787	2.92		Clay	96.4			25.75	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	29.390	1.019	4332.4	3379.6	16.111	3.744	2.89		Clay	94.0			27.78	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	35.280	1.386	4351.6	3388.8	19.538	4.187	2.85		Clay	91.3			33.35	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	42.420	2.091	4372.0	3398.6	23.677	5.198	2.85		Clay	91.2			40.09	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	53.950	3.775	4391.2	3407.8	30.374	7.294	2.88		Clay	93.3			50.99	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	71.770	4.800	4411.6	3417.6	40.710	6.901	2.77		Clay	85.0			67.84	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	112.550	6.146	4430.8	3426.8	81.948	5.570	2.51		Sand	63.6			106.38	0.83	88.47	163.14	0.85	0.703	0.913	0.406	0.680	0.97	0.01	0.01
36.250	146.580	5.834	4450.0	3436.0	107.072	4.042	2.33		Sand	49.1			138.54	0.85	117.65	194.31	0.85	0.703	0.881	1.392	2.696	3.83	0.00	0.00
36.420	202.280	5.150	4470.4	3445.8	148.168	2.574	2.08		Sand	29.8			191.19	0.87	166.33	235.00	0.85	0.703	0.854	26.117	49.052	69.77	0.00	0.00
36.580	59.560	5.541	4489.6	3455.0	33.178	9.667	2.94		Clay	98.5			56.29	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	114.300	6.230	4510.0	3464.8	82.761	5.560	2.50		Sand	63.3			108.03	0.83	89.56	164.45	0.85	0.703	0.910	0.422	0.712	1.01	0.01	0.01
36.910	156.120	7.860	4529.2	3474.0	113.493	5.108	2.39		Sand	54.3			147.56	0.85	125.94	207.54	0.85	0.703	0.857	2.970	5.602	7.97	0.00	0.00
37.070	133.780	7.394	4548.4	3483.2	96.878	5.622	2.47		Sand	60.3			126.45	0.84	106.18	184.78	0.85	0.703	0.889	0.886	1.712	2.43	0.00	0.00
37.240	69.520	5.676	4568.8	3493.0	38.497	8.442	2.86		Clay	91.5			65.71	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	56.320	3.489	4588.0	3502.2	30.852	6.458	2.84		Clay	89.9			53.23	0.88	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	53.820	3.015	4608.4	3512.0	29.337	5.852	2.82		Clay	88.7			50.87	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	43.620	3.079	4627.6	3521.2	23.461	7.455	2.96		Clay	100.0			41.23	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	38.060	2.636	4646.8	3530.5	20.245	7.376	3.01		Clay	100.0			35.97	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	36.620	2.765	4667.2	3540.3	19.369	8.063	3.05		Clay	100.0			34.61	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	43.930	3.623	4686.4	3549.5	23.433	8.711	3.01		Clay	100.0			41.52	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	58.590	3.538	4706.8	3559.3	31.600	6.291	2.82		Clay	88.7			55.38	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	49.470	3.618	4726.0	3568.5	26.402	7.680	2.94		Clay	98.0			46.76	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	56.650	2.952	4745.2	3577.7	30.342	5.439	2.79		Clay	86.1			53.54	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	38.570	2.720	4765.6	3587.5	20.174	7.516	3.01		Clay	100.0			36.46	0.87	n.a.	n.a.	0.84	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	38.960	1.995	4784.8	3596.7	20.334	5.456	2.92		Clay	96.3			36.82	0.87	n.a.	n.a.	0.84	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.210	36.620	1.810	4805.2	3606.5	18.975	5.289	2.93		Clay	97.3			34.61	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.370	33.860	1.584	4824.4	3615.7	17.395	5.036	2.94		Clay	98.5			32.00	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	33.520	1.473	4843.6	3624.9	17.158	4.737	2.93		Clay	97.5			31.68	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	34.170	1.533	4864.0	3634.7	17.464	4.830	2.93		Clay	97.4			32.30	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	37.760	1.870	4883.2	3643.9	19.385	5.295	2.92		Clay	96.8			35.69	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.030	43.540	2.535	4903.6	3653.7	22.491	6.169	2.92		Clay	96.6			41.15	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	54.670	3.588	4922.8	3662.9	28.506	6.872	2.88		Clay	93.4			51.67	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.350	75.460	5.043	4942.0	3672.2	39.753	6.910	2.78		Clay	85.6			71.32	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	95.240	5.691	4962.4	3682.0	50.386	6.135	2.68		Clay	77.0			90.02	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.680	72.460	4.914	4981.6	3691.2	37.912	7.023	2.80		Clay	87.1			68.49	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	68.580	4.395	5002.0	3701.0	35.709	6.651	2.80		Clay	87.1			64.82	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	54.190	3.138	5021.2	3710.2	27.858	6.072	2.85		Clay	90.9			51.22	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	35.480	2.192	5040.4	3719.4	17.723	6.649	3.02		Clay	100.0			33.53	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	33.400	1.399	5060.8	3729.2	16.556	4.532	2.93		Clay	97.4			31.57	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	32.450	1.348	5080.0	3738.4	16.001	4.507	2.94		Clay	98.2			30.67	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	32.360	1.034	5100.4	3748.2	15.906	3.468	2.87		Clay	92.7			30.59	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	32.970	1.513	5119.6	3757.4	16.187	4.974	2.96		Clay	100.0			31.16	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	25.620	1.489	5138.8	3766.6	12.239	6.458	3.13		Clay	100.0			24.22	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 1

PGA (A_{max}) 0.80

Total Settlement: 0.41 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.160	32.860	1.479	5159.2	3776.4	16.037	4.883	2.96		Clay	99.9			31.06	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	31.910	1.422	5178.4	3785.6	15.491	4.848	2.97		Clay	100.0			30.16	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	31.890	1.320	5198.8	3795.4	15.435	4.506	2.95		Clay	99.2			30.14	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	30.880	1.313	5218.0	3804.6	14.861	4.645	2.97		Clay	100.0			29.19	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	33.520	1.467	5237.2	3813.9	16.205	4.747	2.95		Clay	99.0			31.68	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	37.290	1.556	5257.6	3823.6	18.130	4.488	2.90		Clay	94.8			35.25	0.86	n.a.	n.a.	0.81	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	37.620	1.528	5276.8	3832.9	18.254	4.368	2.89		Clay	94.0			35.56	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	34.900	1.385	5297.2	3842.7	16.786	4.296	2.91		Clay	95.9			32.99	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	34.420	1.302	5316.4	3851.9	16.492	4.099	2.90		Clay	95.3			32.53	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	34.400	1.345	5336.8	3861.7	16.434	4.240	2.91		Clay	96.2			32.51	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	37.100	1.581	5356.0	3870.9	17.785	4.593	2.91		Clay	95.8			35.07	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	39.900	1.853	5375.2	3880.1	19.181	4.979	2.91		Clay	95.7			37.71	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	40.830	2.065	5395.6	3889.9	19.606	5.416	2.93		Clay	97.0			38.59	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	38.990	1.856	5414.8	3899.1	18.611	5.116	2.93		Clay	97.1			36.85	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	42.660	1.830	5435.2	3908.9	20.437	4.582	2.86		Clay	92.1			40.32	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	46.730	2.282	5454.4	3918.1	22.461	5.185	2.87		Clay	92.5			44.17	0.85	n.a.	n.a.	0.81	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	78.720	2.948	5473.6	3927.3	38.695	3.879	2.61		Clay	71.8			74.40	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	66.190	2.256	5494.0	3937.1	32.228	3.556	2.64		Clay	74.4	74		74.00	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	43.100	2.197	5513.2	3946.3	20.446	5.446	2.91		Clay	96.1			40.74	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	37.600	3.218	5533.6	3956.1	17.610	9.237	3.12		Clay	100.0			35.54	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	101.510	4.882	5552.8	3965.3	49.798	4.945	2.61		Clay	71.7	133		133.00	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	141.340	6.213	5572.0	3974.6	95.554	4.484	2.39		Sand	54.4			133.59	0.80	106.99	183.45	0.80	0.695	0.862	0.837	1.550	2.23	0.00	0.00
45.770	147.250	6.920	5592.4	3984.4	99.500	4.790	2.40		Sand	55.3			139.18	0.81	112.04	190.30	0.80	0.694	0.851	1.140	2.135	3.07	0.00	0.00
45.930	89.620	5.094	5611.6	3993.6	43.477	5.868	2.70		Clay	79.3			84.71	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	47.840	3.764	5632.0	4003.4	22.493	8.361	3.01		Clay	100.0			45.22	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	39.430	2.244	5651.2	4012.6	18.245	6.131	2.98		Clay	100.0			37.27	0.84	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	33.630	1.940	5670.4	4021.8	15.314	6.301	3.05		Clay	100.0			31.79	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	31.830	1.496	5690.8	4031.6	14.379	5.162	3.01		Clay	100.0			30.09	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	29.660	1.387	5710.0	4040.8	13.267	5.173	3.04		Clay	100.0			28.03	0.84	n.a.	n.a.	0.79	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	28.620	1.267	5730.4	4050.6	12.717	4.919	3.04		Clay	100.0			27.05	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	31.820	1.338	5749.6	4059.8	14.259	4.621	2.99		Clay	100.0			30.08	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	34.600	1.453	5768.8	4069.0	15.589	4.582	2.95		Clay	99.3			32.70	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	34.900	1.611	5789.2	4078.8	15.693	5.034	2.98		Clay	100.0			32.99	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	36.670	1.738	5808.4	4088.0	16.519	5.147	2.97		Clay	100.0			34.66	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	35.580	1.870	5828.8	4097.8	15.943	5.724	3.01		Clay	100.0			33.63	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	33.800	1.877	5848.0	4107.0	15.036	6.078	3.05		Clay	100.0			31.95	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	36.030	1.724	5867.2	4116.3	16.081	5.210	2.98		Clay	100.0			34.05	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	36.310	1.823	5887.6	4126.0	16.173	5.465	2.99		Clay	100.0			34.32	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	33.960	2.133	5906.8	4135.3	14.996	6.880	3.08		Clay	100.0			32.10	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	33.620	2.150	5927.2	4145.1	14.792	7.014	3.09		Clay	100.0			31.78	0.84	n.a.	n.a.	0.78	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	33.160	2.107	5946.4	4154.3	14.533	6.978	3.10		Clay	100.0			31.34	0.84	n.a.	n.a.	0.78	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.880	32.000	2.017	5965.6	4163.5	13.939	6.951	3.11		Clay	100.0			30.25	0.84	n.a.	n.a.	0.78	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	30.700	1.994	5986.0	4173.3	13.278	7.198	3.13		Clay	100.0			29.02	0.84	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	29.820	1.958	6005.2	4182.5	12.824	7.301	3.15		Clay	100.0			28.19	0.84	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	28.560	1.900	6025.6	4192.3	12.188	7.437	3.17		Clay	100.0			26.99	0.83	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	27.810	1.874	6044.8	4201.5	11.799	7.559	3.19		Clay	100.0			26.29	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	27.620	1.781	6064.0	4210.7	11.679	7.244	3.18		Clay	100.0			26.11	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	27.230	1.707	6084.4	4220.5	11.462	7.058	3.18		Clay	100.0			25.74	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	28.370	1.716	6103.6	4229.7	11.972	6.778	3.15		Clay	100.0			26.81	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	30.300	2.129	6124.0	4239.5	12.850	7.817	3.17		Clay	100.0			28.64	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.360	42.140	2.450	6143.2	4248.7	18.391	6.272	2.99		Clay	100.0			39.83	0.83	n.a.	n.a.	0.78	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.520	48.920	3.600	6162.4	4258.0	21.531	7.853	3.01		Clay	100.0			46.24	0.83	n.a.	n.a.	0.77	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No.	2

PGA (A_{max})	0.80

Total Settlement:	0.66	(Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.160	2.360	2.301	20.0	20.0	235.000	97.902	3.39		Unsaturated	100.0			2.23	1.70	3.79	58.90	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	240.600	4.777	41.3	41.3	1628.616	1.985	1.54		Unsaturated	0.0			227.41	1.70	386.60	386.60	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	149.070	5.801	61.3	61.3	827.981	3.892	1.89		Unsaturated	14.4			140.90	1.70	239.53	271.49	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	96.780	5.057	82.5	82.5	463.069	5.227	2.10		Unsaturated	30.9			91.47	1.70	155.51	223.73	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	69.270	3.298	102.5	102.5	297.258	4.765	2.14		Unsaturated	34.5			65.47	1.70	111.30	174.81	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	51.320	2.548	122.5	122.5	201.360	4.971	2.24		Unsaturated	42.5			48.51	1.70	82.46	146.03	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	44.520	2.298	143.8	143.8	161.184	5.171	2.31		Unsaturated	47.7			42.08	1.70	71.53	135.40	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	45.960	2.642	163.8	163.8	155.879	5.758	2.36		Unsaturated	51.5			43.44	1.70	73.85	140.10	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	48.650	3.056	185.0	185.0	155.218	6.293	2.39		Unsaturated	54.2			45.98	1.70	78.17	146.71	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	41.060	2.153	205.0	205.0	124.374	5.256	2.38		Unsaturated	53.3			38.81	1.70	65.98	130.84	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	36.440	2.296	225.0	225.0	105.297	6.319	2.49		Unsaturated	61.9			34.44	1.70	58.55	124.22	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	34.850	2.438	246.3	246.3	96.217	7.022	2.55		Unsaturated	66.7			32.94	1.70	56.00	122.17	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	28.460	2.201	266.3	266.3	114.254	7.771	2.54		Unsaturated	66.1			26.90	1.70	45.73	108.83	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	22.900	1.803	287.5	287.5	86.982	7.925	2.61		Unsaturated	72.1			21.64	1.70	36.80	98.53	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	23.880	1.775	307.5	307.5	86.519	7.481	2.60		Unsaturated	70.6			22.57	1.70	38.37	100.28	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	28.890	1.965	327.5	327.5	100.232	6.841	2.53		Unsaturated	65.1			27.31	1.70	46.42	109.48	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	38.820	1.910	348.8	348.8	89.974	4.942	2.44		Unsaturated	58.3			36.69	1.70	62.38	128.05	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	65.670	2.581	368.8	368.8	148.270	3.942	2.23		Unsaturated	41.6			62.07	1.70	105.52	174.17	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	46.280	3.359	390.0	390.0	101.461	7.288	2.55		Unsaturated	66.6			43.74	1.70	74.36	145.83	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	42.900	3.059	410.0	410.0	91.676	7.165	2.57		Unsaturated	68.2			40.55	1.70	68.93	139.21	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	49.290	3.227	430.0	430.0	102.896	6.576	2.51		Unsaturated	63.4			46.59	1.70	79.20	151.18	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	55.250	3.351	451.3	451.3	112.621	6.090	2.46		Unsaturated	59.5			52.22	1.70	88.78	162.19	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	57.900	3.543	471.3	471.3	115.493	6.144	2.45		Unsaturated	59.2			54.73	1.70	93.03	167.56	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	61.370	4.054	492.5	492.5	119.751	6.632	2.47		Unsaturated	60.7			58.01	1.70	98.61	175.20	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	65.580	4.515	512.5	512.5	125.457	6.911	2.47		Unsaturated	61.0			61.98	1.66	102.74	180.59	1.00	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	67.450	4.469	533.8	533.8	126.434	6.652	2.46		Unsaturated	59.7			63.75	1.63	103.92	181.67	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	69.200	4.136	553.8	553.8	127.345	6.000	2.42		Unsaturated	56.6			65.41	1.61	105.16	182.06	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	75.100	4.182	573.8	573.8	135.797	5.589	2.38		Unsaturated	53.3			70.98	1.57	111.37	188.53	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	77.730	4.503	595.0	595.0	138.018	5.815	2.39		Unsaturated	54.1			73.47	1.54	113.27	191.33	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	78.060	4.759	615.0	615.0	136.317	6.121	2.41		Unsaturated	55.8			73.78	1.53	112.52	191.13	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	76.400	4.162	636.3	636.3	131.141	5.471	2.38		Unsaturated	53.4			72.21	1.52	109.71	186.45	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	76.670	4.585	656.3	656.3	129.569	6.006	2.42		Unsaturated	56.3			72.47	1.50	108.88	186.67	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	76.040	4.801	676.3	676.3	126.568	6.342	2.44		Unsaturated	58.3			71.87	1.49	107.11	185.22	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	70.650	4.624	697.5	697.5	115.735	6.577	2.48		Unsaturated	61.1			66.78	1.49	99.77	176.83	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	64.430	4.762	717.5	717.5	103.998	7.433	2.55		Unsaturated	66.7			60.90	1.50	91.38	167.76	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	52.340	4.916	738.8	738.8	102.609	9.460	2.64		Unsaturated	73.9			49.47	1.53	75.72	149.25	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	46.920	4.464	758.8	758.8	90.186	9.592	2.67		Unsaturated	76.8			44.35	1.54	68.22	140.10	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	42.890	4.028	778.8	778.8	109.151	9.477	2.62		Unsaturated	72.8			40.54	1.54	62.57	132.01	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	39.970	3.655	800.0	800.0	98.925	9.236	2.64		Unsaturated	73.9			37.78	1.54	58.20	126.57	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	39.770	3.677	820.0	820.0	96.000	9.341	2.65		Unsaturated	74.8			37.59	1.53	57.37	125.66	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.730	37.780	3.395	841.3	841.3	88.819	9.088	2.66		Unsaturated	75.6			35.71	1.52	54.25	121.76	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.890	36.930	3.303	861.3	861.3	84.759	9.050	2.67		Unsaturated	76.4			34.91	1.51	52.64	119.82	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.050	37.350	3.081	881.3	881.3	83.766	8.347	2.64		Unsaturated	74.3			35.30	1.49	52.71	119.54	0.99	0.511	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.220	33.250	2.919	902.5	902.5	72.684	8.899	2.70		Unsaturated	79.1			31.43	1.49	46.94	112.87	0.99	0.511	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.380	31.540	2.755	922.5	922.5	67.379	8.864	2.72		Unsaturated	80.5			29.81	1.49	44.31	109.67	0.98	0.511	1.095	n.a.	n.a.	n.a.	0.00	0.00
7.550	31.250	2.605	943.8	943.8	65.225	8.464	2.71		Unsaturated	79.9			29.54	1.47	43.51	108.55	0.98	0.510	1.092	n.a.	n.a.	n.a.	0.00	0.00
7.710	29.770	2.446	963.8	963.8	60.780	8.352	2.73		Unsaturated	81.1			28.14	1.47	41.23	105.75	0.98	0.510	1.087	n.a.	n.a.	n.a.	0.00	0.00
7.870	27.910	2.220	983.8	983.8	55.742	8.098	2.74		Unsaturated	82.1			26.38	1.46	38.48	102.33	0.98	0.510	1.083	n.a.	n.a.	n.a.	0.00	0.00
8.040	26.760	1.887	1005.0	1005.0	52.254	7.187	2.72		Unsaturated	80.3			25.29	1.45	36.67	99.71	0.98	0.510	1.079	n.a.	n.a.	n.a.	0.00	0.00
8.200	29.130	2.141	1025.0	1025.0	55.839	7.482	2.71		Unsaturated	79.9			27.53	1.43	39.31	103.09	0.98	0.509	1.079	n.a.	n.a.	n.a.	0.00	0.00
8.370	27.960	2.272	1046.3	1046.3	52.448	8.280	2.76		Unsaturated	84.0			26.43	1.42	37.46	101.26	0.98	0.509	1.076	n.a.	n.a.	n.a.	0.00	0.00
8.530	26.350	2.153	1066.3	1066.3	48.426	8.339	2.79		Unsaturated	86.0			24.91	1.41	35.12	98.47	0.98	0.509	1.072	n.a.	n.a.	n.a.	0.00	0.00
8.690	27.260	2.136	1086.3	1086.3	49.191	7.994	2.77		Unsaturated	84.5			25.77	1.40	35.95	99.36	0.98	0.508	1.071	n.a.	n.a.	n.a.	0.00	0.00
8.860	30.160	2.082	1107.5	1107.5	53.465	7.031	2.70		Unsaturated	79.3			28.51	1.38	39.20	102.84	0.98	0.508	1.070	n.a.	n.a.	n.a.	0.00	0.00
9.020	33.450	2.237	1127.5	1127.5	58.335	6.801	2.67		Unsaturated	76.4			31.62	1.36	42.84	107.12	0.98	0.508	1.071	n.a.	n.a.	n.a.	0.00	0.00
9.190	33.510	2.481	1148.8	1148.8	57.342	7.532	2.71		Unsaturated	79.5			31.67	1.34	42.53	107.21	0.98	0.507	1.069	n.a.	n.a.	n.a.	0.00	0.00
9.350	30.700	2.316	1168.8	1168.8	51.535	7.690	2.74		Unsaturated	82.5			29.02	1.34	38.86	102.86	0.98	0.507	1.065	n.a.	n.a.	n.a.	0.00	0.00
9.510	28.310	2.028	1188.8	1188.8	46.630	7.318	2.75		Unsaturated	83.4			26.76	1.33	35.71	98.90	0.98	0.507	1.061	n.a.	n.a.	n.a.	0.00	0.00
9.680	24.680	1.904	1210.0	1210.0	39.793	7.910	2.83		Unsaturated	89.1			23.33	1.33	31.07	93.55	0.98	0.506	1.056	n.a.	n.a.	n.a.	0.00	0.00
9.840	24.000	1.960	1230.0	1230.0	38.024	8.383	2.86		Unsaturated	91.6			22.68	1.32	30.00	92.44	0.98	0.506	1.054	n.a.	n.a.	n.a.	0.00	0.00
10.010	24.700	1.997	1251.3	1251.3	38.481	8.295	2.85		Clay	91.1			23.35	1.15	n.a.	n.a.	0.98	0.506	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.170	24.740	1.888	1271.3	1271.3	37.922	7.834	2.84		Clay	89.9			23.38	1.14	n.a.	n.a.	0.97	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.330	23.180	1.865	1291.3	1291.3	34.903	8.278	2.88		Clay	93.3			21.91	1.14	n.a.	n.a.	0.97	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.500	23.220	1.708	1312.5	1312.5	34.383	7.569	2.85		Clay	91.3			21.95	1.13	n.a.	n.a.	0.97	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.80

Total Settlement: 0.66 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.660	24.090	2.044	1332.5	1332.5	35.158	8.728	2.89		Clay	94.5			22.77	1.13	n.a.	n.a.	0.97	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.830	27.470	2.195	1353.8	1353.8	39.584	8.193	2.84		Clay	90.1			25.96	1.13	n.a.	n.a.	0.97	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.990	24.780	2.212	1373.8	1373.8	35.076	9.182	2.91		Clay	95.8			23.42	1.12	n.a.	n.a.	0.97	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.150	27.910	1.886	1393.8	1393.8	39.050	6.930	2.79		Clay	86.1			26.38	1.12	n.a.	n.a.	0.97	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.320	27.680	1.850	1415.0	1415.0	38.124	6.860	2.79		Clay	86.4			26.16	1.11	n.a.	n.a.	0.97	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.480	24.870	1.770	1435.0	1435.0	33.662	7.330	2.85		Clay	91.0			23.51	1.11	n.a.	n.a.	0.97	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.650	24.480	1.724	1456.3	1456.3	32.621	7.257	2.86		Clay	91.5			23.14	1.10	n.a.	n.a.	0.97	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.810	26.070	2.034	1476.3	1476.3	34.319	8.028	2.87		Clay	92.9			24.64	1.10	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.980	43.560	2.499	1497.5	1497.5	57.177	5.838	2.62		Clay	72.8			41.17	1.10	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	54.710	2.975	1517.5	1517.5	60.216	5.513	2.59	plastic	Clay	70.1	57	1.18	67.26	1.09	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	58.150	3.356	1537.5	1537.5	63.626	5.849	2.59	plastic	Clay	70.5	57	1.18	67.26	1.09	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.470	60.530	3.166	1558.8	1558.8	65.800	5.298	2.55	plastic	Clay	67.1		1.18	67.51	1.08	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.630	56.670	3.343	1578.8	1578.8	64.836	5.982	2.60	plastic	Clay	70.6		1.18	63.20	1.08	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.800	58.340	3.472	1600.0	1600.0	66.140	6.034	2.59	plastic	Clay	70.4		1.18	65.07	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.960	53.600	2.967	1620.0	1620.0	60.154	5.620	2.60	plastic	Clay	70.7		1.18	59.78	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.120	47.300	1.966	1640.0	1640.0	49.902	4.230	2.56	plastic	Clay	67.7		1.18	52.75	1.07	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	93.300	3.971	1661.3	1661.3	98.640	4.295	2.37	plastic	Clay	52.5		1.18	104.06	1.07	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	123.200	4.634	1681.3	1681.3	129.746	3.787	2.25	plastic	Clay	43.2		1.18	137.41	1.06	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	69.560	4.689	1702.5	1702.5	75.618	6.825	2.60	plastic	Clay	70.9		1.18	77.58	1.06	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	59.670	2.581	1722.5	1722.5	61.608	4.388	2.51	plastic	Clay	63.7		1.18	66.55	1.06	n.a.	n.a.	0.96	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	57.530	2.311	1742.5	1742.5	59.014	4.078	2.50	plastic	Clay	62.8		1.18	64.16	1.05	n.a.	n.a.	0.96	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	50.540	1.715	1763.8	1763.8	51.410	3.453	2.49	plastic	Clay	62.0		1.18	56.37	1.05	n.a.	n.a.	0.96	0.583	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	41.920	1.433	1783.8	1783.8	42.236	3.493	2.55	plastic	Clay	67.1		1.18	46.75	1.05	n.a.	n.a.	0.96	0.586	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	42.710	1.077	1805.0	1805.0	42.785	2.576	2.46	plastic	Clay	59.6		1.18	47.63	1.04	n.a.	n.a.	0.96	0.588	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	40.840	0.896	1825.0	1825.0	40.636	2.245	2.44	plastic	Clay	57.8		1.18	45.55	1.04	n.a.	n.a.	0.96	0.590	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.760	42.900	1.389	1845.0	1845.0	42.490	3.309	2.53	plastic	Clay	65.7		1.18	47.85	1.04	n.a.	n.a.	0.96	0.593	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	38.560	1.763	1866.3	1866.3	40.324	4.685	2.66		Clay	75.4			36.45	1.03	n.a.	n.a.	0.96	0.595	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	29.800	1.466	1886.3	1886.3	30.597	5.080	2.77		Clay	84.2			28.17	1.03	n.a.	n.a.	0.95	0.597	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	26.320	1.159	1907.5	1907.5	26.596	4.568	2.78		Clay	85.2			24.88	1.03	n.a.	n.a.	0.95	0.600	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	26.590	0.925	1927.5	1927.5	26.590	3.610	2.71		Clay	79.8			25.13	1.02	n.a.	n.a.	0.95	0.602	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	38.220	0.810	1947.5	1947.5	36.696	2.174	2.46	plastic	Clay	59.9	40		40.00	1.02	n.a.	n.a.	0.95	0.604	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	42.720	0.724	1968.8	1968.8	40.896	1.734	2.36	plastic	Clay	52.0			40.38	1.02	n.a.	n.a.	0.95	0.606	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	37.110	0.801	1988.8	1988.8	35.211	2.216	2.48	plastic	Clay	61.4			35.08	1.02	n.a.	n.a.	0.95	0.608	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.080	36.100	0.869	2010.0	2010.0	34.035	2.476	2.52		Sand	64.8			34.12	1.03	35.03	94.74	0.95	0.610	1.005	0.131	0.163	0.27	0.03	0.05
16.240	39.060	0.896	2030.0	2030.0	36.713	2.354	2.48		Sand	61.6			36.92	1.02	37.70	97.41	0.95	0.612	1.004	0.134	0.168	0.27	0.03	0.05
16.400	47.800	1.023	2050.0	2050.0	44.917	2.187	2.40		Sand	54.6			45.18	1.02	45.88	105.78	0.95	0.614	1.004	0.145	0.189	0.31	0.03	0.04
16.570	61.220	2.088	2071.3	2071.3	57.496	3.470	2.45		Sand	59.4			57.86	1.01	58.42	123.32	0.95	0.616	1.003	0.179	0.253	0.41	0.03	0.04
16.730	47.590	2.164	2091.3	2091.3	44.513	4.649	2.62		Clay	72.8			44.98	1.00	n.a.	n.a.	0.95	0.618	n.a.	n.a.	n.a.	n.a.	0.00	0.00
16.900	31.520	1.159	2112.5	2112.5	28.841	3.805	2.70		Clay	78.9			29.79	1.00	n.a.	n.a.	0.95	0.620	n.a.	n.a.	n.a.	n.a.	0.00	0.00
17.060	51.690	1.626	2132.5	2132.5	47.663	3.212	2.49		Sand	62.1	80		80.00	1.00	79.75	151.48	0.95	0.621	0.999	0.299	0.503	0.81	0.01	0.02
17.220	85.370	2.671	2152.5	2152.5	78.994	3.169	2.33		Sand	49.5			80.69	0.99	80.13	147.11	0.95	0.623	0.997	0.271	0.441	0.71	0.02	0.03
17.390	79.730	0.606	2173.8	2173.8	73.338	0.770	1.95		Sand	18.9			75.36	0.99	74.38	105.47	0.94	0.625	0.997	0.145	0.187	0.30	0.03	0.04
17.550	46.270	0.982	2193.8	2193.8	41.933	2.173	2.42		Sand	56.3			43.73	0.98	42.96	102.61	0.94	0.627	0.996	0.141	0.179	0.29	0.03	0.04
17.720	39.750	0.983	2215.0	2215.0	35.699	2.543	2.51		Sand	64.1			37.57	0.98	36.71	96.75	0.94	0.629	0.995	0.133	0.165	0.26	0.03	0.04
17.880	35.230	0.747	2235.0	2235.0	31.372	2.190	2.52		Sand	64.3			33.30	0.97	32.37	91.21	0.94	0.630	0.995	0.127	0.154	0.24	0.04	0.05
18.040	65.130	1.354	2255.0	2255.0	58.600	2.116	2.30		Sand	46.9			61.56	0.97	59.80	120.20	0.94	0.632	0.992	0.172	0.236	0.37	0.03	0.04
18.210	100.920	0.462	2276.3	2276.3	90.931	0.463	1.75		Sand	3.1			95.39	0.96	91.86	91.86	0.94	0.633	0.993	0.128	0.155	0.24	0.04	0.05
18.370	97.750	1.803	2296.3	2296.3	87.649	1.866	2.13		Sand	33.7			92.39	0.97	89.36	147.18	0.94	0.635	0.987	0.271	0.438	0.69	0.02	0.03
18.540	130.310	1.335	2317.5	2317.5	116.644	1.034	1.87		Sand	12.5			123.17	0.96	118.45	134.69	0.94	0.637	0.987	0.213	0.317	0.50	0.02	0.03
18.700	172.260	3.563	2337.5	2337.5	153.859	2.083	2.00		Sand	23.3			162.82	0.97	157.80	211.45	0.94	0.638	0.970	3.839	8.193	12.84	0.00	0.00
18.860	245.010	6.448	2357.5	2357.5	218.341	2.644	1.99		Sand	22.5			231.58	0.97	225.07	287.37	0.94	0.640	0.968	37661.177	80168.256	125339.43	0.00	0.00
19.030	240.810	6.813	2378.8	2378.8	213.610	2.843	2.03		Sand	25.0			227.61	0.97	220.69	289.41	0.94	0.641	0.965	55581.812	########	184022.35	0.00	0.00
19.190	195.100	2.044	2398.8	2398.8	172.131	1.054	1.75		Sand	3.1			184.40	0.96	176.20	176.21	0.94	0.643	0.974	0.627	1.239	1.93	0.00	0.00
19.360	193.420	2.950	2420.0	2420.0	169.879	1.535	1.87		Sand	13.0			182.82	0.96	174.78	196.00	0.94	0.644	0.966	1.520	3.231	5.02	0.00	0.00
19.520	89.670	3.225	2440.0	2440.0	77.853	3.647	2.38		Sand	53.5	182		182.00	0.96	175.29	269.83	0.94	0.645	0.957	1898.325	3997.814	6193.90	0.00	0.00
19.690	23.820	2.644	2461.3	2461.3	18.356	11.703	3.18		Clay	100.0			22.51	0.96	n.a.	n.a.	0.93	0.647	n.a.	n.a.	n.a.	n.a.	0.00	0.00
19.850	17.190	0.562	2481.3	2481.3	12.856	3.526	2.95		Clay	98.9			16.25	0.96	n.a.	n.a.	0.93	0.648	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.010	10.170	0.471	2501.2	2500.6	7.134	5.280	3.26		Clay	100.0			9.61	0.96	n.a.	n.a.	0.93	0.650	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.180	8.190	0.316	2521.6	2510.4	5.520	4.563	3.31		Clay	100.0			7.74	0.96	n.a.	n.a.	0.93	0.651	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.340	8.130	0.323	2540.8	2519.6	5.445	4.712	3.33		Clay	100.0			7.68	0.95	n.a.	n.a.	0.93	0.652	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.510	8.650	0.322	2561.2	2529.4	5.827	4.369	3.28		Clay	100.0			8.18	0.95	n.a.	n.a.	0.93	0.653	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.670	8.560	0.360	2580.4	2538.6	5.727	4.951	3.32		Clay	100.0			8.09	0.95	n.a.	n.a.	0.93	0.655	n.a.	n.a.	n.a.	n.a.	0.00	0.00
20.830	9.050	0.324	2599.6	2547.8	6.084	4.186	3.26		Clay	100.0			8.55	0.95	n.a.	n.a.	0.93	0.656	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.000	9.380	0.376	2620.0	2557.6	6.311	4.664	3.27		Clay	100.0			8.87	0.95	n.a.	n.a.	0.93	0.657	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.80

Total Settlement: 0.66 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.160	10.770	0.480	2639.2	2566.8	7.364	5.081	3.24		Clay	100.0			10.18	0.95	n.a.	n.a.	0.93	0.658	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.330	18.360	0.858	2659.6	2576.6	13.219	5.037	3.04		Clay	100.0			17.35	0.95	n.a.	n.a.	0.93	0.659	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	24.200	1.070	2678.8	2585.8	17.681	4.678	2.92		Clay	96.4			22.87	0.95	n.a.	n.a.	0.93	0.661	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	32.040	1.016	2698.0	2595.0	23.654	3.309	2.72		Clay	80.9			30.28	0.95	n.a.	n.a.	0.93	0.662	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	41.530	1.073	2718.4	2604.8	34.221	2.670	2.54		Sand	66.3			39.25	0.90	35.32	95.46	0.92	0.663	0.979	0.132	0.160	0.24	0.03	0.04
21.980	42.530	1.264	2737.6	2614.0	31.492	3.070	2.61		Clay	71.6			40.20	0.95	n.a.	n.a.	0.92	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	44.090	1.708	2758.0	2623.8	32.556	3.998	2.67		Clay	76.9			41.67	0.94	n.a.	n.a.	0.92	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	60.770	2.079	2777.2	2633.1	50.314	3.501	2.50		Sand	62.8	68		68.00	0.91	61.76	128.60	0.92	0.666	0.971	0.193	0.273	0.41	0.02	0.03
22.470	72.810	2.240	2796.4	2642.3	60.402	3.136	2.41		Sand	55.6			68.82	0.91	62.37	127.13	0.92	0.667	0.971	0.189	0.265	0.40	0.02	0.03
22.640	58.710	2.594	2816.8	2652.1	43.213	4.527	2.62		Clay	72.9			55.49	0.94	n.a.	n.a.	0.92	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	39.660	2.081	2836.0	2661.3	28.740	5.443	2.81		Clay	87.4			37.49	0.94	n.a.	n.a.	0.92	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.970	21.290	1.695	2856.4	2671.1	14.872	8.533	3.15		Clay	100.0			20.12	0.94	n.a.	n.a.	0.92	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.130	34.900	2.199	2875.6	2680.3	24.969	6.571	2.91		Clay	95.5			32.99	0.94	n.a.	n.a.	0.92	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	146.550	2.819	2894.8	2689.5	121.650	1.943	2.05		Sand	26.8			138.52	0.92	127.28	183.14	0.92	0.672	0.948	0.826	1.678	2.50	0.00	0.00
23.460	159.420	3.143	2915.2	2699.3	132.191	1.990	2.03		Sand	25.5			150.68	0.92	138.80	194.23	0.92	0.673	0.940	1.386	2.866	4.26	0.00	0.00
23.620	154.380	3.314	2934.4	2708.5	127.747	2.167	2.07		Sand	28.5			145.92	0.92	134.27	194.39	0.92	0.674	0.939	1.398	2.887	4.29	0.00	0.00
23.790	189.100	3.892	2954.8	2718.3	156.462	2.075	2.00		Sand	22.8			178.73	0.93	165.60	219.30	0.92	0.674	0.925	6.758	13.751	20.39	0.00	0.00
23.950	126.900	3.896	2974.0	2727.5	104.407	3.107	2.24		Sand	42.6	178		178.00	0.93	166.32	250.78	0.91	0.675	0.924	142.939	290.517	430.20	0.00	0.00
24.110	97.320	3.909	2993.2	2736.7	79.639	4.079	2.41		Sand	55.9	178		178.00	0.93	166.32	259.72	0.91	0.676	0.923	444.792	903.027	1335.59	0.00	0.00
24.280	90.980	3.625	3013.6	2746.5	74.229	4.051	2.43		Sand	57.3	178		178.00	0.93	166.16	260.22	0.91	0.677	0.922	476.057	965.379	1426.01	0.00	0.00
24.440	29.010	1.861	3032.8	2755.7	19.954	6.770	2.99		Clay	100.0			27.42	0.93	n.a.	n.a.	0.91	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.610	10.660	0.712	3053.2	2765.5	6.605	7.796	3.39		Clay	100.0			10.08	0.93	n.a.	n.a.	0.91	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.770	11.060	0.574	3072.4	2774.8	6.865	6.031	3.31		Clay	100.0			10.45	0.93	n.a.	n.a.	0.91	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.930	11.830	0.639	3091.6	2784.0	7.388	6.216	3.29		Clay	100.0			11.18	0.93	n.a.	n.a.	0.91	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	11.980	0.631	3112.0	2793.8	7.462	6.055	3.28		Clay	100.0			11.32	0.93	n.a.	n.a.	0.91	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	11.930	0.650	3131.2	2803.0	7.395	6.273	3.29		Clay	100.0			11.28	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	12.560	0.675	3151.6	2812.8	7.810	6.147	3.27		Clay	100.0			11.87	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	14.400	1.059	3170.8	2822.0	9.082	8.260	3.30		Clay	100.0			13.61	0.93	n.a.	n.a.	0.91	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	20.960	1.028	3190.0	2831.2	13.680	5.310	3.04		Clay	100.0			19.81	0.93	n.a.	n.a.	0.91	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	15.540	0.951	3210.4	2841.0	9.810	6.828	3.22		Clay	100.0			14.69	0.93	n.a.	n.a.	0.90	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	14.810	0.774	3229.6	2850.2	9.259	5.869	3.20		Clay	100.0			14.00	0.92	n.a.	n.a.	0.90	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	16.540	0.761	3250.0	2860.0	10.430	5.101	3.12		Clay	100.0			15.63	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	15.220	0.772	3269.2	2869.2	9.470	5.680	3.18		Clay	100.0			14.39	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	14.500	0.730	3288.4	2878.4	8.933	5.678	3.20		Clay	100.0			13.71	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	11.790	0.677	3308.8	2888.2	7.019	6.683	3.33		Clay	100.0			11.14	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	9.960	0.560	3328.0	2897.4	5.726	6.754	3.40		Clay	100.0			9.41	0.92	n.a.	n.a.	0.90	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	9.300	0.513	3348.4	2907.2	5.246	6.723	3.43		Clay	100.0			8.79	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	10.610	0.517	3367.6	2916.4	6.121	5.795	3.34		Clay	100.0			10.03	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	10.600	0.500	3388.0	2926.2	6.087	5.609	3.33		Clay	100.0			10.02	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	10.320	0.419	3407.2	2935.5	5.871	4.859	3.31		Clay	100.0			9.75	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	10.400	0.391	3426.4	2944.7	5.900	4.502	3.29		Clay	100.0			9.83	0.92	n.a.	n.a.	0.90	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	10.790	0.453	3446.8	2954.5	6.138	4.999	3.30		Clay	100.0			10.20	0.92	n.a.	n.a.	0.89	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	11.850	0.462	3466.0	2963.7	6.827	4.565	3.24		Clay	100.0			11.20	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	13.240	0.534	3486.4	2973.5	7.733	4.648	3.20		Clay	100.0			12.51	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	13.730	0.711	3505.6	2982.7	8.031	5.936	3.25		Clay	100.0			12.98	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	15.720	0.776	3524.8	2991.9	9.330	5.559	3.18		Clay	100.0			14.86	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	14.960	0.662	3545.2	3001.7	8.787	5.018	3.17		Clay	100.0			14.14	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	12.820	0.496	3564.4	3010.9	7.332	4.495	3.21		Clay	100.0			12.12	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	12.650	0.467	3584.8	3020.7	7.189	4.297	3.20		Clay	100.0			11.96	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	13.300	0.525	3604.0	3029.9	7.590	4.562	3.20		Clay	100.0			12.57	0.91	n.a.	n.a.	0.89	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.360	15.620	0.689	3623.2	3039.1	9.087	4.993	3.16		Clay	100.0			14.76	0.91	n.a.	n.a.	0.89	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.530	19.960	0.885	3643.6	3048.9	11.898	4.879	3.06		Clay	100.0			18.87	0.91	n.a.	n.a.	0.89	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.690	21.070	1.042	3662.8	3058.1	12.582	5.416	3.07		Clay	100.0			19.91	0.91	n.a.	n.a.	0.89	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.860	20.750	1.398	3683.2	3067.9	12.326	7.391	3.17		Clay	100.0			19.61	0.91	n.a.	n.a.	0.88	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	25.220	0.966	3702.4	3077.2	15.189	4.132	2.93		Clay	97.7			23.84	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	16.690	0.719	3721.6	3086.4	9.609	4.845	3.13		Clay	100.0			15.78	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	12.690	0.564	3742.0	3096.2	6.989	5.211	3.26		Clay	100.0			11.99	0.90	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	12.030	0.529	3761.2	3105.4	6.537	5.212	3.29		Clay	100.0			11.37	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	11.840	0.480	3781.6	3115.2	6.388	4.822	3.27		Clay	100.0			11.19	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	13.210	0.729	3800.8	3124.4	7.240	6.446	3.31		Clay	100.0			12.49	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	18.940	1.364	3820.0	3133.6	10.869	8.006	3.23		Clay	100.0			17.90	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	39.010	2.552	3840.4	3143.4	23.599	6.881	2.94		Clay	98.0			36.87	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	59.830	3.594	3859.6	3152.6	36.732	6.206	2.77		Clay	84.7			56.55	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	77.840	3.510	3880.0	3162.4	58.682	4.625	2.54		Sand	66.2		1.8	132.43	0.88	115.96	199.26	0.88	0.699	0.895	1.813	3.571	5.11	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 2

PGA (A_{max}) 0.80

Total Settlement: 0.66 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.660	79.800	3.192	3899.2	3171.6	60.103	4.100	2.49		Sand	62.5		1.8	135.77	0.88	118.94	201.90	0.88	0.700	0.891	2.107	4.131	5.90	0.00	0.00
31.820	41.100	1.692	3918.4	3180.8	24.610	4.323	2.79		Clay	85.9			38.85	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	19.290	0.968	3938.8	3190.6	10.857	5.589	3.13		Clay	100.0			18.23	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	22.560	0.739	3958.0	3199.8	12.864	3.593	2.95		Clay	99.3			21.32	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	23.500	0.852	3978.4	3209.6	13.404	3.958	2.97		Clay	100.0			22.21	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	22.880	0.832	3997.6	3218.8	12.974	3.983	2.98		Clay	100.0			21.63	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	21.670	0.839	4016.8	3228.1	12.182	4.269	3.02		Clay	100.0			20.48	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	21.190	0.832	4037.2	3237.9	11.842	4.337	3.03		Clay	100.0			20.03	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	20.390	0.842	4056.4	3247.1	11.310	4.584	3.06		Clay	100.0			19.27	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	16.160	0.824	4076.8	3256.9	8.672	5.833	3.22		Clay	100.0			15.27	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	12.530	0.670	4096.0	3266.1	6.419	6.389	3.35		Clay	100.0			11.84	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	11.460	0.534	4115.2	3275.3	5.741	5.684	3.35		Clay	100.0			10.83	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	11.440	0.523	4135.6	3285.1	5.706	5.577	3.35		Clay	100.0			10.81	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	10.450	0.508	4154.8	3294.3	5.083	6.067	3.41		Clay	100.0			9.88	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	9.700	0.519	4175.2	3304.1	4.608	6.823	3.48		Clay	100.0			9.17	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	10.620	0.514	4194.4	3313.3	5.145	6.027	3.41		Clay	100.0			10.04	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	12.620	0.620	4213.6	3322.5	6.328	5.895	3.33		Clay	100.0			11.93	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	11.620	0.706	4234.0	3332.3	5.704	7.429	3.43		Clay	100.0			10.98	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	13.070	0.874	4253.2	3341.5	6.550	7.988	3.40		Clay	100.0			12.35	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	15.140	0.903	4273.6	3351.3	7.760	6.944	3.30		Clay	100.0			14.31	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	15.730	0.915	4292.8	3360.5	8.084	6.732	3.28		Clay	100.0			14.87	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	14.240	0.937	4312.0	3369.8	7.172	7.757	3.36		Clay	100.0			13.46	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	14.640	0.994	4332.4	3379.6	7.382	7.970	3.36		Clay	100.0			13.84	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	22.420	1.666	4351.6	3388.8	11.948	8.228	3.21		Clay	100.0			21.19	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	40.930	2.858	4372.0	3398.6	22.800	7.376	2.97		Clay	100.0			38.69	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	72.960	4.616	4391.2	3407.8	41.531	6.522	2.75		Clay	83.1			68.96	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	96.930	5.844	4411.6	3417.6	55.434	6.170	2.65		Clay	75.0			91.62	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	92.710	6.024	4430.8	3426.8	52.816	6.657	2.69		Clay	78.1			87.63	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	102.780	6.819	4450.0	3436.0	58.530	6.782	2.67		Clay	76.3			97.15	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	91.870	6.126	4470.4	3445.8	52.026	6.835	2.70		Clay	79.1			86.83	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	54.250	4.192	4489.6	3455.0	30.104	8.061	2.91		Clay	96.1			51.28	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	42.610	2.627	4510.0	3464.8	23.294	6.510	2.93		Clay	97.0			40.27	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	39.870	2.220	4529.2	3474.0	21.650	5.904	2.92		Clay	96.5			37.68	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	37.890	2.136	4548.4	3483.2	20.450	5.998	2.94		Clay	98.3			35.81	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	36.920	2.134	4568.8	3493.0	19.831	6.160	2.96		Clay	99.8			34.90	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	38.020	2.353	4588.0	3502.2	20.402	6.587	2.97		Clay	100.0			35.94	0.88	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	39.900	2.240	4608.4	3512.0	21.410	5.957	2.93		Clay	97.0			37.71	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	35.360	1.329	4627.6	3521.2	18.770	4.023	2.86		Clay	91.4			33.42	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	32.360	2.105	4646.8	3530.5	17.016	7.008	3.05		Clay	100.0			30.59	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.060	30.610	2.856	4667.2	3540.3	15.974	10.100	3.18		Clay	100.0			28.93	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.220	58.720	4.446	4686.4	3549.5	31.766	7.886	2.89		Clay	94.2			55.50	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	66.920	5.219	4706.8	3559.3	36.281	8.082	2.86		Clay	91.7			63.25	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.550	61.430	3.651	4726.0	3568.5	33.105	6.182	2.80		Clay	87.1			58.06	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.710	134.830	4.090	4745.2	3577.7	96.282	3.088	2.27		Sand	44.2			127.44	0.83	105.30	175.78	0.84	0.703	0.893	0.617	1.114	1.59	0.00	0.00
38.880	188.540	5.226	4765.6	3587.5	135.132	2.807	2.14		Sand	34.1			178.20	0.85	152.23	224.38	0.84	0.702	0.842	10.123	18.743	26.68	0.00	0.00
39.040	149.300	6.476	4784.8	3596.7	106.504	4.408	2.36		Sand	51.6			141.12	0.84	118.17	196.32	0.84	0.702	0.866	1.545	2.945	4.19	0.00	0.00
39.210	126.470	7.492	4805.2	3606.5	89.823	6.039	2.51		Sand	63.9			119.54	0.82	98.51	176.11	0.83	0.702	0.891	0.625	1.129	1.61	0.00	0.00
39.370	93.890	5.144	4824.4	3615.7	50.600	5.623	2.65		Clay	74.6			88.74	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.530	54.900	3.256	4843.6	3624.9	28.954	6.204	2.84		Clay	90.5			51.89	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.700	74.130	4.139	4864.0	3634.7	39.452	5.772	2.73		Clay	81.2			70.07	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.860	112.010	5.635	4883.2	3643.9	78.917	5.143	2.49		Sand	62.3			105.87	0.81	85.72	159.19	0.83	0.702	0.906	0.363	0.586	0.83	0.01	0.01
40.030	67.590	4.293	4903.6	3653.7	35.656	6.591	2.80		Clay	86.9			63.88	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.190	41.140	2.894	4922.8	3662.9	21.119	7.483	3.00		Clay	100.0			38.88	0.87	n.a.	n.a.	0.83	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.350	86.700	3.746	4942.0	3672.2	45.874	4.448	2.60		Clay	71.0			81.95	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.520	169.520	6.094	4962.4	3682.0	119.688	3.648	2.26		Sand	43.9			160.23	0.84	134.69	212.34	0.83	0.701	0.834	4.078	7.482	10.67	0.00	0.00
40.680	122.170	6.917	4981.6	3691.2	85.646	5.780	2.51		Sand	63.7			115.47	0.81	93.90	170.13	0.83	0.701	0.893	0.506	0.873	1.25	0.00	0.00
40.850	63.240	4.461	5002.0	3701.0	32.823	7.345	2.86		Clay	91.6			59.77	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	34.160	1.410	5021.2	3710.2	17.061	4.456	2.92		Clay	96.3			32.29	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	26.190	1.788	5040.4	3719.4	12.728	7.552	3.16		Clay	100.0			24.75	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	40.860	2.570	5060.8	3729.2	20.557	6.704	2.97		Clay	100.0			38.62	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	61.550	3.840	5080.0	3738.4	31.570	6.508	2.83		Clay	89.5			58.18	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	78.930	4.911	5100.4	3748.2	40.756	6.430	2.75		Clay	83.1			74.60	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	74.360	4.054	5119.6	3757.4	38.218	5.646	2.73		Clay	81.4			70.28	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	36.880	2.368	5138.8	3766.6	18.218	6.902	3.02		Clay	100.0			34.86	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No.	2

PGA (A_{max})	0.80

Total Settlement:	0.66	(Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.160	23.280	1.094	5159.2	3776.4	10.963	5.283	3.11		Clay	100.0			22.00	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.320	28.180	0.980	5178.4	3785.6	13.520	3.829	2.95		Clay	99.3			26.64	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	23.050	0.999	5198.8	3795.4	10.776	4.883	3.10		Clay	100.0			21.79	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	21.820	0.892	5218.0	3804.6	10.099	4.641	3.10		Clay	100.0			20.62	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	22.970	0.854	5237.2	3813.9	10.672	4.194	3.06		Clay	100.0			21.71	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	22.120	0.876	5257.6	3823.6	10.195	4.493	3.09		Clay	100.0			20.91	0.86	n.a.	n.a.	0.81	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	22.500	0.918	5276.8	3832.9	10.364	4.622	3.09		Clay	100.0			21.27	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	29.430	1.337	5297.2	3842.7	13.939	4.992	3.01		Clay	100.0			27.82	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	37.410	3.081	5316.4	3851.9	18.044	8.865	3.10		Clay	100.0			35.36	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	73.620	5.504	5336.8	3861.7	36.747	7.758	2.84		Clay	90.4			69.58	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	101.400	6.591	5356.0	3870.9	51.008	6.677	2.70		Clay	78.9			95.84	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	97.820	6.824	5375.2	3880.1	49.036	7.173	2.73		Clay	81.7			92.46	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	68.020	4.574	5395.6	3889.9	33.586	7.003	2.84		Clay	89.9			64.29	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	39.280	2.030	5414.8	3899.1	18.759	5.552	2.95		Clay	98.8			37.13	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	32.730	1.200	5435.2	3908.9	15.356	3.998	2.92		Clay	96.7			30.94	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	30.790	1.075	5454.4	3918.1	14.325	3.829	2.93		Clay	97.7			29.10	0.85	n.a.	n.a.	0.81	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	30.050	1.112	5473.6	3927.3	13.909	4.070	2.96		Clay	99.8			28.40	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	32.870	1.153	5494.0	3937.1	15.302	3.829	2.91		Clay	95.9			31.07	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	34.490	1.205	5513.2	3946.3	16.082	3.797	2.89		Clay	94.3			32.60	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	34.460	1.290	5533.6	3956.1	16.022	4.070	2.91		Clay	95.9			32.57	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	34.740	1.435	5552.8	3965.3	16.121	4.489	2.94		Clay	97.9			32.84	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	35.110	1.502	5572.0	3974.6	16.265	4.647	2.94		Clay	98.5			33.19	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	34.050	1.598	5592.4	3984.4	15.688	5.113	2.98		Clay	100.0			32.18	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	32.180	1.498	5611.6	3993.6	14.711	5.100	3.00		Clay	100.0			30.42	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	29.290	1.376	5632.0	4003.4	13.226	5.199	3.04		Clay	100.0			27.68	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	30.690	1.212	5651.2	4012.6	13.889	4.351	2.98		Clay	100.0			29.01	0.84	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	33.900	1.410	5670.4	4021.8	15.448	4.539	2.95		Clay	99.3			32.04	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	35.040	1.709	5690.8	4031.6	15.971	5.307	2.99		Clay	100.0			33.12	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	36.400	1.780	5710.0	4040.8	16.603	5.305	2.97		Clay	100.0			34.40	0.84	n.a.	n.a.	0.79	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	37.850	1.771	5730.4	4050.6	17.274	5.063	2.95		Clay	98.8			35.78	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	37.470	1.757	5749.6	4059.8	17.043	5.080	2.95		Clay	99.2			35.42	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	37.430	1.704	5768.8	4069.0	16.980	4.932	2.95		Clay	98.7			35.38	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	35.410	1.586	5789.2	4078.8	15.944	4.878	2.96		Clay	100.0			33.47	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	34.040	1.546	5808.4	4088.0	15.233	4.965	2.98		Clay	100.0			32.17	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	32.740	1.455	5828.8	4097.8	14.557	4.879	2.99		Clay	100.0			30.95	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	34.870	1.439	5848.0	4107.0	15.557	4.505	2.95		Clay	99.0			32.96	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	36.420	1.512	5867.2	4116.3	16.270	4.514	2.94		Clay	97.8			34.42	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	36.520	1.801	5887.6	4126.0	16.275	5.363	2.98		Clay	100.0			34.52	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	44.590	3.389	5906.8	4135.3	20.137	8.140	3.04		Clay	100.0			42.15	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	111.870	6.123	5927.2	4145.1	52.548	5.622	2.63		Clay	73.8			105.74	0.84	n.a.	n.a.	0.78	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.720	156.600	7.398	5946.4	4154.3	103.631	4.816	2.39		Sand	54.6			148.02	0.80	118.29	197.93	0.78	0.689	0.827	1.685	3.065	4.45	0.00	0.00
48.880	125.800	6.868	5965.6	4163.5	82.757	5.592	2.51		Sand	63.5	148		148.00	0.80	118.61	201.81	0.78	0.689	0.818	2.096	3.774	5.48	0.00	0.00
49.050	115.880	5.791	5986.0	4173.3	75.976	5.129	2.50		Sand	63.0	148		148.00	0.80	118.48	201.50	0.78	0.688	0.818	2.058	3.705	5.38	0.00	0.00
49.210	92.660	5.767	6005.2	4182.5	42.873	6.432	2.74		Clay	82.0			87.58	0.84	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.380	95.480	6.001	6025.6	4192.3	44.113	6.490	2.73		Clay	81.5			90.25	0.83	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	73.530	4.689	6044.8	4201.5	33.563	6.651	2.82		Clay	88.6			69.50	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	48.480	2.582	6064.0	4210.7	21.587	5.681	2.91		Clay	95.7			45.82	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	40.160	1.838	6084.4	4220.5	17.589	4.952	2.94		Clay	97.8			37.96	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	56.000	3.323	6103.6	4229.7	25.036	6.276	2.89		Clay	94.3			52.93	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	135.260	7.679	6124.0	4239.5	88.275	5.809	2.50		Sand	63.2			127.84	0.78	99.45	177.11	0.78	0.686	0.857	0.649	1.135	1.66	0.00	0.00
50.360	239.100	10.785	6143.2	4248.7	157.437	4.569	2.27		Sand	44.6			225.99	0.83	188.03	279.73	0.78	0.685	0.791	9482.898	16499.465	24072.45	0.00	0.00
50.520	218.760	10.007	6162.4	4258.0	143.707	4.640	2.30		Sand	46.9			206.77	0.83	171.93	261.29	0.77	0.685	0.790	550.711	957.404	1397.56	0.00	0.00
50.690	188.250	10.346	6182.8	4267.7	123.230	5.588	2.40		Sand	55.2			177.93	0.82	145.33	232.65	0.77	0.685	0.790	20.908	36.317	53.04	0.00	0.00
50.850	126.970	5.508	6202.0	4277.0	82.351	4.447	2.43		Sand	57.4			120.01	0.77	91.94	165.50	0.77	0.684	0.871	0.436	0.709	1.04	0.01	0.00
51.020	56.350	3.140	6222.4	4286.8	24.839	5.899	2.88		Clay	93.0			53.26	0.83	n.a.	n.a.	0.77	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.180	41.580	1.628	6241.6	4296.0	17.905	4.234	2.89		Clay	93.8			39.30	0.83	n.a.	n.a.	0.77	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.350	37.670	1.668	6262.0	4305.8	16.043	4.829	2.96		Clay	99.7			35.60	0.83	n.a.	n.a.	0.77	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.510	39.380	1.641	6281.2	4315.0	16.797	4.527	2.93		Clay	97.0			37.22	0.83	n.a.	n.a.	0.77	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.670	42.550	2.011	6300.4	4324.2	18.223	5.104	2.93		Clay	97.6			40.22	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.840	45.180	2.157	6320.8	4334.0	19.391	5.132	2.91		Clay	96.1			42.70	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.000	50.030	2.174	6340.0	4343.2	21.579	4.638	2.85		Clay	91.0			47.29	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.170	50.160	2.224	6360.4	4353.0	21.585	4.735	2.86		Clay	91.4			47.41	0.83	n.a.	n.a.	0.77	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	56.120	2.892	6379.6	4362.2	24.268	5.464	2.86		Clay	91.8			53.04	0.83	n.a.	n.a.	0.76	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	78.340	5.889	6398.8	4371.4	34.378	7.837	2.87		Clay	92.2			74.05	0.83	n.a.	n.a.	0.76	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No.	2

PGA (A_{max})	0.80

Total Settlement:	0.66	(Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	$CRR_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
52.660	132.330	10.151	6419.2	4381.2	58.943	7.862	2.71		Clay	80.1			125.08	0.83	n.a.	n.a.	0.76	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.820	247.340	13.768	6438.4	4390.4	160.186	5.640	2.34		Sand	50.4			233.78	0.82	192.83	290.18	0.76	0.680	0.781	64489.039	########	163019.86	0.00	0.00
52.990	222.100	14.538	6458.8	4400.2	143.457	6.642	2.43		Sand	57.3			209.92	0.82	173.05	269.00	0.76	0.679	0.780	1673.285	2872.688	4228.77	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
0.160	46.360	0.920	20.0	20.0	450.616	1.984	1.72		Unsaturated	0.8			43.82	1.70	74.49	74.49	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.330	38.570	1.129	41.3	41.3	260.962	2.927	1.99		Unsaturated	22.1			36.46	1.70	61.97	97.97	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.490	46.680	1.144	61.3	61.3	259.158	2.453	1.93		Unsaturated	17.0			44.12	1.70	75.01	101.46	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.660	45.920	1.211	82.5	82.5	219.612	2.639	1.99		Unsaturated	22.3			43.40	1.70	73.78	112.11	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.820	57.270	1.552	102.5	102.5	245.725	2.712	1.97		Unsaturated	21.0			54.13	1.70	92.02	130.17	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
0.980	84.370	1.921	122.5	122.5	331.190	2.279	1.84		Unsaturated	10.3			79.74	1.70	135.57	145.29	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.150	86.080	1.837	143.8	143.8	311.895	2.136	1.83		Unsaturated	9.5			81.36	1.70	138.31	145.61	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.310	71.430	1.585	163.8	163.8	242.418	2.221	1.91		Unsaturated	15.5			67.51	1.70	114.77	140.59	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.480	60.630	0.813	185.0	185.0	193.513	1.344	1.79		Unsaturated	6.5			57.31	1.70	97.42	98.43	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.640	47.480	0.503	205.0	205.0	143.869	1.062	1.81		Unsaturated	7.8			44.88	1.70	76.29	78.73	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.800	29.140	0.443	225.0	225.0	84.138	1.527	2.09		Unsaturated	30.0			27.54	1.70	46.82	91.59	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
1.970	19.890	0.373	246.3	246.3	54.767	1.889	2.29		Unsaturated	46.1			18.80	1.70	31.96	84.78	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.130	17.410	0.389	266.3	266.3	46.035	2.253	2.40		Unsaturated	54.6			16.46	1.70	27.97	83.00	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.300	15.270	0.465	287.5	287.5	38.787	3.074	2.54		Unsaturated	66.3			14.43	1.70	24.54	81.57	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.460	13.390	0.462	307.5	307.5	48.267	3.488	2.51		Unsaturated	63.8			12.66	1.70	21.52	77.15	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.620	12.020	0.399	327.5	327.5	41.369	3.367	2.55		Unsaturated	66.8			11.36	1.70	19.31	74.95	1.00	0.519	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.790	13.040	0.277	348.8	348.8	29.953	2.156	2.53		Unsaturated	65.2			12.33	1.70	20.95	76.74	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
2.950	13.690	0.233	368.8	368.8	30.579	1.727	2.46		Unsaturated	60.0			12.94	1.70	22.00	76.87	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.120	13.820	0.284	390.0	390.0	29.997	2.081	2.52		Unsaturated	64.4			13.06	1.70	22.21	78.18	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.280	14.300	0.338	410.0	410.0	30.265	2.399	2.55		Unsaturated	67.2			13.52	1.70	22.98	79.76	1.00	0.518	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.440	12.970	0.428	430.0	430.0	36.781	3.352	2.58		Unsaturated	69.7			12.26	1.70	20.84	77.47	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.610	11.540	0.551	451.3	451.3	50.147	4.872	2.60		Unsaturated	71.2			10.91	1.70	18.54	74.77	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.770	10.210	0.667	471.3	471.3	42.332	6.687	2.75		Unsaturated	83.3			9.65	1.70	16.41	73.75	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
3.940	11.000	0.783	492.5	492.5	43.670	7.277	2.77		Unsaturated	84.7			10.40	1.70	17.67	75.58	1.00	0.517	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.100	14.400	0.949	512.5	512.5	55.195	6.708	2.68		Unsaturated	77.3			13.61	1.70	23.14	81.70	1.00	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.270	15.560	1.132	533.8	533.8	57.304	7.399	2.70		Unsaturated	79.1			14.71	1.70	25.00	84.38	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.430	16.510	1.141	553.8	553.8	58.630	7.026	2.68		Unsaturated	77.2			15.60	1.70	26.53	86.08	0.99	0.516	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.590	18.420	1.156	573.8	573.8	63.209	6.377	2.62		Unsaturated	72.9			17.41	1.70	29.60	89.36	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.760	19.670	1.268	595.0	595.0	65.118	6.544	2.62		Unsaturated	73.0			18.59	1.70	31.61	91.97	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
4.920	20.250	1.568	615.0	615.0	64.854	7.862	2.69		Unsaturated	78.0			19.14	1.70	32.54	94.01	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.090	21.910	1.373	636.3	636.3	67.872	6.360	2.60		Unsaturated	71.3			20.71	1.70	35.21	96.32	0.99	0.515	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.250	25.030	1.493	656.3	656.3	52.985	6.045	2.66		Unsaturated	75.5			23.66	1.70	40.22	103.56	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.410	26.290	1.805	676.3	676.3	76.752	6.957	2.60		Unsaturated	71.1			24.85	1.70	42.24	105.38	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.580	27.340	2.063	697.5	697.5	77.394	7.643	2.63		Unsaturated	73.5			25.84	1.70	43.93	108.02	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.740	26.870	2.098	717.5	717.5	73.899	7.914	2.66		Unsaturated	75.4			25.40	1.69	42.83	106.93	0.99	0.514	1.100	n.a.	n.a.	n.a.	0.00	0.00
5.910	27.080	1.980	738.8	738.8	72.313	7.412	2.64		Unsaturated	74.1			25.60	1.66	42.61	106.41	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.070	26.010	1.901	758.8	758.8	67.560	7.416	2.66		Unsaturated	75.6			24.58	1.65	40.60	104.07	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.230	25.210	1.863	778.8	778.8	63.745	7.507	2.68		Unsaturated	77.1			23.83	1.64	39.01	102.27	0.99	0.513	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.400	24.160	1.777	800.0	800.0	59.400	7.481	2.69		Unsaturated	78.6			22.84	1.62	37.07	99.98	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.560	23.750	1.760	820.0	820.0	56.927	7.541	2.71		Unsaturated	79.7			22.45	1.61	36.08	98.87	0.99	0.512	1.100	n.a.	n.a.	n.a.	0.00	0.00
6.730	24.430	1.829	841.3	841.3	57.080	7.616	2.71		Unsaturated	79.9			23.09	1.58	36.59	99.56	0.99	0.512	1.098	n.a.	n.a.	n.a.	0.00	0.00
6.890	26.790	1.825	861.3	861.3	61.212	6.924	2.66		Unsaturated	75.8			25.32	1.56	39.42	102.59	0.99	0.512	1.098	n.a.	n.a.	n.a.	0.00	0.00
7.050	28.350	2.107	881.3	881.3	63.340	7.548	2.68		Unsaturated	77.4			26.80	1.53	41.06	104.97	0.99	0.511	1.097	n.a.	n.a.	n.a.	0.00	0.00
7.220	32.010	2.278	902.5	902.5	69.936	7.218	2.64		Unsaturated	74.1			30.26	1.50	45.41	110.04	0.99	0.511	1.098	n.a.	n.a.	n.a.	0.00	0.00
7.380	33.510	2.480	922.5	922.5	71.650	7.504	2.65		Unsaturated	74.6			31.67	1.48	46.89	112.05	0.98	0.511	1.097	n.a.	n.a.	n.a.	0.00	0.00
7.550	32.400	2.566	943.8	943.8	67.662	8.037	2.68		Unsaturated	77.7			30.62	1.47	44.99	110.12	0.98	0.510	1.093	n.a.	n.a.	n.a.	0.00	0.00
7.710	42.700	2.578	963.8	963.8	69.199	6.105	2.58		Unsaturated	69.8			40.36	1.42	57.40	124.68	0.98	0.510	1.100	n.a.	n.a.	n.a.	0.00	0.00
7.870	44.640	2.712	983.8	983.8	71.329	6.143	2.58		Unsaturated	69.3			42.19	1.40	59.26	126.98	0.98	0.510	1.100	n.a.	n.a.	n.a.	0.00	0.00
8.040	37.610	2.757	1005.0	1005.0	73.846	7.429	2.63		Unsaturated	73.7			35.55	1.41	50.22	116.20	0.98	0.510	1.090	n.a.	n.a.	n.a.	0.00	0.00
8.200	48.230	2.884	1025.0	1025.0	64.802	6.045	2.60		Unsaturated	70.9			45.59	1.37	62.49	131.52	0.98	0.509	1.099	n.a.	n.a.	n.a.	0.00	0.00
8.370	44.250	2.394	1046.3	1046.3	58.776	5.474	2.59		Unsaturated	70.5			41.82	1.37	57.33	124.75	0.98	0.509	1.091	n.a.	n.a.	n.a.	0.00	0.00
8.530	33.830	2.281	1066.3	1066.3	62.456	6.850	2.65		Unsaturated	75.1			31.98	1.39	44.40	108.91	0.98	0.509	1.078	n.a.	n.a.	n.a.	0.00	0.00
8.690	34.680	2.450	1086.3	1086.3	62.853	7.178	2.67		Unsaturated	76.2			32.78	1.37	45.05	109.95	0.98	0.508	1.077	n.a.	n.a.	n.a.	0.00	0.00
8.860	28.630	2.319	1107.5	1107.5	50.702	8.260	2.77		Unsaturated	84.7			27.06	1.38	37.30	101.14	0.98	0.508	1.069	n.a.	n.a.	n.a.	0.00	0.00
9.020	26.680	2.187	1127.5	1127.5	46.326	8.374	2.80		Unsaturated	87.1			25.22	1.37	34.61	97.93	0.98	0.508	1.066	n.a.	n.a.	n.a.	0.00	0.00
9.190	27.130	2.069	1148.8	1148.8	46.234	7.790	2.78		Unsaturated	85.2			25.64	1.36	34.86	98.02	0.98	0.507	1.064	n.a.	n.a.	n.a.	0.00	0.00
9.350	26.790	1.946	1168.8	1168.8	44.844	7.424	2.77		Unsaturated	84.7			25.32	1.35	34.17	97.05	0.98	0.507	1.062	n.a.	n.a.	n.a.	0.00	0.00
9.510	26.200	1.818	1188.8	1188.8	43.080	7.100	2.77		Unsaturated	84.4			24.76	1.34	33.19	95.74	0.98	0.507	1.059	n.a.	n.a.	n.a.	0.00	0.00
9.680	25.810	1.729	1210.0	1210.0	41.661	6.859	2.77		Unsaturated	84.3			24.40	1.33	32.44	94.76	0.98	0.506	1.057	n.a.	n.a.	n.a.	0.00	0.00
9.840	25.000	1.755	1230.0	1230.0	39.650	7.198	2.80		Unsaturated	86.7			23.63	1.32	31.21	93.46	0.98	0.506	1.055	n.a.	n.a.	n.a.	0.00	0.00
10.170	24.630	1.766	1271.3	1271.3	37.749	7.359	2.82		Clay	88.4			23.28	1.14	n.a.	n.a.	0.97	0.510	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.330	24.110	1.769	1291.3	1291.3	36.344	7.540	2.84		Clay	89.9			22.79	1.14	n.a.	n.a.	0.97	0.513	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.500	23.750	1.703	1312.5	1312.5	35.190	7.374	2.84		Clay	90.1			22.45	1.13	n.a.	n.a.	0.97	0.517	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.660	23.790	1.708	1332.5	1332.5	34.707	7.388	2.84		Clay	90.5			22.49	1.13	n.a.	n.a.	0.97	0.521	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
10.830	23.970	1.730	1353.8	1353.8	34.413	7.428	2.85		Clay	90.8			22.66	1.13	n.a.	n.a.	0.97	0.524	n.a.	n.a.	n.a.	n.a.	0.00	0.00
10.990	23.740	1.651	1373.8	1373.8	33.562	7.161	2.84		Clay	90.5			22.44	1.12	n.a.	n.a.	0.97	0.528	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.150	23.030	1.512	1393.8	1393.8	32.048	6.772	2.84		Clay	90.2			21.77	1.12	n.a.	n.a.	0.97	0.531	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.320	22.900	1.439	1415.0	1415.0	31.367	6.484	2.83		Clay	89.6			21.64	1.11	n.a.	n.a.	0.97	0.535	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.480	22.500	1.636	1435.0	1435.0	30.359	7.509	2.89		Clay	94.1			21.27	1.11	n.a.	n.a.	0.97	0.538	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.650	21.760	1.524	1456.3	1456.3	28.885	7.244	2.89		Clay	94.4			20.57	1.10	n.a.	n.a.	0.97	0.541	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.810	23.370	1.564	1476.3	1476.3	30.661	6.912	2.86		Clay	91.7			22.09	1.10	n.a.	n.a.	0.97	0.544	n.a.	n.a.	n.a.	n.a.	0.00	0.00
11.980	23.220	1.599	1497.5	1497.5	30.012	7.114	2.87		Clay	93.0			21.95	1.10	n.a.	n.a.	0.97	0.547	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.140	23.610	1.701	1517.5	1517.5	30.117	7.442	2.89		Clay	94.0			22.32	1.09	n.a.	n.a.	0.97	0.550	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.300	22.810	1.689	1537.5	1537.5	28.672	7.664	2.91		Clay	96.0			21.56	1.09	n.a.	n.a.	0.97	0.553	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.470	21.400	1.561	1558.8	1558.8	26.458	7.568	2.93		Clay	97.6			20.23	1.08	n.a.	n.a.	0.97	0.556	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.630	20.700	1.365	1578.8	1578.8	25.223	6.854	2.92		Clay	96.3			19.57	1.08	n.a.	n.a.	0.97	0.559	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.800	20.610	1.341	1600.0	1600.0	24.763	6.771	2.92		Clay	96.5			19.48	1.08	n.a.	n.a.	0.96	0.562	n.a.	n.a.	n.a.	n.a.	0.00	0.00
12.960	22.460	1.389	1620.0	1620.0	26.728	6.417	2.88		Clay	93.3			21.23	1.07	n.a.	n.a.	0.96	0.565	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.120	25.440	1.785	1640.0	1640.0	30.024	7.251	2.88		Clay	93.5			24.05	1.07	n.a.	n.a.	0.96	0.568	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.290	27.490	2.019	1661.3	1661.3	32.096	7.574	2.87		Clay	93.0			25.98	1.07	n.a.	n.a.	0.96	0.570	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.450	27.970	2.035	1681.3	1681.3	32.273	7.500	2.87		Clay	92.6			26.44	1.06	n.a.	n.a.	0.96	0.573	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.620	27.480	2.046	1702.5	1702.5	31.282	7.683	2.89		Clay	93.9			25.97	1.06	n.a.	n.a.	0.96	0.576	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.780	27.540	1.853	1722.5	1722.5	30.977	6.944	2.86		Clay	91.6			26.03	1.06	n.a.	n.a.	0.96	0.578	n.a.	n.a.	n.a.	n.a.	0.00	0.00
13.940	27.730	1.826	1742.5	1742.5	30.828	6.800	2.85		Clay	91.2			26.21	1.05	n.a.	n.a.	0.96	0.581	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.110	29.300	1.947	1763.8	1763.8	32.225	6.852	2.84		Clay	90.3			27.69	1.05	n.a.	n.a.	0.96	0.583	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.270	29.910	2.121	1783.8	1783.8	32.536	7.309	2.86		Clay	91.7			28.27	1.05	n.a.	n.a.	0.96	0.586	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.440	29.940	2.109	1805.0	1805.0	32.175	7.262	2.86		Clay	91.8			28.30	1.04	n.a.	n.a.	0.96	0.588	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.600	53.300	2.726	1825.0	1825.0	54.919	5.203	2.60		Mixed	70.7			50.38	1.07	53.89	120.37	0.96	0.590	1.018	0.172	0.243	0.41	0.03	0.04
14.760	56.330	3.216	1845.0	1845.0	60.062	5.805	2.61		Clay	71.6			53.24	1.04	n.a.	n.a.	0.96	0.593	n.a.	n.a.	n.a.	n.a.	0.00	0.00
14.930	43.700	2.827	1866.3	1866.3	45.832	6.610	2.73		Clay	81.1			41.30	1.03	n.a.	n.a.	0.96	0.595	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.090	38.550	2.690	1886.3	1886.3	39.875	7.154	2.79		Clay	86.4			36.44	1.03	n.a.	n.a.	0.95	0.597	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.260	37.830	2.487	1907.5	1907.5	38.664	6.745	2.78		Clay	85.6			35.76	1.03	n.a.	n.a.	0.95	0.600	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.420	36.040	2.082	1927.5	1927.5	36.396	5.935	2.76		Clay	83.8			34.06	1.02	n.a.	n.a.	0.95	0.602	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.580	29.520	1.649	1947.5	1947.5	29.316	5.777	2.82		Clay	88.4			27.90	1.02	n.a.	n.a.	0.95	0.604	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.750	30.430	1.436	1968.8	1968.8	29.913	4.876	2.76		Clay	83.8			28.76	1.02	n.a.	n.a.	0.95	0.606	n.a.	n.a.	n.a.	n.a.	0.00	0.00
15.910	105.570	2.132	1988.8	1988.8	101.956	2.039	2.12		Sand	32.2	140		140.00	1.02	142.77	210.32	0.95	0.608	1.018	3.558	7.972	13.11	0.00	0.00
16.080	149.330	2.930	2010.0	2010.0	143.843	1.975	2.00		Sand	23.4			141.14	1.02	143.60	195.21	0.95	0.610	1.013	1.458	3.248	5.32	0.00	0.00
16.240	209.340	2.921	2030.0	2030.0	201.032	1.402	1.80		Sand	6.8			197.86	1.01	200.56	202.31	0.95	0.612	1.011	2.158	4.800	7.84	0.00	0.00
16.400	248.070	3.490	2050.0	2050.0	237.231	1.413	1.75		Sand	3.3			234.47	1.01	236.59	236.59	0.95	0.614	1.010	30.503	67.745	110.35	0.00	0.00
16.570	281.040	4.312	2071.3	2071.3	267.498	1.540	1.75		Sand	3.1			265.63	1.01	267.14	267.14	0.95	0.616	1.006	1266.912	2805.079	4554.43	0.00	0.00
16.730	319.860	3.766	2091.3	2091.3	303.115	1.181	1.63		Sand	0.0			302.33	1.00	303.27	303.27	0.95	0.618	1.004	#########	########	3597616.74	0.00	0.00
16.900	293.990	7.058	2112.5	2112.5	277.104	2.409	1.90		Sand	15.2			277.87	1.00	277.99	317.26	0.95	0.620	1.000	#########	########	##########	0.00	0.00
17.060	222.970	5.736	2132.5	2132.5	208.926	2.585	2.00		Sand	22.7			210.75	1.00	210.32	270.97	0.95	0.621	0.998	2264.891	4971.150	7999.11	0.00	0.00
17.220	182.670	3.618	2152.5	2152.5	170.177	1.993	1.96		Sand	19.8			172.66	0.99	171.75	217.98	0.95	0.623	0.995	6.118	13.390	21.49	0.00	0.00
17.390	178.190	2.504	2173.8	2173.8	165.156	1.414	1.86		Sand	11.5			168.42	0.99	166.82	181.82	0.94	0.625	0.994	0.782	1.649	2.64	0.00	0.00
17.550	161.610	2.904	2193.8	2193.8	149.001	1.809	1.97		Sand	20.3			152.75	0.99	150.91	195.59	0.94	0.627	0.991	1.487	3.241	5.17	0.00	0.00
17.720	138.570	3.605	2215.0	2215.0	126.990	2.622	2.13		Sand	33.7			130.97	0.98	128.98	195.42	0.94	0.629	0.989	1.474	3.205	5.10	0.00	0.00
17.880	138.110	3.301	2235.0	2235.0	125.988	2.410	2.11		Sand	31.6			130.54	0.98	128.13	191.70	0.94	0.630	0.987	1.221	2.651	4.21	0.00	0.00
18.040	129.670	3.392	2255.0	2255.0	117.692	2.639	2.16		Sand	35.6			122.56	0.98	119.88	186.44	0.94	0.632	0.986	0.954	2.068	3.27	0.00	0.00
18.210	152.150	2.743	2276.3	2276.3	137.617	1.817	1.99		Sand	22.2			143.81	0.98	140.23	188.51	0.94	0.633	0.983	1.049	2.268	3.58	0.00	0.00
18.370	145.120	2.720	2296.3	2296.3	130.629	1.889	2.02		Sand	24.4			137.16	0.97	133.30	185.57	0.94	0.635	0.982	0.918	1.969	3.10	0.00	0.00
18.540	144.290	2.784	2317.5	2317.5	129.270	1.945	2.03		Sand	25.4			136.38	0.97	132.13	186.22	0.94	0.637	0.979	0.945	2.033	3.19	0.00	0.00
18.700	159.390	2.835	2337.5	2337.5	142.286	1.792	1.98		Sand	21.1			150.65	0.97	145.63	191.80	0.94	0.638	0.976	1.227	2.635	4.13	0.00	0.00
18.860	185.960	2.498	2357.5	2357.5	165.464	1.352	1.84		Sand	10.3			175.77	0.96	169.11	179.82	0.94	0.640	0.977	0.721	1.470	2.30	0.00	0.00
19.030	186.930	3.105	2378.8	2378.8	165.579	1.671	1.91		Sand	15.8			176.68	0.96	170.05	202.02	0.94	0.641	0.969	2.121	4.519	7.05	0.00	0.00
19.190	201.370	2.589	2398.8	2398.8	177.697	1.293	1.81		Sand	7.5			190.33	0.96	182.16	185.08	0.94	0.643	0.972	0.898	1.900	2.96	0.00	0.00
19.360	169.480	3.123	2420.0	2420.0	148.721	1.856	1.97		Sand	21.0			160.19	0.96	153.27	200.27	0.94	0.644	0.965	1.918	4.071	6.32	0.00	0.00
19.520	182.350	2.861	2440.0	2440.0	159.429	1.580	1.90		Sand	15.2			172.35	0.95	164.24	193.40	0.94	0.645	0.965	1.328	2.821	4.37	0.00	0.00
19.690	149.790	2.381	2461.3	2461.3	130.195	1.603	1.97		Sand	20.3			141.58	0.95	134.04	176.53	0.93	0.647	0.969	0.635	1.250	1.93	0.00	0.00
19.850	134.220	2.063	2481.3	2481.3	116.070	1.552	1.99		Sand	22.3			126.86	0.94	119.42	164.71	0.93	0.648	0.971	0.426	0.767	1.18	0.01	0.01
20.010	120.080	1.963	2501.2	2500.6	103.318	1.652	2.05		Sand	26.7			113.50	0.94	106.34	158.12	0.93	0.650	0.971	0.353	0.606	0.93	0.01	0.01
20.180	86.120	2.453	2521.6	2510.4	73.638	2.891	2.32		Sand	48.8			81.40	0.93	75.79	141.30	0.93	0.651	0.975	0.240	0.368	0.57	0.02	0.03
20.340	78.340	2.630	2540.8	2519.6	66.756	3.413	2.40		Sand	55.4			74.05	0.93	68.71	135.11	0.93	0.652	0.975	0.215	0.317	0.49	0.02	0.03
20.510	79.760	2.352	2561.2	2529.4	67.846	2.997	2.36		Sand	51.7			75.39	0.93	69.83	135.09	0.93	0.653	0.975	0.215	0.316	0.48	0.02	0.03
20.670	82.010	2.080	2580.4	2538.6	69.656	2.577	2.30		Sand	47.3			77.51	0.92	71.70	135.39	0.93	0.655	0.974	0.216	0.318	0.49	0.02	0.03
20.830	76.280	1.754	2599.6	2547.8	64.586	2.339	2.30		Sand	46.8	77		77.00	0.92	71.09	134.36	0.93	0.656	0.974	0.212	0.311	0.47	0.02	0.03
21.000	72.390	1.778	2620.0	2557.6	61.109	2.502	2.34		Sand	49.8	77		77.00	0.92	71.01	135.74	0.93	0.657	0.973	0.217	0.321	0.49	0.02	0.03
21.160	33.580	1.242	2639.2	2566.8	25.137	3.851	2.75		Clay	82.7			31.74	0.95	n.a.	n.a.	0.93	0.658	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
21.330	15.310	0.855	2659.6	2576.6	10.852	6.114	3.15		Clay	100.0			14.47	0.95	n.a.	n.a.	0.93	0.659	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.490	12.970	0.533	2678.8	2585.8	8.996	4.582	3.14		Clay	100.0			12.26	0.95	n.a.	n.a.	0.93	0.661	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.650	12.910	0.644	2698.0	2595.0	8.910	5.574	3.20		Clay	100.0			12.20	0.95	n.a.	n.a.	0.93	0.662	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.820	18.080	0.660	2718.4	2604.8	12.838	3.948	2.98		Clay	100.0			17.09	0.95	n.a.	n.a.	0.92	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
21.980	13.640	0.640	2737.6	2614.0	9.389	5.211	3.16		Clay	100.0			12.89	0.95	n.a.	n.a.	0.92	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.150	15.470	0.653	2758.0	2623.8	10.741	4.636	3.08		Clay	100.0			14.62	0.94	n.a.	n.a.	0.92	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.310	17.090	0.913	2777.2	2633.1	11.926	5.815	3.11		Clay	100.0			16.15	0.94	n.a.	n.a.	0.92	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.470	31.960	1.946	2796.4	2642.3	23.133	6.368	2.92		Clay	96.7			30.21	0.94	n.a.	n.a.	0.92	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.640	63.890	2.894	2816.8	2652.1	47.119	4.632	2.60		Clay	71.4			60.39	0.94	n.a.	n.a.	0.92	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
22.800	96.720	3.849	2836.0	2661.3	80.321	4.038	2.41		Sand	55.4			91.42	0.91	83.47	153.93	0.92	0.669	0.962	0.317	0.523	0.78	0.01	0.02
22.970	77.460	3.986	2856.4	2671.1	63.962	5.242	2.56		Sand	67.4	91		91.00	0.91	83.07	157.25	0.92	0.670	0.960	0.345	0.582	0.87	0.01	0.01
23.130	65.830	3.914	2875.6	2680.3	48.049	6.079	2.69		Clay	77.9			62.22	0.94	n.a.	n.a.	0.92	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.290	73.430	3.470	2894.8	2689.5	60.348	4.821	2.54		Sand	66.6			69.40	0.90	62.50	130.53	0.92	0.672	0.967	0.199	0.283	0.42	0.02	0.03
23.460	79.320	3.239	2915.2	2699.3	65.159	4.159	2.47		Sand	61.0			74.97	0.90	67.55	135.51	0.92	0.673	0.966	0.216	0.316	0.47	0.02	0.03
23.620	65.880	2.803	2934.4	2708.5	53.812	4.352	2.55		Sand	66.6	74		74.00	0.90	66.59	135.81	0.92	0.674	0.965	0.217	0.319	0.47	0.02	0.03
23.790	50.570	2.630	2954.8	2718.3	36.120	5.358	2.73		Clay	81.4			47.80	0.94	n.a.	n.a.	0.92	0.674	n.a.	n.a.	n.a.	n.a.	0.00	0.00
23.950	48.160	2.778	2974.0	2727.5	34.224	5.952	2.78		Clay	85.4			45.52	0.94	n.a.	n.a.	0.91	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.110	53.980	2.150	2993.2	2736.7	38.355	4.097	2.63		Clay	73.4			51.02	0.93	n.a.	n.a.	0.91	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.280	36.470	2.243	3013.6	2746.5	25.460	6.416	2.89		Clay	94.5			34.47	0.93	n.a.	n.a.	0.91	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
24.440	68.560	2.571	3032.8	2755.7	55.528	3.835	2.50		Sand	62.7	119		119.00	0.91	108.64	188.75	0.91	0.678	0.939	1.060	2.189	3.23	0.00	0.00
24.610	126.700	4.240	3053.2	2765.5	103.489	3.387	2.28		Sand	45.1			119.75	0.91	108.87	180.79	0.91	0.679	0.943	0.750	1.487	2.19	0.00	0.00
24.770	86.730	4.650	3072.4	2774.8	70.318	5.458	2.54		Sand	66.4	119		119.00	0.91	108.42	189.62	0.91	0.679	0.937	1.104	2.275	3.35	0.00	0.00
24.930	60.760	4.440	3091.6	2784.0	42.539	7.498	2.79		Clay	86.1			57.43	0.93	n.a.	n.a.	0.91	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.100	44.530	3.200	3112.0	2793.8	30.764	7.446	2.88		Clay	93.5			42.09	0.93	n.a.	n.a.	0.91	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.260	37.220	2.414	3131.2	2803.0	25.440	6.771	2.91		Clay	95.8			35.18	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.430	37.020	2.069	3151.6	2812.8	25.202	5.836	2.87		Clay	92.4			34.99	0.93	n.a.	n.a.	0.91	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.590	39.080	2.047	3170.8	2822.0	26.573	5.458	2.83		Clay	89.5			36.94	0.93	n.a.	n.a.	0.91	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.750	37.150	2.019	3190.0	2831.2	25.117	5.678	2.86		Clay	91.8			35.11	0.93	n.a.	n.a.	0.91	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
25.920	33.000	1.742	3210.4	2841.0	22.101	5.549	2.89		Clay	94.5			31.19	0.93	n.a.	n.a.	0.90	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.080	33.210	1.860	3229.6	2850.2	22.170	5.887	2.91		Clay	95.9			31.39	0.92	n.a.	n.a.	0.90	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.250	33.420	1.942	3250.0	2860.0	22.234	6.109	2.92		Clay	96.7			31.59	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.410	31.740	1.811	3269.2	2869.2	20.985	6.017	2.93		Clay	97.8			30.00	0.92	n.a.	n.a.	0.90	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.570	28.890	1.544	3288.4	2878.4	18.931	5.666	2.95		Clay	99.0			27.31	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.740	27.150	1.275	3308.8	2888.2	17.655	4.999	2.94		Clay	97.9			25.66	0.92	n.a.	n.a.	0.90	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
26.900	23.580	1.150	3328.0	2897.4	15.128	5.245	3.00		Clay	100.0			22.29	0.92	n.a.	n.a.	0.90	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.070	21.310	0.977	3348.4	2907.2	13.508	4.975	3.02		Clay	100.0			20.14	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.230	18.370	0.897	3367.6	2916.4	11.443	5.378	3.10		Clay	100.0			17.36	0.92	n.a.	n.a.	0.90	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.400	16.590	0.826	3388.0	2926.2	10.181	5.548	3.15		Clay	100.0			15.68	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.560	15.320	0.750	3407.2	2935.5	9.277	5.504	3.18		Clay	100.0			14.48	0.92	n.a.	n.a.	0.90	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.720	14.980	0.764	3426.4	2944.7	9.011	5.759	3.20		Clay	100.0			14.16	0.92	n.a.	n.a.	0.90	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
27.890	13.630	0.739	3446.8	2954.5	8.060	6.203	3.26		Clay	100.0			12.88	0.92	n.a.	n.a.	0.89	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.050	11.930	0.576	3466.0	2963.7	6.881	5.646	3.29		Clay	100.0			11.28	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.220	12.430	0.605	3486.4	2973.5	7.188	5.659	3.27		Clay	100.0			11.75	0.91	n.a.	n.a.	0.89	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.380	14.910	0.702	3505.6	2982.7	8.822	5.333	3.19		Clay	100.0			14.09	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.540	17.390	0.881	3524.8	2991.9	10.447	5.636	3.15		Clay	100.0			16.44	0.91	n.a.	n.a.	0.89	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.710	20.880	1.890	3545.2	3001.7	12.731	9.889	3.24		Clay	100.0			19.74	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
28.870	48.330	3.377	3564.4	3010.9	30.919	7.255	2.87		Clay	92.8			45.68	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.040	88.020	5.063	3584.8	3020.7	57.091	5.872	2.63		Clay	73.0			83.19	0.91	n.a.	n.a.	0.89	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
29.200	96.040	5.148	3604.0	3029.9	74.436	5.462	2.53		Sand	65.2	95	1.78	169.10	0.91	153.39	247.10	0.89	0.695	0.892	93.026	182.616	262.83	0.00	0.00
29.360	101.050	5.390	3623.2	3039.1	78.267	5.431	2.51		Sand	63.9		1.78	170.01	0.91	154.12	247.59	0.89	0.695	0.891	98.296	192.764	277.28	0.00	0.00
29.530	100.650	5.281	3643.6	3048.9	77.818	5.344	2.51		Sand	63.6		1.78	169.34	0.91	153.30	246.42	0.89	0.696	0.890	86.067	168.600	242.39	0.00	0.00
29.690	91.810	4.752	3662.8	3058.1	70.743	5.281	2.53		Sand	65.4	95	1.78	169.10	0.90	152.97	246.65	0.89	0.696	0.890	88.338	172.872	248.40	0.00	0.00
29.860	68.890	4.079	3683.2	3067.9	43.709	6.084	2.71		Clay	80.1			65.11	0.91	n.a.	n.a.	0.88	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.020	37.670	2.370	3702.4	3077.2	23.280	6.617	2.93		Clay	97.4			35.60	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.180	16.840	1.102	3721.6	3086.4	9.707	7.358	3.24		Clay	100.0			15.92	0.91	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.350	11.270	0.592	3742.0	3096.2	6.071	6.303	3.36		Clay	100.0			10.65	0.90	n.a.	n.a.	0.88	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.510	12.800	0.554	3761.2	3105.4	7.033	5.076	3.25		Clay	100.0			12.10	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.680	16.700	0.659	3781.6	3115.2	9.508	4.447	3.11		Clay	100.0			15.78	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
30.840	16.940	0.803	3800.8	3124.4	9.627	5.337	3.16		Clay	100.0			16.01	0.90	n.a.	n.a.	0.88	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.000	18.760	0.921	3820.0	3133.6	10.754	5.468	3.13		Clay	100.0			17.73	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.170	19.950	1.016	3840.4	3143.4	11.472	5.637	3.11		Clay	100.0			18.86	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.330	19.900	0.975	3859.6	3152.6	11.400	5.426	3.11		Clay	100.0			18.81	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.500	19.230	0.910	3880.0	3162.4	10.935	5.265	3.11		Clay	100.0			18.18	0.90	n.a.	n.a.	0.88	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.660	20.130	0.867	3899.2	3171.6	11.464	4.771	3.07		Clay	100.0			19.03	0.90	n.a.	n.a.	0.88	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
31.820	17.350	0.848	3918.4	3180.8	9.677	5.508	3.16		Clay	100.0			16.40	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
31.990	17.790	0.843	3938.8	3190.6	9.917	5.325	3.15		Clay	100.0			16.81	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.150	18.600	0.890	3958.0	3199.8	10.389	5.352	3.13		Clay	100.0			17.58	0.90	n.a.	n.a.	0.87	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.320	18.860	0.913	3978.4	3209.6	10.513	5.410	3.13		Clay	100.0			17.83	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.480	18.760	0.928	3997.6	3218.8	10.414	5.534	3.14		Clay	100.0			17.73	0.90	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.640	18.480	0.970	4016.8	3228.1	10.205	5.889	3.17		Clay	100.0			17.47	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.810	18.290	0.975	4037.2	3237.9	10.051	5.990	3.17		Clay	100.0			17.29	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
32.970	17.390	0.925	4056.4	3247.1	9.462	6.019	3.20		Clay	100.0			16.44	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.140	17.730	0.894	4076.8	3256.9	9.636	5.697	3.18		Clay	100.0			16.76	0.89	n.a.	n.a.	0.87	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.300	17.220	0.864	4096.0	3266.1	9.291	5.693	3.19		Clay	100.0			16.28	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.460	15.440	0.839	4115.2	3275.3	8.172	6.268	3.26		Clay	100.0			14.59	0.89	n.a.	n.a.	0.87	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.630	13.340	0.769	4135.6	3285.1	6.863	6.824	3.34		Clay	100.0			12.61	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.790	10.870	0.678	4154.8	3294.3	5.338	7.716	3.46		Clay	100.0			10.27	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
33.960	9.800	0.541	4175.2	3304.1	4.668	7.019	3.48		Clay	100.0			9.26	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.120	9.590	0.481	4194.4	3313.3	4.523	6.421	3.47		Clay	100.0			9.06	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.280	9.480	0.455	4213.6	3322.5	4.438	6.172	3.47		Clay	100.0			8.96	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.450	9.890	0.477	4234.0	3332.3	4.665	6.133	3.45		Clay	100.0			9.35	0.89	n.a.	n.a.	0.86	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.610	12.780	0.694	4253.2	3341.5	6.376	6.518	3.35		Clay	100.0			12.08	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.780	19.920	0.956	4273.6	3351.3	10.613	5.378	3.13		Clay	100.0			18.83	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
34.940	27.510	1.089	4292.8	3360.5	15.095	4.292	2.95		Clay	98.7			26.00	0.89	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.100	27.910	1.104	4312.0	3369.8	15.285	4.287	2.94		Clay	98.4			26.38	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.270	30.430	1.219	4332.4	3379.6	16.726	4.313	2.91		Clay	96.1			28.76	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.430	32.060	1.431	4351.6	3388.8	17.637	4.789	2.92		Clay	97.0			30.30	0.88	n.a.	n.a.	0.86	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.600	36.680	1.979	4372.0	3398.6	20.299	5.738	2.93		Clay	97.5			34.67	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.760	46.820	2.983	4391.2	3407.8	26.190	6.684	2.90		Clay	94.8			44.25	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
35.930	62.820	3.925	4411.6	3417.6	35.472	6.476	2.80		Clay	86.6			59.38	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.090	61.940	4.193	4430.8	3426.8	34.858	7.020	2.83		Clay	89.1			58.54	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.250	57.210	3.989	4450.0	3436.0	32.005	7.254	2.86		Clay	91.9			54.07	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.420	61.280	3.533	4470.4	3445.8	34.271	5.983	2.78		Clay	85.5			57.92	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.580	49.380	3.075	4489.6	3455.0	27.285	6.523	2.88		Clay	93.2			46.67	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.750	44.520	2.584	4510.0	3464.8	24.397	6.115	2.89		Clay	94.4			42.08	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
36.910	43.270	2.341	4529.2	3474.0	23.607	5.709	2.88		Clay	93.5			40.90	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.070	50.480	3.097	4548.4	3483.2	27.679	6.425	2.87		Clay	92.4			47.71	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.240	55.930	3.402	4568.8	3493.0	30.716	6.342	2.83		Clay	89.6			52.86	0.88	n.a.	n.a.	0.85	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.400	56.000	4.295	4588.0	3502.2	30.670	7.996	2.91		Clay	95.4			52.93	0.88	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.570	82.980	5.270	4608.4	3512.0	45.943	6.533	2.72		Clay	80.8			78.43	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.730	92.980	6.264	4627.6	3521.2	51.497	6.909	2.71		Clay	79.6			87.88	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
37.890	134.950	6.569	4646.8	3530.5	97.048	4.953	2.42		Sand	56.8			127.55	0.84	106.54	183.89	0.84	0.703	0.887	0.853	1.632	2.32	0.00	0.00
38.060	114.420	6.643	4667.2	3540.3	81.904	5.927	2.53		Sand	65.3	127		127.00	0.84	106.17	186.40	0.84	0.703	0.884	0.952	1.851	2.63	0.00	0.00
38.220	98.770	6.539	4686.4	3549.5	54.333	6.781	2.69		Clay	77.9			93.36	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.390	108.460	5.623	4706.8	3559.3	77.328	5.299	2.51		Sand	63.5			102.51	0.82	83.60	156.85	0.84	0.703	0.912	0.341	0.545	0.78	0.01	0.01
38.550	109.700	5.444	4726.0	3568.5	78.123	5.072	2.49		Sand	62.1			103.69	0.82	84.52	157.61	0.84	0.703	0.911	0.348	0.558	0.79	0.01	0.01
38.710	85.140	4.661	4745.2	3577.7	46.269	5.632	2.67		Clay	76.8			80.47	0.87	n.a.	n.a.	0.84	0.703	n.a.	n.a.	n.a.	n.a.	0.00	0.00
38.880	46.530	3.855	4765.6	3587.5	24.612	8.733	3.00		Clay	100.0			43.98	0.87	n.a.	n.a.	0.84	0.702	n.a.	n.a.	n.a.	n.a.	0.00	0.00
39.040	99.780	4.382	4784.8	3596.7	70.603	4.500	2.48		Sand	61.2	144		144.00	0.84	121.28	204.44	0.84	0.702	0.853	2.450	4.598	6.55	0.00	0.00
39.210	152.480	6.063	4805.2	3606.5	108.654	4.040	2.32		Sand	48.8			144.12	0.84	120.73	198.01	0.83	0.702	0.863	1.692	3.212	4.57	0.00	0.00
39.370	142.370	7.542	4824.4	3615.7	101.198	5.388	2.44		Sand	58.2			134.57	0.83	112.10	191.56	0.83	0.702	0.872	1.213	2.326	3.31	0.00	0.00
39.530	176.510	8.511	4843.6	3624.9	125.716	4.889	2.35		Sand	51.0			166.83	0.85	142.28	226.56	0.83	0.702	0.839	12.149	22.411	31.92	0.00	0.00
39.700	190.260	8.695	4864.0	3634.7	135.456	4.629	2.31		Sand	48.0			179.83	0.86	154.59	240.23	0.83	0.702	0.838	44.079	81.235	115.73	0.00	0.00
39.860	231.570	8.827	4883.2	3643.9	165.031	3.852	2.20		Sand	38.8			218.88	0.87	189.64	276.01	0.83	0.702	0.837	5065.210	9326.397	13288.27	0.00	0.00
40.030	197.490	7.847	4903.6	3653.7	140.289	4.023	2.25		Sand	43.3			186.66	0.86	160.65	244.33	0.83	0.702	0.836	68.225	125.499	178.84	0.00	0.00
40.190	226.530	7.444	4922.8	3662.9	160.967	3.322	2.15		Sand	35.1			214.11	0.87	185.25	266.05	0.83	0.702	0.835	1079.879	1984.636	2828.73	0.00	0.00
40.350	192.990	7.348	4942.0	3672.2	136.694	3.857	2.25		Sand	42.6			182.41	0.86	156.15	238.16	0.83	0.701	0.835	35.668	65.493	93.37	0.00	0.00
40.520	93.460	6.122	4962.4	3682.0	49.419	6.729	2.71		Clay	79.9			88.34	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.680	53.760	3.641	4981.6	3691.2	27.779	7.101	2.90		Clay	94.8			50.81	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
40.850	42.530	2.040	5002.0	3701.0	21.632	5.096	2.88		Clay	93.1			40.20	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.010	33.020	1.745	5021.2	3710.2	16.446	5.721	3.00		Clay	100.0			31.21	0.86	n.a.	n.a.	0.83	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.170	28.540	1.814	5040.4	3719.4	13.991	6.972	3.11		Clay	100.0			26.98	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.340	31.810	1.638	5060.8	3729.2	15.703	5.593	3.01		Clay	100.0			30.07	0.86	n.a.	n.a.	0.82	0.701	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.500	28.770	1.465	5080.0	3738.4	14.033	5.584	3.04		Clay	100.0			27.19	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.670	25.650	1.213	5100.4	3748.2	12.326	5.252	3.07		Clay	100.0			24.24	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.830	24.780	1.008	5119.6	3757.4	11.827	4.536	3.04		Clay	100.0			23.42	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
41.990	23.770	0.916	5138.8	3766.6	11.257	4.322	3.05		Clay	100.0			22.47	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.160	23.950	0.899	5159.2	3776.4	11.318	4.206	3.04		Clay	100.0			22.64	0.86	n.a.	n.a.	0.82	0.700	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
42.320	24.800	0.999	5178.4	3785.6	11.734	4.496	3.04		Clay	100.0			23.44	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.490	24.840	1.096	5198.8	3795.4	11.720	4.927	3.07		Clay	100.0			23.48	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.650	24.410	1.047	5218.0	3804.6	11.460	4.804	3.07		Clay	100.0			23.07	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.810	25.520	1.007	5237.2	3813.9	12.010	4.398	3.03		Clay	100.0			24.12	0.86	n.a.	n.a.	0.82	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
42.980	25.800	1.026	5257.6	3823.6	12.120	4.430	3.03		Clay	100.0			24.39	0.86	n.a.	n.a.	0.81	0.699	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.140	24.460	1.025	5276.8	3832.9	11.387	4.696	3.07		Clay	100.0			23.12	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.310	24.310	1.020	5297.2	3842.7	11.274	4.710	3.07		Clay	100.0			22.98	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.470	25.080	1.052	5316.4	3851.9	11.642	4.693	3.06		Clay	100.0			23.71	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.640	29.740	1.104	5336.8	3861.7	14.021	4.078	2.96		Clay	99.6			28.11	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.800	32.800	1.206	5356.0	3870.9	15.563	4.002	2.92		Clay	96.4			31.00	0.85	n.a.	n.a.	0.81	0.698	n.a.	n.a.	n.a.	n.a.	0.00	0.00
43.960	33.790	1.343	5375.2	3880.1	16.032	4.318	2.93		Clay	97.2			31.94	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.130	35.480	1.442	5395.6	3889.9	16.855	4.400	2.92		Clay	96.3			33.53	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.290	37.820	1.592	5414.8	3899.1	18.011	4.534	2.90		Clay	95.2			35.75	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.460	38.520	1.646	5435.2	3908.9	18.318	4.596	2.90		Clay	95.1			36.41	0.85	n.a.	n.a.	0.81	0.697	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.620	39.050	1.655	5454.4	3918.1	18.541	4.556	2.89		Clay	94.5			36.91	0.85	n.a.	n.a.	0.81	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.780	39.940	1.645	5473.6	3927.3	18.946	4.422	2.88		Clay	93.3			37.75	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
44.950	40.410	1.707	5494.0	3937.1	19.132	4.533	2.88		Clay	93.6			38.19	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.110	40.980	1.786	5513.2	3946.3	19.372	4.671	2.89		Clay	94.0			38.73	0.85	n.a.	n.a.	0.80	0.696	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.280	41.530	1.844	5533.6	3956.1	19.597	4.757	2.89		Clay	94.1			39.25	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.440	42.720	1.865	5552.8	3965.3	20.146	4.668	2.87		Clay	92.9			40.38	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.600	43.010	1.823	5572.0	3974.6	20.241	4.531	2.86		Clay	92.1			40.65	0.85	n.a.	n.a.	0.80	0.695	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.770	41.240	1.686	5592.4	3984.4	19.297	4.385	2.87		Clay	92.6			38.98	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
45.930	39.570	1.569	5611.6	3993.6	18.412	4.268	2.88		Clay	93.3			37.40	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.100	38.390	1.479	5632.0	4003.4	17.772	4.158	2.88		Clay	93.6			36.29	0.85	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.260	37.750	1.452	5651.2	4012.6	17.407	4.157	2.89		Clay	94.2			35.68	0.84	n.a.	n.a.	0.80	0.694	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.420	37.500	1.442	5670.4	4021.8	17.238	4.160	2.89		Clay	94.5			35.44	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.590	35.240	1.443	5690.8	4031.6	16.070	4.455	2.94		Clay	97.9			33.31	0.84	n.a.	n.a.	0.80	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.750	33.610	1.384	5710.0	4040.8	15.222	4.501	2.96		Clay	99.5			31.77	0.84	n.a.	n.a.	0.79	0.693	n.a.	n.a.	n.a.	n.a.	0.00	0.00
46.920	31.550	1.257	5730.4	4050.6	14.163	4.382	2.97		Clay	100.0			29.82	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.080	30.700	1.192	5749.6	4059.8	13.708	4.285	2.98		Clay	100.0			29.02	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.240	30.220	1.201	5768.8	4069.0	13.436	4.395	2.99		Clay	100.0			28.56	0.84	n.a.	n.a.	0.79	0.692	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.410	31.910	1.204	5789.2	4078.8	14.227	4.149	2.96		Clay	99.6			30.16	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.570	33.670	1.204	5808.4	4088.0	15.052	3.914	2.92		Clay	96.8			31.82	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.740	38.030	1.521	5828.8	4097.8	17.139	4.331	2.91		Clay	95.5			35.95	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
47.900	52.600	1.773	5848.0	4107.0	24.191	3.570	2.74		Clay	82.0			49.72	0.84	n.a.	n.a.	0.79	0.691	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.060	52.120	2.416	5867.2	4116.3	23.899	4.912	2.83		Clay	89.7			49.26	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.230	69.740	3.652	5887.6	4126.0	32.378	5.467	2.77		Clay	84.6			65.92	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.390	105.160	5.381	5906.8	4135.3	49.432	5.265	2.63		Clay	73.5			99.40	0.84	n.a.	n.a.	0.79	0.690	n.a.	n.a.	n.a.	n.a.	0.00	0.00
48.560	145.660	6.620	5927.2	4145.1	96.365	4.639	2.40		Sand	55.1			137.67	0.79	108.93	186.24	0.78	0.689	0.848	0.945	1.762	2.56	0.00	0.00
48.720	142.420	7.078	5946.4	4154.3	94.066	5.076	2.44		Sand	58.1			134.61	0.79	106.19	183.97	0.78	0.689	0.851	0.856	1.572	2.28	0.00	0.00
48.880	123.910	6.809	5965.6	4163.5	58.089	5.630	2.61		Clay	71.5			117.12	0.84	n.a.	n.a.	0.78	0.689	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.050	123.570	6.935	5986.0	4173.3	57.785	5.752	2.61		Clay	72.2			116.80	0.84	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.210	128.580	6.871	6005.2	4182.5	84.424	5.471	2.49		Sand	62.5			121.53	0.78	94.36	170.35	0.78	0.688	0.869	0.509	0.858	1.25	0.00	0.00
49.380	85.160	6.428	6025.6	4192.3	39.190	7.824	2.83		Clay	89.1			80.49	0.83	n.a.	n.a.	0.78	0.688	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.540	74.920	4.875	6044.8	4201.5	34.225	6.781	2.82		Clay	88.6			70.81	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.700	47.130	3.383	6064.0	4210.7	20.946	7.671	3.01		Clay	100.0			44.55	0.83	n.a.	n.a.	0.78	0.687	n.a.	n.a.	n.a.	n.a.	0.00	0.00
49.870	35.780	2.187	6084.4	4220.5	15.514	6.680	3.06		Clay	100.0			33.82	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.030	29.160	1.806	6103.6	4229.7	12.345	6.917	3.15		Clay	100.0			27.56	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.200	26.700	1.519	6124.0	4239.5	11.151	6.427	3.16		Clay	100.0			25.24	0.83	n.a.	n.a.	0.78	0.686	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.360	25.330	1.320	6143.2	4248.7	10.478	5.928	3.16		Clay	100.0			23.94	0.83	n.a.	n.a.	0.78	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.520	26.160	1.269	6162.4	4258.0	10.840	5.499	3.13		Clay	100.0			24.73	0.83	n.a.	n.a.	0.77	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.690	28.080	1.385	6182.8	4267.7	11.710	5.544	3.10		Clay	100.0			26.54	0.83	n.a.	n.a.	0.77	0.685	n.a.	n.a.	n.a.	n.a.	0.00	0.00
50.850	31.070	1.589	6202.0	4277.0	13.079	5.682	3.07		Clay	100.0			29.37	0.83	n.a.	n.a.	0.77	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.020	39.720	1.733	6222.4	4286.8	17.080	4.734	2.93		Clay	97.6			37.54	0.83	n.a.	n.a.	0.77	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.180	36.540	1.803	6241.6	4296.0	15.558	5.396	3.00		Clay	100.0			34.54	0.83	n.a.	n.a.	0.77	0.684	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.350	40.400	1.811	6262.0	4305.8	17.311	4.860	2.94		Clay	97.8			38.19	0.83	n.a.	n.a.	0.77	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.510	38.380	1.745	6281.2	4315.0	16.334	4.953	2.96		Clay	99.8			36.28	0.83	n.a.	n.a.	0.77	0.683	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.670	37.490	1.470	6300.4	4324.2	15.883	4.280	2.93		Clay	97.3			35.43	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
51.840	34.340	1.227	6320.8	4334.0	14.388	3.936	2.94		Clay	98.1			32.46	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.000	31.410	1.163	6340.0	4343.2	13.004	4.118	2.99		Clay	100.0			29.69	0.83	n.a.	n.a.	0.77	0.682	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.170	33.170	1.198	6360.4	4353.0	13.779	3.996	2.96		Clay	99.7			31.35	0.83	n.a.	n.a.	0.77	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.330	40.250	1.344	6379.6	4362.2	16.991	3.626	2.86		Clay	91.8			38.04	0.83	n.a.	n.a.	0.76	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.490	38.330	1.531	6398.8	4371.4	16.073	4.358	2.93		Clay	97.4			36.23	0.83	n.a.	n.a.	0.76	0.681	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.660	40.890	1.659	6419.2	4381.2	17.201	4.401	2.91		Clay	95.8			38.65	0.83	n.a.	n.a.	0.76	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00

CORNERSTONE EARTH GROUP

CPT No. 3

PGA (A_{max}) 0.80

Total Settlement: 0.37 (Inches)

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Depth (ft)	q_c (tsf)	f_s (tsf)	σ_{vc} (psf)	Insitu σ'_{vc} (psf)	Q	F (%)	I_c	Layer "Plastic" PI > 7	Flag Soil Type	Fines (%)	q_{cN} near interfaces (soft layer)	Thin Layer Factor (K_H)	Interpreted q_{cN}	C_N	q_{c1N}	q_{c1N-CS}	Stress Reduction Coeff, r_d	CSR	K_σ for Sand	CRR$_{M=7.5, \sigma'vc = 1 atm}$	CRR	Factor of Safety (CRR/CSR)	Vertical Strain ε_v	Settlement (Inches)
52.820	36.960	1.590	6438.4	4390.4	15.370	4.711	2.97		Clay	100.0			34.93	0.82	n.a.	n.a.	0.76	0.680	n.a.	n.a.	n.a.	n.a.	0.00	0.00
52.990	37.470	1.766	6458.8	4400.2	15.563	5.159	2.99		Clay	100.0			35.42	0.82	n.a.	n.a.	0.76	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.150	37.640	2.021	6478.0	4409.4	15.603	5.875	3.02		Clay	100.0			35.58	0.82	n.a.	n.a.	0.76	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.310	67.010	2.953	6497.2	4418.7	28.860	4.631	2.76		Clay	83.5			63.34	0.82	n.a.	n.a.	0.76	0.679	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.480	68.520	4.112	6517.6	4428.4	29.474	6.301	2.84		Clay	90.4			64.76	0.82	n.a.	n.a.	0.76	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.640	58.870	4.344	6536.8	4437.7	25.059	7.812	2.96		Clay	99.7			55.64	0.82	n.a.	n.a.	0.76	0.678	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.810	79.140	4.945	6557.2	4447.5	34.115	6.518	2.81		Clay	87.7			74.80	0.82	n.a.	n.a.	0.76	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
53.970	125.120	6.449	6576.4	4456.7	54.674	5.294	2.60		Clay	71.3			118.26	0.82	n.a.	n.a.	0.76	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.130	88.950	6.544	6595.6	4465.9	38.358	7.640	2.82		Clay	89.0			84.07	0.82	n.a.	n.a.	0.76	0.677	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.300	106.850	6.731	6616.0	4475.7	46.269	6.501	2.72		Clay	80.5			100.99	0.82	n.a.	n.a.	0.75	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.460	100.000	7.128	6635.2	4484.9	43.115	7.373	2.78		Clay	85.4			94.52	0.82	n.a.	n.a.	0.75	0.676	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.630	91.730	6.360	6655.6	4494.7	39.336	7.194	2.80		Clay	86.9			86.70	0.82	n.a.	n.a.	0.75	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.790	91.950	5.822	6674.8	4503.9	39.349	6.570	2.77		Clay	84.5			86.91	0.82	n.a.	n.a.	0.75	0.675	n.a.	n.a.	n.a.	n.a.	0.00	0.00
54.950	139.270	6.219	6694.0	4513.1	87.968	4.575	2.42		Sand	56.7			131.64	0.76	99.93	175.44	0.75	0.674	0.847	0.609	1.040	1.54	0.00	0.00
55.120	131.640	5.380	6714.4	4522.9	82.934	4.194	2.41		Sand	55.7			124.42	0.75	93.46	166.77	0.75	0.674	0.859	0.453	0.734	1.09	0.01	0.00
55.280	117.070	5.021	6733.6	4532.1	73.433	4.415	2.46		Sand	59.8			110.65	0.74	81.72	153.28	0.75	0.674	0.875	0.312	0.466	0.69	0.02	0.00
55.450	111.580	3.279	6754.0	4541.9	69.806	3.031	2.35		Sand	51.3			105.46	0.73	76.90	143.86	0.75	0.673	0.884	0.253	0.358	0.53	0.02	0.00
55.610	163.560	5.046	6773.2	4551.1	103.229	3.150	2.25		Sand	43.2			154.59	0.77	119.17	192.40	0.75	0.673	0.815	1.263	2.266	3.37	0.00	0.00
55.770	217.760	6.793	6792.4	4560.4	138.014	3.169	2.18		Sand	37.0			205.82	0.81	166.90	245.86	0.75	0.672	0.770	80.852	136.899	203.61	0.00	0.00
55.940	134.960	7.606	6812.8	4570.1	57.571	5.782	2.62		Clay	72.4			127.56	0.82	n.a.	n.a.	0.75	0.672	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.100	120.170	7.942	6832.0	4579.4	50.991	6.802	2.71		Clay	79.4			113.58	0.82	n.a.	n.a.	0.75	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.270	127.480	7.246	6852.4	4589.2	54.064	5.841	2.64		Clay	74.1			120.49	0.82	n.a.	n.a.	0.74	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.430	107.300	6.793	6871.6	4598.4	45.174	6.540	2.73		Clay	81.2			101.42	0.81	n.a.	n.a.	0.74	0.671	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.590	94.690	6.202	6890.8	4607.6	39.606	6.797	2.78		Clay	85.2			89.50	0.81	n.a.	n.a.	0.74	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.760	111.070	5.666	6911.2	4617.4	46.613	5.265	2.65		Clay	74.9			104.98	0.81	n.a.	n.a.	0.74	0.670	n.a.	n.a.	n.a.	n.a.	0.00	0.00
56.920	94.400	5.187	6930.4	4626.6	39.310	5.704	2.72		Clay	81.0			89.22	0.81	n.a.	n.a.	0.74	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.090	78.190	5.536	6950.8	4636.4	32.230	7.410	2.87		Clay	92.3			73.90	0.81	n.a.	n.a.	0.74	0.669	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.250	119.100	5.357	6970.0	4645.6	73.751	4.634	2.47		Sand	61.0			112.57	0.73	82.46	154.61	0.74	0.668	0.869	0.322	0.483	0.72	0.02	0.00
57.410	83.340	5.615	6989.2	4654.8	34.307	7.033	2.83		Clay	89.5			78.77	0.81	n.a.	n.a.	0.74	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.580	106.710	6.058	7009.6	4664.6	44.250	5.870	2.70		Clay	78.9			100.86	0.81	n.a.	n.a.	0.74	0.668	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.740	102.020	6.620	7028.8	4673.8	42.152	6.720	2.76		Clay	83.5			96.43	0.81	n.a.	n.a.	0.74	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
57.910	95.680	6.642	7049.2	4683.6	39.352	7.207	2.80		Clay	86.9			90.43	0.81	n.a.	n.a.	0.74	0.667	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.070	82.400	6.694	7068.4	4692.8	33.611	8.488	2.90		Clay	94.8			77.88	0.81	n.a.	n.a.	0.74	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.230	98.280	7.288	7087.6	4702.0	40.296	7.693	2.81		Clay	88.0			92.89	0.81	n.a.	n.a.	0.73	0.666	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.400	86.920	6.578	7108.0	4711.8	35.386	7.891	2.86		Clay	91.7			82.16	0.81	n.a.	n.a.	0.73	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.560	85.950	6.144	7127.2	4721.1	34.902	7.457	2.84		Clay	90.6			81.24	0.81	n.a.	n.a.	0.73	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.730	77.360	5.223	7147.6	4730.8	31.194	7.078	2.86		Clay	91.9			73.12	0.81	n.a.	n.a.	0.73	0.665	n.a.	n.a.	n.a.	n.a.	0.00	0.00
58.890	81.480	5.038	7166.8	4740.1	32.867	6.468	2.82		Clay	88.4			77.01	0.81	n.a.	n.a.	0.73	0.664	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.060	130.710	6.249	7187.2	4749.9	80.192	4.916	2.47		Sand	60.7			123.54	0.74	90.95	165.39	0.73	0.664	0.851	0.434	0.690	1.04	0.01	0.00
59.220	120.280	5.632	7206.4	4759.1	49.033	4.827	2.61		Clay	71.5			113.69	0.81	n.a.	n.a.	0.73	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.380	63.540	4.966	7225.6	4768.3	25.136	8.286	2.98		Clay	100.0			60.06	0.81	n.a.	n.a.	0.73	0.663	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.550	65.930	4.573	7246.0	4778.1	26.080	7.339	2.93		Clay	97.2			62.32	0.81	n.a.	n.a.	0.73	0.662	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.710	69.180	5.043	7265.2	4787.3	27.384	7.694	2.93		Clay	97.2			65.39	0.81	n.a.	n.a.	0.73	0.662	n.a.	n.a.	n.a.	n.a.	0.00	0.00
59.880	62.090	3.758	7285.6	4797.1	24.368	6.429	2.91		Clay	95.6			58.69	0.81	n.a.	n.a.	0.73	0.661	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.040	53.780	3.877	7304.8	4806.3	20.859	7.734	3.01		Clay	100.0			50.83	0.81	n.a.	n.a.	0.73	0.661	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.200	134.730	5.643	7324.0	4815.5	82.120	4.305	2.42		Sand	56.6			127.34	0.73	93.46	167.14	0.72	0.660	0.846	0.459	0.734	1.11	0.01	0.00
60.370	115.970	5.672	7344.4	4825.3	46.545	5.050	2.64		Clay	73.9			109.61	0.80	n.a.	n.a.	0.72	0.660	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.530	76.560	4.731	7363.6	4834.5	30.149	6.491	2.84		Clay	90.6			72.36	0.80	n.a.	n.a.	0.72	0.660	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.700	70.930	4.473	7384.0	4844.3	27.760	6.652	2.88		Clay	93.2			67.04	0.80	n.a.	n.a.	0.72	0.659	n.a.	n.a.	n.a.	n.a.	0.00	0.00
60.860	129.970	8.569	7403.2	4853.5	52.032	6.787	2.70		Clay	78.9			122.84	0.80	n.a.	n.a.	0.72	0.659	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.020	204.900	9.521	7422.4	4862.8	125.440	4.732	2.34		Sand	50.1			193.67	0.79	153.48	240.22	0.72	0.658	0.750	44.012	72.656	110.38	0.00	0.00
61.190	139.840	8.988	7442.8	4872.5	55.872	6.603	2.67		Clay	76.6			132.17	0.80	n.a.	n.a.	0.72	0.658	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.350	117.450	7.794	7462.0	4881.8	46.589	6.853	2.73		Clay	81.7			111.01	0.80	n.a.	n.a.	0.72	0.657	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.520	157.620	8.102	7482.4	4891.6	95.659	5.265	2.45		Sand	58.7			148.98	0.75	111.96	191.60	0.72	0.657	0.800	1.215	2.137	3.25	0.00	0.00
61.680	102.720	6.653	7501.6	4900.8	40.389	6.722	2.77		Clay	84.5			97.09	0.80	n.a.	n.a.	0.72	0.656	n.a.	n.a.	n.a.	n.a.	0.00	0.00
61.840	68.070	4.109	7520.8	4910.0	26.195	6.390	2.88		Clay	93.6			64.34	0.80	n.a.	n.a.	0.72	0.656	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.010	47.070	2.364	7541.2	4919.8	17.602	5.459	2.96		Clay	100.0			44.49	0.80	n.a.	n.a.	0.72	0.655	n.a.	n.a.	n.a.	n.a.	0.00	0.00
62.170	41.970	5.812	7560.4	4929.0	15.496	15.217	3.31		Clay	100.0			39.67	0.80	n.a.	n.a.	0.72	0.655	n.a.	n.a.	n.a.	n.a.	0.00	0.00

ATTACHMENT J

Aspire ERES Academy International Boulevard Project -Acoustic Technical Report

City of Oakland, California



Prepared for:
City of Oakland

Prepared by:
Stantec Consulting Services Inc.

March 9, 2018

Sign-off Sheet

This document entitled Aspire ERES Academy International Boulevard Project -Acoustic Technical Report was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of The City of Oakland (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

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1.0 INTRODUCTION

1.1 NOISE TECHNICAL REPORT PURPOSE

The purpose of this Noise Technical Report is to support the Aspire ERES Academy International Boulevard Project California Environmental Quality Act (CEQA) Categorical Exemption (Cat Ex) documentation. This Report provides analyses of potential project-related impacts for exposure to excessive noise during project construction and operation from the proposed school.

Specifically, the purpose of this Report is to assess the existing ambient noise conditions at the nearest sensitive receptors and within the project area in accordance with the City of Oakland thresholds for exposure. This noise report includes an evaluation of the proposed noise-generating use that could affect offsite noise-sensitive receptors as well as the potential for offsite noise sources to impact nearby receptors of the project site. Additionally, this Report assesses the potential indoor noise conditions located at the proposed school.

Noise sources associated with the proposed project would include construction and operational activities. Construction noise sources include demolition, site grading, construction of the building and apparatuses, and the increased traffic related to material delivery. Operational noise can be attributed to an increase of traffic counts from students, teachers, and visitors of the school as well as typical school associated noise, such as bus commutes, landscape maintenance, and children playing at the outdoor play facilities.

1.2 PROJECT DESCRIPTION AND LOCATION

Aspire Public Schools proposes to construct a new charter school for kindergarten through 8th grade on an approximately 0.88-acre site that is located at 2956 International Boulevard in the City of Oakland, California. The project includes a 3-story classroom building with an associated parking lot, landscaping, and play area. The building square footage is 44,186 square feet with an additional classroom and corridor of 1,258 square feet and a rooftop deck of 2,490 square feet.

The site is currently occupied by a paved parking lot. The proposed school site is bounded to the north by Fruitvale Health Care Center Nursing Home, to the east by Derby Avenue, to the south by a multi-story office building and parking lot, and to the west by an apartment complex and a historic house museum (Cohen-Bray House). The project site is about 600 feet northeast of an elevated Bay Area Rapid Transit (BART) light rail line along East 12th Street and approximately 1,000 feet northeast of an Amtrak and Union Pacific (UP) railroad right-of-way.

1.3 NOISE FUNDAMENTALS AND TERMINOLOGY

Noise is generally defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an

environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy (vibration) transmitted by pressure waves over a medium such as air or water. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting, written as dBA and referred to as A-weighted decibels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. Table 1 defines sound measurements and other terminology used in this Report, and Table 2 summarizes typical A-weighted sound levels for different noise sources.

With respect to how humans perceive and react to changes in noise levels, a 1dBA increase is imperceptible, a 3 dBA increase is barely perceptible, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is subjectively perceived as approximately twice as loud (Egan 2007). These subjective reactions to changes in noise levels was developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. These statistical indicators are thought to be most applicable to noise levels in the range of 50 to 70 dBA, as this is the usual range of voice and interior noise levels. The number of agencies and municipalities have developed or adopted noise level standards, consistent with these and other similar studies, to help prevent annoyance into protect against the degradation of the existing noise environment.

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (Leq), the minimum and maximum sound levels (Lmin and Lmax), percentile-exceeded sound levels (such as L10, L20), the day-night sound level (Ldn), and the community noise equivalent level (CNEL). Ldn and CNEL values differ by less than 1 dB. As a matter of practice, Ldn and CNEL values are considered to be equivalent and are treated as such in this assessment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (Federal Highway Administration 2011). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface such

as grass attenuates at a greater rate than sound that travels over a hard surface such as pavement. The increased attenuation is typically in the range of 1–2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 1: Definition of Sound Measurement

Sound Measurements	Sample Heading
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
C-Weighted Decibel (dBC)	The sound pressure level in decibels as measured using the C-weighting filter network. The C-weighting is very close to an unweighted or flat response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A- and C-weighted level gives an indication of low frequency content.
Maximum Sound Level (Lmax)	The maximum sound level measured during the measurement period.
Minimum Sound Level (Lmin)	The minimum sound level measured during the measurement period.
Equivalent Sound Level (Leq)	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (Lxx)	The sound level exceeded xx % of a specific time period. L10 is the sound level exceeded 10% of the time. L90 is the sound level exceeded 90% of the time. L90 is often considered to be representative of the background noise level in a given area.
Day-Night Level (Ldn)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.

Sound Measurements	Sample Heading
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.
Source: Federal Highway Administration 2006	

Table 2: Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	-110-	Rock band
Jet flyover at 1,000 Feet		
	-100-	
Gas lawnmower at 3 Feet		
	-90-	
Diesel truck at 50 Feet at 50 MPH		Food blender at 3 Feet
	-80-	Garbage Disposal at 3 Feet
Noisy urban area, daytime		
Gas lawnmower, 100 Feet	-70-	Vacuum Cleaner at 10 Feet
Commercial area		Normal Speech at 3 Feet
Heavy traffic at 300 Feet	-60-	
		Large business office
Quiet urban daytime	-50-	Dishwasher in next room
Quiet urban nighttime	-40-	Theater, large conference room (Background)
Quiet suburban nighttime		
	-30-	
Quiet rural nighttime		Library
	-20-	Bedroom at night, concert hall(Background)
	-10-	Broadcast/recording studio
	-0-	

Decibel Addition

Because decibels are logarithmic units, sound pressure levels cannot be added or subtracted through ordinary arithmetic. On the dB scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, their combined sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one source produces a sound pressure level of 70 dBA, two identical sources would not produce 140 dBA—rather, they would combine to produce 73 dBA. The cumulative sound level of any number of sources can be determined using decibel addition.

Vibration

Operation of heavy construction equipment, particularly pile driving and other impact devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (PPV).

Table 3 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006).

Table 3: Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic/vibratory)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089

Equipment	PPV at 25 Feet
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Source: Federal Transit Administration 2006.	

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2006). PPVref is the reference PPV from Table 3:

PPV = PPVref x (25/Distance)^1.5

Table 4 summarizes guidelines vibration annoyance potential criteria suggested by Caltrans (California Department of Transportation 2004).

Table 4: Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4
Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: California Department of Transportation 2004.		

Table 5 summarizes guideline vibration damage potential criteria suggested by Caltrans (California Department of Transportation 2004).

Table 5: Guideline Vibration Damage Potential Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structure	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: California Department of Transportation 2004.

2.0 REGULATORY SETTING

Federal, state, and local agencies regulate different aspects of environmental noise. Generally, the federal government sets noise standards for transportation-related noise sources closely linked to interstate commerce. These include aircraft, locomotives, and trucks. No federal noise standards are directly applicable to the project. The state government sets noise standards for transportation noise sources such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies. Local general plans identify general principles intended to guide and influence development plans.

2.1 STATE REGULATIONS

California Code

Part 2, Title 24 of the California Code of Regulations California Noise Insulation Standards establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed 45 Ldn in any habitable room. Where such residences are located in an environment where exterior noise is 60 Ldn or greater, an acoustical analysis is required to ensure that interior levels do not exceed the 45 Ldn interior standard.

General Plan Noise Element Guidelines

The State of California General Plan Guidelines (Governor's Office of Planning and Research 2003) establishes guidelines for the preparation of local general plan noise elements, including a sound level/land use compatibility chart that categorizes, by land use, outdoor Ldn ranges in up to four categories (normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable). For many land uses, the chart shows overlapping Ldn ranges for two or more compatibility categories.

The noise element guideline chart identifies the normally acceptable range of Ldn values for low-density residential uses as less than 60 dB and the conditionally acceptable range as 55–70 dB. The normally acceptable range for high-density residential uses is identified as Ldn values of less than 65 dB, and the conditionally acceptable range is identified as 60–70 dB. For educational and medical facilities, Ldn values of less than 70 dB are considered normally acceptable, and Ldn values of 60–70 dB are considered conditionally acceptable. For office and commercial land uses, Ldn values of less than 70 dB are considered normally acceptable, and Ldn values of 67.5–77.5 are categorized as conditionally acceptable. When noise levels are in the conditionally acceptable range new construction should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation requirements are included in the design.

These overlapping Ldn ranges are intended to indicate that local conditions (existing sound levels and community attitudes toward dominant sound sources) should be considered in evaluating land use compatibility at specific locations.

2.2 LOCAL REGULATIONS

City of Oakland General Plan

The City of Oakland has developed goals and policies to protect public health from potential noise impacts. The noise element of the General Plan formulates two goals for the City:

- To protect Oakland's quality of life and physical and mental well-being of residents and others in the City by reducing the community's exposure to noise; and

- To safeguard Oakland's economic welfare by mitigating noise incompatibilities among commercial, industrial, and residential land uses.

POLICY 1: Ensure the compatibility of existing and, especially, of proposed development projects not only with neighboring land uses but also with their surrounding noise environment.

ACTION 1.1: Use the noise-land use compatibility matrix (Table 7) in conjunction with the noise contour maps (especially for roadway traffic) to evaluate the acceptability of residential and other proposed land uses and also the need for any mitigation or abatement measures to achieve the desired degree of acceptability.

ACTION 1.2: Continue using the City's zoning regulations and permit processes to limit the hours of operation of noise-producing activities which create conflicts with residential uses and to attach noise-abatement requirements to such activities.

POLICY 3: Reduce the community's exposure to noise by minimizing the noise levels that are received by Oakland residents and others in the City. (This policy addresses the reception of noise whereas Policy 2 addresses the generation of noise.)

ACTION 3.1: Continue to use the building-permit application process to enforce the California Noise Insulation Standards regulating the maximum allowable interior noise level in new multi-unit buildings.

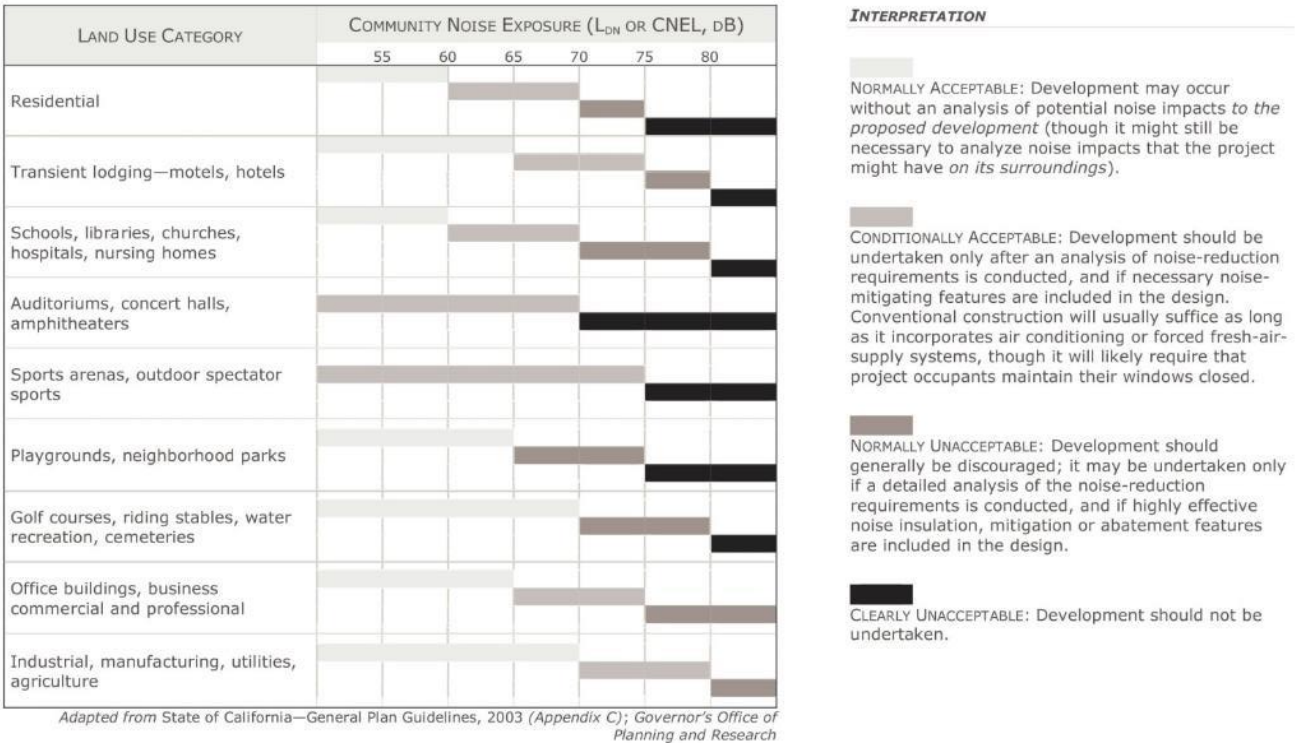
ACTION 3.2: Review the City's noise performance standards and revise them as appropriate to be consistent with City Council policy.

ACTION 3.3: Demand that Caltrans implement sound barriers, building retrofit programs and other measures to mitigate to the maximum extent feasible noise impacts on residential and other sensitive land uses from any new, widened or upgraded roadways; any new sound barrier must conform with City policies and standards regarding visual and aesthetic resources and quality.

Table 6: Permissible Maximum Indoor Noise Levels

Land Use	Maximum Indoor L_{DN} (dBA)
Residential, hotels, motels, transient lodging, institutional (churches, hospitals, classrooms, libraries), movie theaters	45 dBA
Professional offices, research and development, auditoria, meeting halls	50 dBA
Retail, banks, restaurants, sports clubs	55 dBA
Manufacturing, warehousing	65 dbA
Source: City of Oakland General Plan Noise Element 2005	

Table 7: Noise-Land Use Compatibility Matrix



Source: City of Oakland General Plan Noise Element 2005

City of Oakland Municipal Code

8.18.010 - Excessive and annoying noises prohibited.

A. It is unlawful for any person to create or allow to be created any excessive or annoying noise as defined herein. Any violation of the regulations specified herein shall be punishable as an infraction.

B. Definitions.

"Annoying noise" means noise with a repetitive pattern, shrill frequencies, and/or static-like sounds, including loud music and noise attributable to, but not limited to, leaf blowers, alarms, engines, barking dogs, and other animals.

"Excessive noise" means any unnecessary noise which persists for ten minutes or more; such period of noise need not be witnessed by enforcement personnel if the occupants of two or more separate housing or commercial units certify that they have experienced such period of noise and describe with particularity the source.

C. Excessive and Annoying Noises a Nuisance. The following acts, and the causing or permitting thereof, shall be considered disturbing the peace and shall constitute an infraction.

1. Mechanical or Electronic Devices. Using any mechanical or electronic device for the intensification of any sound or noise into the public streets which produces excessive or annoying noise;

8. Loading and Unloading. Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, refuse, or similar objects between the hours of nine p.m. and six a.m. in such a manner as to cause a noise disturbance across a residential property line or at any time to violate the applicable noise provisions of the Oakland Planning Code;

9. Domestic Power Tools, Machinery. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between nine p.m. and six a.m. so as to create a noise disturbance across a real property line or at any time to violate the applicable noise provisions of the Oakland Planning Code;

10. Sensitive Uses. Creation of any noise within or adjacent to a hospital or medical care facility, nursing home, school, court, day care, church, or similar facility, so as to interfere with the functions of such activity;

11. Noise resulting from construction and demolition activities, the operation of commercial refrigeration units, air conditioning systems, compressors, commercial exhaust systems, ventilation units, and other commercial or industrial noises associated with land use activities, shall be regulated pursuant to standards contained within the noise regulations of the Oakland Planning Code.

8.18.020 - Persistent noises a nuisance.

The persistent maintenance or emission of any noise or sound produced by human, animal or mechanical means, between the hours of nine p.m. and seven a.m. next ensuing, which, by reason of its raucous or nerve-racking nature, shall disturb the peace or comfort, or be injurious to the health of any person shall constitute a nuisance.

Failure to comply with the following provisions shall constitute a nuisance.

A. All construction equipment powered by internal combustion engines shall be properly muffled and maintained.

B. Unnecessary idling of internal combustion engines is prohibited.

C. All stationery noise-generating construction equipment such as tree grinders and air compressors are to be located as far as is practical from existing residences.

D. Quiet construction equipment, particularly air compressors, are to be selected whenever possible.

E. Use of pile drivers and jack hammers shall be prohibited on Sundays and holidays, except for emergencies and as approved in advance by the Building Official.

Whenever the existence of any such nuisance shall come to the attention of the Health Officer, it shall be his or her duty to notify in writing the occupant of the premises upon which such nuisance exists, specifying the measures necessary to abate such nuisance, and unless the same is abated within forty-eight (48) hours thereafter, the occupant so notified shall be guilty of an infraction, and the Health Officer shall summarily abate such nuisance.

City of Oakland Planning Code

17.120.050 Noise

All activities shall be so operated that the noise level inherently and regularly generated by these activities across real property lines shall not exceed the applicable values indicated in Subsection A., B., or C. as modified where applicable by the adjustments indicated in Subsection D. or E. Further noise restrictions are outlined in Section 8.18.010 of the Oakland Municipal Code.

A. Residential Zone Noise Level Standards. The maximum allowable noise levels received by any Residential Zone are described in Table 17.120.01.

City of Oakland Planning Code, Section 17.120.050, establishes maximum allowable receiving noise limits for residential zones, as summarized in Table 17.120.01.

Table 17.120.01 – MAXIMUM ALLOWABLE RECEIVING NOISE LEVEL STANDARDS, RESIDENTIAL AND CIVIC		
Cumulative number of minutes in Either the Daytime or Nighttime One Hour Time Period	**Daytime (7 a.m. to 10 p.m.)**	**Nighttime (10 p.m. to 7 a.m.)**
20	60 dBA	45 dBA
10	65 dBA	50 dBA
5	70 dBA	55 dBA
1	75 dBA	60 dBA
0	80 dBA	65 dBA

A. Commercial Noise Level standards. The maximum allowable noise levels received by any land use activity within any Commercial Zone (including the Housing and Business Mix HBX Zones, and the Central Estuary District D-CE-3 and D-CE-4 Zones) are described in Table 17.120.02. Table 17.120.02 establishes the maximum allowable receiving noise levels:

Table 17.120.02 – MAXIMUM ALLOWABLE RECEIVING NOISE LEVEL STANDARDS	
Cumulative number of minutes in Either the Daytime or Nighttime One Hour Time Period	**Anytime**
20	65
10	70
5	75
1	80
0	85

B. Industrial, Agricultural and Extractive Noise Level Standards. The maximum allowable noise levels received by any land use activity within any industrial Zone are described in Table 17.120.03. Table 17.120.03 establishes the maximum allowable receiving noise levels:

Table 17.120.03 – MAXIMUM ALLOWABLE RECEIVING NOISE LEVEL STANDARDS, dBA	
Cumulative minutes in Any One Hour Time Period	**Anytime**
20	70
10	75
5	80
1	85
0	90

C. In the event the measured ambient noise level exceeds the applicable noise level standard in any category above, the stated applicable noise level shall be adjusted so as to equal the ambient noise level.
D. Each of the noise level standards specified above in Subsections A., B., and C. shall be reduced by five (5) dBA for a simple tone noise such as a whine, screech, or hum, noise consisting primarily of speech or music, or for recurring impulse noise such as hammering or riveting.

Note: Two conditions contained in Section 17.120.050 would potentially apply to the project:

- In the event the measured ambient noise level exceeds the applicable noise level standard in any category above, the stated applicable noise level shall be adjusted so as to equal the ambient noise level
- Each of the noise level standards above shall be reduced by 5 dBA for noise consisting primarily of speech.

Recess periods would exceed 20 minutes in any hour; therefore, the receiving noise limit would be 60 dBA. Because the noise source would be students playing outside for recess, a source consisting primarily of speech, we assumed the 5 dBA penalty would be applied to the standards. Applying the penalty would reduce the receiving noise limit to 55 dBA. We measured average ambient noise levels during daytime hours at 2950 International Blvd of 57 dBA and at 1442 Derby of 60 dBA. As this exceeds the limit, we have adjusted the limit to equal the measured ambient noise levels. ***Based on these factors, the receiving noise limit we are applying to the project at 2950 International Blvd is 57 dBA and is 60 dBA at 1442 Derby Ave***.

City of Oakland Standard Conditions of Approval (SCA)

58. Construction Days/Hours

Requirement: The project applicant shall comply with the following restrictions concerning construction days and hours:

a. Construction activities are limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except that pier drilling and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m.

b. Construction activities are limited to between 9:00 a.m. and 5:00 p.m. on Saturday. In residential zones and within 300 feet of a residential zone, construction activities are allowed from 9:00 a.m. to 5:00 p.m. only within the interior of the building with the doors and windows closed. No pier drilling or other extreme noise generating activities greater than 90 dBA are allowed on Saturday.

c. No construction is allowed on Sunday or federal holidays.

Construction activities include, but are not limited to, truck idling, moving equipment (including trucks, elevators, etc.) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

Any construction activity proposed outside of the above days and hours for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case-by-case basis by the City, with criteria including the urgency/emergency nature of the work, the proximity of residential or other sensitive uses, and a consideration of nearby residents'/occupants' preferences. The project applicant shall notify property owners and occupants located within 300 feet at least 14 calendar days prior to construction activity proposed outside of the above days/hours. When submitting a request to the City to allow construction activity outside of the above days/hours, the project applicant shall submit information concerning the type and duration of proposed construction activity and the draft public notice for City review and approval prior to distribution of the public notice.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

59. Construction Noise

Requirement: The project applicant shall implement noise reduction measures to reduce noise impacts due to construction. Noise reduction measures include, but are not limited to, the following:

a. Equipment and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds) wherever feasible.

b. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves shall be used, if such jackets are commercially available, and this could achieve a reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.

c. Applicant shall use temporary power poles instead of generators where feasible.

d. Stationary noise sources shall be located as far from adjacent properties as possible, and they shall be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction.

e. The noisiest phases of construction shall be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.

When Required: During construction

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

60. Extreme Construction Noise

a. ***Construction Noise Management Plan Required***

Requirement: Prior to any extreme noise generating construction activities (e.g., pier drilling, pile driving and other activities generating greater than 90dBA), the project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction impacts associated with extreme noise generating activities. The project applicant shall implement the approved Plan during construction. Potential attenuation measures include, but are not limited to, the following:

i. Erect temporary plywood noise barriers around the construction site, particularly along on sites adjacent to residential buildings;

ii. Implement "quiet" pile driving technology (such as pre-drilling of piles, the use of more than one pile driver to shorten the total pile driving duration), where feasible, in consideration of geotechnical and structural requirements and conditions;

iii. Utilize noise control blankets on the building structure as the building is erected to reduce noise emission from the site;

iv. Evaluate the feasibility of noise control at the receivers by temporarily improving the noise reduction capability of adjacent buildings by the use of sound blankets for example and implement such measure if such measures are feasible and would noticeably reduce noise impacts; and

v. Monitor the effectiveness of noise attenuation measures by taking noise measurements.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

Public Notification Required

Requirement: The project applicant shall notify property owners and occupants located within 300 feet of the construction activities at least 14 calendar days prior to commencing extreme noise generating activities. Prior to providing the notice, the project applicant shall submit to the City for review and approval the proposed type and duration of extreme noise generating activities and the proposed public notice. The public notice shall provide the estimated start and end dates of the extreme noise generating activities and describe noise attenuation measures to be implemented.

When Required: During construction

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

61. Project-Specific Construction Noise Reduction Measures

Requirement: The project applicant shall submit a Construction Noise Management Plan prepared by a qualified acoustical consultant for City review and approval that contains a set of site-specific noise attenuation measures to further reduce construction noise impacts. The project applicant shall implement the approved Plan during construction

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

62. Construction Noise Complaints

Requirement: The project applicant shall submit to the City for review and approval a set of procedures for responding to and tracking complaints received pertaining to construction noise, and shall implement the procedures during construction. At a minimum, the procedures shall include**:**

a. Designation of an on-site construction complaint and enforcement manager for the project;

b. A large on-site sign near the public right-of-way containing permitted construction days/hours, complaint procedures, and phone numbers for the project complaint manager and City Code Enforcement unit;

c. Protocols for receiving, responding to, and tracking received complaints; and

d. Maintenance of a complaint log that records received complaints and how complaints were addressed, which shall be submitted to the City for review upon the City's request.

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Building

Monitoring/Inspection: Bureau of Building

63. Exposure to Community Noise

Requirement: The project applicant shall submit a Noise Reduction Plan prepared by a qualified acoustical engineer for City review and approval that contains noise reduction measures (e.g., sound-rated window, wall, and door assemblies) to achieve an acceptable interior noise level in accordance with the land use compatibility guidelines of the Noise Element of the Oakland General Plan. The applicant shall implement the approved Plan during construction. To the maximum extent practicable, interior noise levels shall not exceed the following:

a. 45 dBA: Residential activities, civic activities, hotels

b. 50 dBA: Administrative offices; group assembly activities

c. 55 dBA: Commercial activities

d. 65 dBA: Industrial activities

When Required: Prior to approval of construction-related permit

Initial Approval: Bureau of Planning

Monitoring/Inspection: Bureau of Building

64. Operational Noise

Requirement: Noise levels from the project site after completion of the project (i.e., during project operation) shall comply with the performance standards of chapter 17.120 of the Oakland Planning Code and chapter 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the City.

When Required: Ongoing

Initial Approval: N/A

Monitoring/Inspection: Bureau of Building

3.0 ENVIRONMENTAL SETTING

3.1 EFFECTS OF NOISE

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several non-acoustic factors. The number and effect of these non-acoustic environmental and physical factors vary depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustomed to, the less tolerable the new noise source will be to the individual.

3.2 EXISTING NOISE ENVIRONMENT

Existing Land Uses

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches and residences are considered to be more sensitive to noise intrusion than are commercial or industrial activities. Ambient noise levels can also affect the perceived desirability or livability of a development.

As shown on Figure 1.0, the project site is surrounded by a mix of land uses, including medical and multi-family residential to the north; multi-family residential and commercial to the east; commercial to the south; and commercial, medical, and multi-family residential to the west. In addition, there is a vacant disturbed parcel area across Derby Avenue, directly east of the project site, which is anticipated for future development as a retail store.

In general, the surrounding area is characterized by urban, mixed-use residential and commercial neighborhood of Fruitvale. Many medical offices are present in the property vicinity. The medical and commercial uses surrounding the project site primarily consist of single- and two-story structures reflective of and include areas of paved surface parking lots while the multi-family residential structures primarily consist of two- to four-story buildings. The Fruitvale Medical Building (3022 International Boulevard) is a six-story historical structure located on the southern portion of parcel 025-0720-005-02, outside of the project boundary.

Figure 1. Project Site mix of land use



Existing Noise Conditions

The existing noise environment in a project area is characterized by the area's general level of development because the level of development and ambient noise levels tend to be closely correlated. Areas which are not urbanized are relatively quiet, while areas which are more urbanized are noisier as a result of roadway traffic, industrial activities, and other human activities.

According to the Highway Traffic Noise Analysis and Abatement Policy and Guidance, provided by the Federal Highway Administration (FHWA), the level of traffic noise depends on three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the vehicle mix within the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and a greater number of trucks. A doubling of the traffic volume, assuming that the speed and vehicle mix do not change, results in a noise level increase of 3 dBA. The vehicle mix on a given roadway may also have an effect on community noise levels. As the number of medium and heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise level impacts will increase. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires on the roadway.

As part of the City of Oakland General Plan EIR, Illingworth & Rodkin conducted a city-wide noise-monitoring survey in August 2004 to determine local ambient noise conditions. Noise levels were measured long-term (for 24 hours) at 12 locations in the city, and short-term (for 1 hour) at 11 additional locations. These 23 measurements were supplemented with results from 14 noise studies conducted by others between 1999 and 2003 for specific development projects in Oakland. The results from this study are summarized in Table 8 for monitoring locations within the vicinity of the proposed project.

Illingworth & Rodkin used Caltrans' noise prediction model LeqV2 to develop noise contours (measured in Ldn) for the major traffic thoroughfares in Oakland (including the state and interstate freeways), employing traffic data obtained from various government agencies. The data were input into the traffic noise model for calibration with the observed noise measurements, and existing noise levels along city streets and highways were then calculated using the calibrated traffic noise model.

Table 8: Calculated Traffic Noise Levels for Roadways within the Project Vicinity

Street Name	Existing Ldn (at 75 feet)	Distance (ft) to Noise Contour from Roadway Center		
		70 Ldn	65 Ldn	60 Ldn
Fruitvale Avenue (From Harold Street to International Boulevard)	62	*	*	100
International Boulevard (From 14th Avenue to Fruitvale Avenue)	66	*	90	180
Note: * Distances of less than 50 feet are not included on this table Source: City of Oakland General Plan Noise Element 2005				

According to the Oakland General Plan Railroad/BARR Noise Contours Map, the proposed project is located between the 60 Ldn and 65 Ldn noise level contours.

To supplement the calculated noise data provided by the City of Oakland General Plan, short-term noise measurements were conducted at potentially sensitive receptors adjacent to the proposed project site; these are shown on Figure 2, where R-x denotes a sensitive receptor and ST-x denotes a short-term measurement location. The results of these measurements are presented in Table 9.

Table 9: Measured Short-term Noise Levels at Sensitive Receptors

Measurement Location	Leq (dBA)		Estimated Ldn (dBA)
	Daytime Hours (7 a.m. to 10 p.m.)	Nighttime Hours (10 p.m. to 7 a.m.)	
ST-1 1442 Derby Avenue	60	58	65
ST-2 3022 International Blvd	59	54	62
ST-3 2950 International Blvd	57	54	61
ST-4 3020 E 15th Street	60	52	61
Note: Measurements conducted on March 28, 2017, between the hours of 5 a.m. and 6 p.m.			

Based on these data, it is estimated that the existing noise levels at the project site are between 61 and 65 Ldn. This is consistent with the noise monitoring and modeling results from the Illingworth & Rodkin study, as summarized in Table 8.

4.0 METHODS

Results from the short-term site measurements, supplemented by general ambient noise conditions modeled by Illingworth & Rodkin, were used to provide baseline noise conditions at nearby sensitive receptors and within the project site vicinity. The noise study conducted by Illingworth & Rodkin and presented in the City of Oakland's General Plan Noise Element provides modeled noise levels from a specified distance from the roadway centerline, see Table 8. Average vehicle speeds on local area roadways were assumed to be consistent with posted speed limits and remain as such with or without implementation of the proposed project. For the purpose of this analysis, potential sensitive receptors were determined by reviewing current aerial photography.

Short-term site noise data were used as an input to the FHWA Roadway Construction Noise Model (RCNM) as the existing ambient noise level input. The RCNM is used as the FHWA's national standard for predicting noise generated from construction activities. Federal Transit Administration (FTA)methodology was used to predict noise generated from project-specific increase in traffic levels, due both to short-term construction and to long-term operational noise conditions including indoor noise levels.

The primary method used to evaluate noise impacts for this analysis includes the use of the RCNM methodology. The RCNM analysis includes the calculation of noise levels (Lmax and Leq) at incremental distances for a variety of construction equipment. The spreadsheet inputs include acoustical use factors, Lmax values, and Leq values at the nearest sensitive receptor. For this analysis, it was assumed that a worst-case noise scenario for each construction activity would entail the operation of the three noisiest pieces of equipment simultaneously. Table 10 summarizes the construction equipment and phasing used as input for RCNM.

Table 10: Construction Activities and Equipment

Phase	Equipment
Demolition (10 days)	Concrete/Industrial Saws
	Dozer
	Tractor/Loader/Backhoe (x2)
Site Preparation (1 day)	Grader
	Tractor/Loader/Backhoe
Grading (2 days)	Concrete/Industrial Saws

Phase	Equipment
	Dozer
	Tractor/Loader/Backhoe (x2)
Building Construction (100 days)	Crane
	Forklift (x2)
	Tractor/Loader/Backhoe (x2)
Paving (5 days)	Cement and Motor Mixers (x4)
	Paver
	Roller
Architectural Coating (5 days)	Air Compressor

FHWA Traffic Noise Model (TNM) was used to predict increases in traffic noise due to project construction activities and long-term operation of the proposed project at four existing sensitive receptors as well as the project location. Sensitive receptors were identified through review of current aerial photography and are shown on Figure 2. The FHWA TNM model is based upon reference energy mean emission levels (REMELS) for automobiles, medium trucks (two axles) and heavy trucks (three or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The

Approximately 42 trips per day are assumed for project construction-related deliveries and worker commute trips. Construction traffic entering and exiting the project site would travel on the following local roadways:

International Boulevard/SR 185 is a four-lane urban arterial roadway that runs approximately north-south parallel to Interstate 880 (I-880), beginning at the Lake Merritt area, passing through east Oakland and City of San Leandro, and ending in the City of Hayward where it becomes Mission Street.

Derby Avenue is a two-lane local street running approximately east-west between E. 10th Street and E. 15th Street.

E. 15th Street is a two-lane local street that runs approximately north-south between Fruitvale Avenue and the cul-de-sac north of Derby Avenue in the project vicinity.

Stantec conducted a project specific traffic study that collected existing weekday vehicle counts at all the intersections of the roadways listed above during a.m. (7:00 a.m. – 9:00 a.m.) and p.m. (4:00 p.m. – 6:00 p.m.) peak periods. As shown in Table 11, the project traffic study also estimated the increase of vehicle traffic generated from the operations of the proposed project.

Table 11: Project Trip Generation

Land Use (ITE Code)	Size	A.M. Peak Hour				P.M. Peak Hour				Daily Trips	
		Rate	In	Out	Total	Rate	In	Out	Total	Rate	Total
Private School (K-8) (534)	620 Students	0.9	307	251	558	0.6	175	197	372	2.48	1538
Transit/Bike/Walk Trips Reduction	43.0%		132	108	240		75	85	160		661
Totals			**175**	**143**	**318**		**100**	**112**	**212**		**877**

Source: ITE Trip Generation, 9th Edition, 2012; City of Oakland Transportation Impact Study Guidelines, City of Oakland Transportation Planning and Funding Division, November 26, 2013; Stantec, 2017.
Note: * The proposed Project would include program from Kindergarten to eighth grade. ITE land use category "Private School (K-8)" would provide closest trip generation estimates compared to other public school land use categories.

As shown in Table 11, it is expected that the proposed project would generate approximately 877 daily trips, 318 trips (175 inbound and 143 outbound) during the a.m. peak hour and 212 trips (100 inbound and 112 outbound) during the p.m. peak hour. Stantec developed the proposed project's trip distribution based on knowledge of the study area and input from City staff.

Long-term operation of the proposed project would generate an increase in traffic volumes on the local roadway network within the project vicinity. Consequently, noise levels from vehicular traffic sources along International Boulevard, Derby Avenue, and E. 15th Street would increase. FTA methodology was used to predict potential noise impacts to off-site sensitive receptors and to the proposed project. Noise impacts resulting from the increase of vehicle traffic were evaluated by comparing existing ambient noise conditions to construction estimates and the operations noise level projections.

Figure 2. Potential Sensitive Receptor Locations



5.0 NOISE ANALYSIS RESULTS

5.1 CONSTRUCTION-RELATED NOISE IMPACTS

Construction of the proposed school is expected to last approximately 6 months and is anticipated to be completed by December 2017. Construction noise would typically be generated from the use of concrete saws, graders, compactors, dozers, cranes, and backhoes. Noise generated from construction activities would be temporary and would occur within the hours allowed by the City's Noise Ordinance and Standard Conditions of Approval.

Table 12 lists equipment that is expected to be used along with noise levels generated from the FHWA RCNM (Federal Highway Administration 2006). Lmax sound levels at the nearest sensitive receptor, the 7-Direction Apartments and Native American Health Center approximately 35 feet to the west, are shown along with the typical acoustic use factor. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at full power (i.e., its loudest condition) during construction and is used to estimate Leq values from Lmax values. For example, the Leq value for a piece of equipment that operates at full power 50% of the time (acoustical use factor of 50) is 3 dB less than the Lmax value.

Table 12: RCNM Estimated Construction Equipment Noise Levels at Nearest Receptor

Source	Reference Lmax (dBA)	Distance to Nearest Receptor (feet)	Sound Level at nearest receptor (dBA)		
			Lmax	Acoustical Use Factor (%)	Leq
Backhoe	78	35	81	40	77
Compressor (air)	78	35	81	40	77
Concrete Saw	90	35	93	20	86
Concrete Mixer	79	35	82	40	78
Crane	81	35	84	16	76
Dozer	82	35	85	40	81
Front End Loader	79	35	82	40	78
Grader	85	35	88	40	84
Man Lift	75	35	78	20	71

Source	Reference Lmax (dBA)	Distance to Nearest Receptor (feet)	Sound Level at nearest receptor (dBA)		
			Lmax	Acoustical Use Factor (%)	Leq
Paver	77	35	80	50	77
Roller	80	35	83	20	76
Source: Federal Highway Administration 2006 (Stantec 2017)					

A reasonable worst-case noise condition for general construction activity is that the two loudest pieces of equipment for each phase would operate simultaneously. This represents a conservative scenario, as it assumes that the two loudest pieces of equipment would be operating simultaneously at the exact location of the project site closest to the nearest receptor. The worst-case noise levels for each construction phase are summarized in Table 13; these calculations represent the worst-case total noise level at the nearest receptor, located approximately 35 feet from the proposed project where general construction activity would occur.

Table 13: RCNM Estimated Construction Equipment Noise Levels by Phase

Phase	Total Sound Level at Nearest Receptor, Leq (dBA)
Demolition (10 days)	87 (concrete saw, dozer)
Site Preparation (1 day)	85 (grader, loader)
Grading (2 days)	87 (concrete saw, dozer)
Building Construction (100 days)	81 (backhoe, loader)
Paving (5 days)	81 (concrete mixer, paver)
Architectural Coating (5 days)	77 (air compressor)

Noise impacts associated with the proposed project construction would result in temporary or periodic increases in ambient noise levels. However, construction activities would be temporary and would occur during daylight hours, all construction equipment powered by internal combustion engines would be properly muffled and maintained, idling of internal combustion

engines will be minimized, and all stationery noise-generating construction equipment, such as air compressors, would be located as far as practically possible from existing receptors. Please refer to Appendix I in the CEQA Analysis detailing the proposed project's construction noise reduction measures.

Construction-related traffic (i.e., materials delivery trucks and employee commute vehicles) would pass within 30 feet of several residences located along the access roads. Construction-related deliveries and employee trips are expected to result in approximately 60 automobile and 24 truck trips per day over the duration of construction, with a total of 24 haul trips during the demolition phase. The resulting traffic noise levels were calculated using FTA methodology; it is estimated that 60 automobile and 24 truck trips per day over the 100 day building construction phase, traveling approximately 25 mph would generate maximum hourly noise levels of 53 dBA, at the closet receptor (Receptor #1), approximately 33 feet from the roadway centerline. These worst-case results would meet the daytime maximum exterior residential noise standard of 60 dBA and would not be considered a significant impact.

Vibration

During construction of the proposed project, equipment such as backhoes, cranes, dozers, graders, loaders, and rollers may be used as close as 35 feet from the closest sensitive receptor, and 200 feet from the historic Cohen-Bray House. Construction equipment that would be used during project construction would generate vibration levels between 0.002 and 0.127 PPV as measured at a distance of 35 feet from the operating machinery. As shown in Table 14, the groundborne vibration levels would be below the Caltrans cosmetic damage vibration threshold of 0.3 PPV for older residential buildings at the closest receptor, and below the threshold of 0.1 PPV for fragile buildings (at the Cohen-Bray House). At the closest residential receptor, the vibration levels are also below the human annoyance threshold, with the exception of the vibratory compactor (roller). As the roller would operate for a period of less than 5 days during daytime hours, construction-related groundborne vibration impacts would be less than significant.

Table 14: Construction Equipment Related to Groundbourne Vibration

Type of Equipment	Peak Particle Velocity at 25 feet	Peak Particle Velocity at 35 feet	Peak Particle Velocity at 200 feet	Threshold at which Human Annoyance Could Occur	Threshold at which Cosmetic Damage Could Occur (Cohen-Bray House)	Potential for proposed project to exceed thresholds
Large Dozer	0.089	0.054	0.004	0.1	0.3 (0.1)	None
Small Bulldozer	0.003	0.002	0.0001	0.1	0.3 (0.1)	None
Loaded Trucks	0.076	0.046	0.003	0.1	0.3 (0.1)	None

Type of Equipment	Peak Particle Velocity at 25 feet	Peak Particle Velocity at 35 feet	Peak Particle Velocity at 200 feet	Threshold at which Human Annoyance Could Occur	Threshold at which Cosmetic Damage Could Occur (Cohen-Bray House)	Potential for proposed project to exceed thresholds
Vibratory Compactor (Roller)	0.210	0.127	0.009	0.1	0.3 (0.1)	Less Than Significant
Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Guidelines 2006b						

5.2 OPERATIONAL NOISE IMPACTS

Long-term operation of the proposed project would generate an increase in traffic volumes on the local roadways within the project vicinity. As shown in Table 11, the proposed project would generate approximately 877 daily trips, 318 trips during the a.m. peak hour, and 212 trips during the p.m. peak hour. Based on the existing peak traffic volume per hour on International Blvd of 1668 (Kittelson & Associates, Inc. 2013) and the expected project peak traffic volume per hour, noise levels along International Boulevard would increase by approximately 1 dB. Noise at the four Receptors from project traffic along Derby Avenue and within the project site is expected to increase by 1 to 7 dB; however, the highest predicted level would still be several decibels less than the contribution from traffic along International Boulevard. Therefore, the expected peak hourly noise increase from project traffic at all Receptors is approximately 1 dB. Because the majority of project traffic would occur during these two peak hours, the Ldn at all four Receptors is not expected to increase.

Per the FTA (FTA, 2006), a 0 to 2 dB increase would result in no impact when the existing background noise levels are already 60 dBA Ldn. Additionally, the expected Ldn values would meet the City of Oakland thresholds for residential and commercial land uses. Therefore, the increase in noise levels at the Receptors from project traffic would not be considered a significant impact.

Long-term operation of the proposed project would also generate noise in the form of site maintenance, children playing during recess or on the on-site turf field, and the bell system.

Site maintenance activities would typically consist of landscape maintenance equipment, and small power tools, and would occur only during daytime hours. While ambient noise levels in the vicinity of these tools would temporarily increase, the noise levels are generally expected to be similar to site maintenance activities at the adjacent receptors. In addition, the City of Oakland (City of Oakland, 2017) exempts such activities between the hours of 7 a.m. and 9 p.m. Therefore, noise from site maintenance activities would not be considered a significant impact.

There is a playground with a climbing playset located approximately 50 feet from the nearest residential receptor (R-3) at 2950 International Boulevard; a turf field designed for sports activities and general play is also located approximately 116 feet from the same receptor. Playground activity typically consist of 70 students at recess and outside sport activities during daytime hours and 30 students outside for physical education (PE) classes.

To support the project's operational noise modeling, Stantec collected additional operational noise data at four existing Aspire Charter Schools in the City of Oakland that are comparable in size to the project's proposed recess and PE classes; Aspire College Academy at 9030 Atherton Street, Aspire ERES Academy at 1936 Courtland Avenue, Aspire Triumph Technology Academy (ATTA) at 3200 62nd Avenue, and Aspire Berkley Maynard Academy (BMA) at 6200 San Pablo Avenue (Figure 1). Noise measurements were taken at the four existing schools with and without students at recess and/or PE classes. The measurements with students present were evaluated and compared to the corresponding measurements without students present to determine the overall student noise contribution, and then averaged to add existing background ambient levels at the Aspire ERES site. The results of the additional noise surveys at the existing four Aspire Charter Schools and a discussion of the analysis are provided in Appendix C.

Based on these results, noise levels at 2950 International Boulevard with the added project contributions from sport activities, recess, and PE is expected to be, on average, 57 dBA with the green living wall feature (Table 15).

Table 15: Playground Noise Analysis Results with Project

Receiver	Existing Measured ERES Site Leq (day)	Calculated ERES Site Leq with Playground (15-min)	Increase over existing
2950 International Blvd	57	57	0
2946 International Blvd	57	57	0
1442 Derby Ave	60	60	0
3020 E. 15th St	60	60	0
Source: Stantec 2017			

As the measured existing exterior ambient noise level at this receptor was 57 dBA (Table 15), the playground activity with the green living wall feature in place would not generate an increase in ambient noise levels and impacts from recess activities at the project site would be less than significant.



Figure 1: Aspire School Locations

A rooftop exterior recreation area is located on the eastern façade; the center is approximately 65 feet from the multi-family residential receptor (R-1) at 1442 Derby Avenue and 105 feet from the multi-family residential receptor (R-4) at 3020 E. 15th Street. Lunch-time break activity typically tak es place on the exterior rooftop and consist of approximately 60 students. The new noise level at 1442 Derby Avenue with added contributions from student break-time activities is expected to be, on average, 60 dBA with a minimal number of students near the eastern boarder of rooftop area and with outdoor seating provisions in the plan (Appendix C). As the recorded ambient noise level at both of these receptors was 60 dBA (see Table 9 above), the student activities will not generate an increase in ambient noise levels and would not be considered a significant impact.

Bells to notify students of school events/schedule are exempt from the noise limits (City of Oakland, 2017), and therefore, would not be considered a significant impact.

6.0 CONCLUSION

Noise generation associated with the proposed development is typically attributed to the project construction activities. These include site grading, construction of the building and apparatuses, and the increased traffic related to facility use. Operational noise generation can be attributed to the slight increase to traffic counts from students being transported to the proposed project, as well as typical institutional noise, such as, landscape maintenance, waste collection, and students playing and talking at designated outdoor areas.

A change in the noise characteristics associated with operations such as students playing at designated outdoor areas for recess, physical education and lunch breaks can be anticipated. The added noise is expected during school hours and it is not anticipated to increase the day-time ambient levels at adjacent receptors with the current living wall features in place.

Based on FHWA RCNM, the proposed project can anticipate high levels of construction noise and vibration on a temporary basis, with no long-term noise or vibration impacts from construction. While the noise level impacts presented for each phase of construction are a "worst-case" scenario and would be audible over traffic-related noise level impacts surrounding the area, these high levels are not expected to be continuous. Moreover, these noise and vibration levels will occur only during the hours allowed by the City's Noise Ordinance per Oakland SCA 58, and will be reduced by the application of noise and vibration control techniques affecting and controlling the construction noise and vibration at the source. Noise and vibration control techniques, as detailed in Oakland SCAs 59, 60, 61, 62, 63, and 64, would be implemented to ensure that noise and vibration generated from temporary construction activities would not exceed the City of Oakland's established maximum outdoor noise threshold or the FTA's human annoyance or cosmetic damage thresholds at nearby sensitive receptors.

Furthermore, based on FTA methodology; which included, noise volumes from existing and projected roadway noise, project occupants can anticipate long-term exterior operational noise conditions below the City's thresholds of significance. Likewise, given the anticipated noise reduction offered by the proposed building structure, the project occupants can anticipate long-term interior noise levels below the City's interior thresholds of significance. In summary, the proposed project is not anticipated to exceed interior noise levels above the City's thresholds of significance.

7.0 REFERENCES

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APPENDICES

APPENDIX A FHWA RCNM RESULTS

Demolition Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Demolition

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment				
			Spec	Actual	Receptor	Estimated	
		Impact	Lmax	Lmax	Distance	Shielding	
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw		No	20		89.6	50	0
Dozer		No	40		81.7	50	0
Backhoe		No	40		77.6	50	0
Front End Loader		No	40		79.1	50	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	89.6	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB Factor of Safety 87.7

Site Preparation Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Site Preparation

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment				
			Spec	Actual	Receptor	Estimated	
		Impact	Lmax	Lmax	Distance	Shielding	
Description		Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Front End Loader		No	40		79.1	50	0
Grader		No	40	85		50	0

		Results													
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader		85	81	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	85	82	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB Factor of Safety 85

Grading Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Grading

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	50	0
Dozer	No	40		81.7	50	0
Backhoe	No	40		77.6	50	0
Front End Loader	No	40		79.1	50	0

			Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Backhoe		77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	89.6	84.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB(A) Factor of Safety 87.7

Building Construction Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Building Construction

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Backhoe	No	40		77.6	50	0
Front End Loader	No	40		79.1	50	0
Crane	No	16		80.6	50	0

			Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe		77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader		79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Crane		80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	80.6	78.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB(A) Factor of Safety 81.7

Paving Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Paving

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	50	0
Paver	No	50		77.2	50	0
Roller	No	20		80	50	0

			Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck		78.8	74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver		77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller		80	73	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	80	78.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB(A) Factor of Safety 81.8

Architectural Coating Phase

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 3/6/2018
Case Description: Aspire-Architectural Coating

		---- Receptor #1 ----		
		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
1442 Derby Avenue	Residential	60	1	52

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	50	0

			Results											
		Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)				
				Day		Evening		Night		Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Total with 3dB(A) Factor of Safety 76.7

APPENDIX B FTA TRAFFIC NOISE RESULTS

Table 6-5. Source Reference SELs at 50 Feet: Highway/Transit Sources @ 50 mph.

Source	Reference SEL (dBA)	Approximate L_{max} (dBA)	Prefer Measurements?
Automobiles	74	70	No
Buses (diesel)	82	79	No
Buses (electric trolleybus)	80	77	No
Buses (hybrid)[1]	83	80	Yes

[1]Hybrid bus with full-time diesel engine and electric drive motors.

Table 6-6. Computation of L_{eq} and L_{dn} at 50 feet: Highway/Transit Sources

Hourly L_{eq} at 50 ft:	$L_{eq}(h) = SEL_{ref} + 10\log(V) + C_{emissions} - 10\log\left(\frac{S}{50}\right) - 35.6$
Daytime L_{eq} at 50 ft:	$L_{eq}(day) = L_{eq}(h)\big\|_{\text{hour}=x}$
Nighttime L_{eq} at 50 ft:	$L_{eq}(night) = L_{eq}(h)\big\|_{\text{hour}=x}$
L_{dn} at 50 ft:	$L_{dn} = 10\log\left[(15)\times 10^{\left(\frac{L_{eq}(day)}{10}\right)} + (9)\times 10^{\left(\frac{L_{eq}(night)+10}{10}\right)}\right] - 13.8$
Noise Emissions	$= 25\times\log\left(\frac{S}{50}\right)$ → buses $C_{emissions}$ $= 1.6$ → accelerating 3-axle commuter buses $= 40\times\log\left(\frac{S}{50}\right)$ → automobiles
Other adjustments	-3 → automobiles, open-graded asphalt +3 → automobiles, grooved pavement

V = hourly volume of vehicles of this type, in vehicles per hour

V_d = average hourly daytime volume of vehicles of this type, in vehicles per hour $= \frac{total\,vehicle\,volume,7\,am\,to\,10\,pm}{15}$

V_n = average hourly nighttime volume of vehicles of this type, in vehicles per hour $= \frac{total\,vehicle\,volume,10\,pm\,to\,7\,am}{9}$

S = average vehicle speed in miles per hour (distance divided by time, excluding stop time at red lights)

Note: Idling buses appear under Stationary Sources.

		Volume per Hour (peak)		Speed (mph)		SELref		Cemissions		LEQ, 1-hour (dBA)		
Receptor	Distance to Centerline	Automobiles	Heavy Trucks	Automobiles	Heavy Trucks	Automobiles	Heavy Trucks	Automobiles	Heavy Trucks	Automobiles	Heavy Trucks	Total
1	33	30	12	25	25	74	82	-12.0	-7.5	44	53	53

APPENDIX C PLAYGROUND NOISE RESULTS

Playground Ambient Noise Measurements

One-second measurements were taken in 15-minute intervals to calculate 15-minute and 1 hour L_{eq}. A total of six measurement sets were taken at various Oakland schools (Aspire College Academy, Aspire ERES Academy, Aspire Triumph Technology Academy (ATTA), Berkeley Maynard Academy (BMA)). Once at the school the technician was instructed to take two measurements at each position defined (Positions with and without students at recess and/or PE classes) and note the student locations if students were present, groupings, activities, and approximate distances from the student groups to the sound level meter.

The results of the playground noise measurements at the four (4) existing school sites are shown in the table below:

Table C-1: Playground Noise Measurements at the Four Aspire School Locations

	Location	Leq (15 min)	Total # students	# students on play structure	# students on asphalt	approx distances from student groups (ft)	Notes
BMA	1	74	60	30	16-basketball, 14 center	10' structure, 20' basketball 150' center	1st grade recess & PE
	1	55	0	0	0	N/A	ambient
	2	71	60	40	16-center, 4 shade	100' structure, 10' shade, 60' center	1st grade recess & PE
	2	53	0	0	0	N/A	ambient
	3	74	115	0	115-center	10' center	2/3 recess & PE
	3	56	0	0	0	N/A	ambient
	Location	**Leq (15 min)**	**Total # students**	**# students on play structure**	**# students on asphalt**	**approx distances from student groups**	**Notes**
Aspires College Academy	1	64	37	10	7-basketball, 20-nrth bldg play	75' structure, 60' basketball, 80' nrth bldg play	4th grade Recess & PE
	1	59	0	0	0	N/A	
	2	69	75-100	0	75-100 line no student grps	5'	4th grade PE
	2	54	0	0	0	N/A	
	3	69	35	17	4-basketball, 15 nrth bldg play	45' structure, 100' basketball, 55' nrth bldg play	5th grd brunch Recess followed by 2/3 grd lunch recess
	3	62	3	3	0	31	
	Location	**Leq (15 min)**	**Total # students**	**# students on play structure**	**# students on asphalt**	**approx distances from student groups (ft)**	**Notes**
ATTA	1	60	20	N/A	20	40	PE & 2/3 Recess
	1	50	0		0	N/A	ambient
	2	74	95		40-recess, 55-PE	10' recess, 120' PE	PE & K/1 Lunch Recess
	2	57	0		0	N/A	ambient
	3	68	60		60	75	PE
	3	64	0		0	N/A	ambient
	Location	**Leq (15 min)**	**Est. # students outside during meas.**	**Est. # students on play structure**	**Est # students on asphalt**	**approx distances from student groups (ft)**	**Notes**
Aspires ERES Academy on Courtland	1	69	56	0	30-circles(both upper-lower), 26-PE (game both upper-lower)	15' circles, 40' game	4th grade PE
	1	65	0	0	0	N/A	ambient
	2	69	50	0	10-steps,40-(both upper lower)	15' steps, 20+' upper lower	6-8th grade Break
	2	59	0	0	0	N/A	ambient
	3	74	40	12	28	12' playset, 12' playground	3-5 grade Recess
	3	67	0	0	0	N/A	ambient

Playground Ambient Noise Analysis Assumptions

The following assumptions were made for the noise predictions at sensitive receptors.

- There exists a living wall at height of 23' where the south and west property lines intersect of lengths 18' along the south and 27' along the west, respectively.
- There exists seating provisions for 60 students along the innermost area of the rooftop, 9 feet away from the east edge of the building facing Derby Avenue.
- 100 students on playground
- 70 students at recess in 15 minute blocks for the 3.5 hours of the school day.
- 30 students at PE scheduled back-to-back between the hours of 8:15-3:00
- Locations of students on playground (and specified activities)
    - 30 at play structure (recess)
    - 40 on asphalt (recess)
    - 30 on turf (PE)
- 60 students on rooftop for 20 minutes/hour lunch breaks for 3 hours of the day between 11:00-1:30
- Locations of students on rooftop (and specified activities)
    - 6 students within 1-3 feet of the east edge of the building (walking/standing)
    - 8 students within 3-9 feet of the east edge of the building (walking/ standing)
    - 46 students seated 9+ feet from the east edge of the building (seated, eating lunch)
- Student noise was considered point source

Playground Ambient Noise Analysis Results

To determine the potential impact of the Aspire ERES playground on the neighborhood, the measurements of existing playground noise with students present were evaluated and compared to the corresponding measurements without students present to determine the overall student noise contribution. The overall student noise contribution difference was then averaged and added to the existing background ambient levels at the Aspire ERES site to help assess any impacts.

Using the measured noise levels and the assumptions listed above, noise levels at 2950 International Boulevard with the added project contributions from sport activities, recess, and PE is expected to be, on average, 57 dBA with the green living wall feature as shown in the table below.

Table C-2: Playground Noise Analysis Results Table

Receiver	Existing Measured ERES Site Leq (day)	Calculated ERES Site Leq with Playground (15-min)	Increase over existing
2950 International Blvd	57	57	0
2946 International Blvd	57	57	0
1442 Derby Ave	60	60	0
3020 E. 15th St	60	60	0
Source: Stantec 2017			

As the measured existing exterior ambient noise level at this receptor was 57 dB(A), the playground activity at the ERES Site with the green living wall feature in place would not generate an increase in ambient noise levels and impacts from recess activities at the project site would be less than significant.

ATTACHMENT K

ATTACHMENT K: PREVIOUSLY IDENTIFIED LUTE EIR AND CCERP EIR MITIGATION MEASURES

Section 7.1: Aesthetics
LUTE EIR Mitigation Measure F.2a: Develop guidelines or a "step back" ordinance for height and bulk for new development projects in the downtown area. Projects should be encouraged to be designed at pedestrian-scale on the street-side, with high towers or strong vertical elements stepping back from the street.
LUTE EIR Mitigation Measure F.2b: Analyze the desired height of downtown office development and develop zoning regulations that support the preferred skyline design.
LUTE EIR Mitigation Measure F.2c: Define view corridors and, based upon these views, designate appropriate height limits and other requirements. Views of Lake Merritt, the Estuary, and architecturally or historically significant buildings should be considered.
LUTE EIR Mitigation Measure F.3a: Standard design guidelines for all Neighborhood Commercial areas should be developed that require continuous or nearly continuous storefronts located along the front yard setback, promote small scale commercial activities rather than large scale establishments at the street level, restrict front yard parking lots and driveways, require small scale pedestrian-oriented signage, have a relatively low height limit. and promote the pedestrian friendly amenities at the streel level.
LUTE EIR Mitigation Measure F.3b: Ensure that structures and sites are designed in an attractive manner which harmonizes with or enhances the visual appearance of the surrounding environment by preparing and adopting industrial and commercial design guidelines.
LUTE EIR Mitigation Measure F.3c: Develop design guidelines for parking facilities of all types.
Section 7.3: Air Quality
LUTE EIR Mitigation Measure E.4: Where residential development would be located above commercial uses, parking garages, or any other uses with a potential to generate odors, the odor-generating use should be properly vented (e.g., located on rooftops) and designed (e.g., equipped with after burners) so as to minimize the potential for nuisance odor problems.
LUTE EIR Mitigation Measure E.5a: The following Basic Control Measures shall be implemented at all construction sites: • Water all active construction areas at least twice daily. • Cover all trucks hauling soil, sand, and other loose debris *or* require all trucks to maintain at least two feet of freeboard. Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites. • Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. • Sweep streets daily (with water sweepers) if visible soil material is carried onto adjacent public streets.
LUTE EIR Mitigation Measure E.5b: The following enhanced control measures shall be implemented at all construction sites when more than four acres are under construction at any one time: • Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more). • Enclose, cover, water twice daily or apply (non-toxic) soil binders to exposed stockpiles (dirt, sand, etc.) • Limit traffic speeds on unpaved roads to 15 mph. • Install sandbags or other erosion control measures to prevent silt runoff to public roadways. • Replant vegetation in disturbed areas as quickly as possible.

LUTE EIR Mitigation Measure E.5c: BAAQMD dust control measures would be implemented by contractors of future development projects as outlined in BAAQMD *CEQA Guidelines* (1996) or any subsequent applicable BAAQMD updates. They are as follows:

- Any stationary motor sources (such as generators and compressors) to be located within 100 feet of any residence or school (sensitive receptors) would be equipped with a supplementary pollution control system on its exhaust as required by Bay Area Air Quality Management District (BAAQMD) and California Air Resources Board (CARB).

- To minimize construction equipment emissions, low- NOx tune-ups should be performed on all construction equipment. Contractors should be required to utilize equipment with recent (within 30 days) low- NOx tune-ups to minimize NOx emissions. This would apply to all diesel-powered equipment greater than 50 horsepower and periodic tune-ups (every 90 days) would be required for equipment used continuously for construction of a specific development.

CCERP EIR Mitigation Measure 6-5: Construction. BAAQMD dust control measures shall be implemented by contractors of future development projects as outlined in BAAQMD *CEQA Guidelines* (1999) or any subsequent applicable BAAQMD updates.

Section 7.5: Cultural Resources

LUTE EIR Mitigation Measure G.2: Establish criteria and interdepartmental referral procedures for determining when discretionary City approval of ground-disturbing activities should be subject to special conditions to safeguard potential archaeological resources.

LUTE EIR Mitigation Measure G.3a: Amend the Zoning Regulations text to incorporate the new preservation regulations and incentives.

LUTE EIR Mitigation Measure G.3b: Develop and adopt design guidelines for Landmarks and Preservation Districts.

CCERP EIR Mitigation Measure 11-1: Should previously unidentified cultural resources be encountered during redevelopment, work in that vicinity shall stop immediately, until an assessment of the finds can be made by an archaeologist. If the resource is found to be significant under CEQA, an appropriate mitigation plan must be developed.

Section 7.12: Noise

LUTE EIR Mitigation Measure L.3a: Establish design requirements for large-scale commercial development that requires adequate buffers from residential uses. Use of open space, recreation space, or transit installations as buffers should be encouraged. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.3b: Mixed residential/ non-residential neighborhoods should be rezoned after determining which should be used for residential, mixed, or non-residential uses. Some of the factors that should be considered when rezoning mixed use areas include the future intentions of the existing residents or businesses, natural features, or health hazards. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.4: Where high density residential development would be located adjacent to existing lower density residential development, new development shall be designed to minimize noise impacts on any existing residential uses due to increased traffic on local roadways and increased parking activities.

LUTE EIR Mitigation Measure L.5a: The City should develop distinct definitions for home occupation, live/work and work/live operations; define appropriate locations for these activities and performance criteria for their establishment; and create permitting procedures and fees that facilitate the establishment of those activities which meet the performance criteria. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.5b: Avoid proliferation of existing incompatible uses by eliminating, through appropriate rezoning actions, pockets of residential zoning within predominantly industrial areas. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.5c: Establish performance-based standards which designate appropriate levels of noise, odors, light/glare, traffic volumes, or other such characteristics for industrial activities located near commercial or residential areas. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.5d: Develop performance zoning regulations which permit industrial and commercial uses based upon their compatibility with other adjacent or nearby uses. (Neighborhood Working Group)

LUTE EIR Mitigation Measure L.7: Future transit improvements shall be designed sufficiently so that future noise levels along these streets can be adequately estimated and considered in the design of future residential or other noise-sensitive developments.

CCERP EIR Mitigation Measure 7.1: Construction Noise. Compliance with the City Noise Ordinance would mitigate construction noise impacts associated with the future development projects in the Plan Area to a less-than-significant level. The following measures shall be required (as necessary) as part of future development projects within the Plan Area in order to comply with Ordinance noise limits (when construction occurs closer than 50 feet from a noise~sensi6ve receptor) as well as to minimize any potential pile driving noise and vibration impacts:

1. Equipment and trucks used for project construction should utilize the best available noise control techniques (improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustica1ly-attenuating shields or shrouds) in order to minimize construction noise impacts. Construction equipment should not generate noise levels above the mitigated levels listed in Table N-4 (75 dBA to 80 dBA at 50 feet, depending on equipment type).
2. Equipment used for project construction should be hydraulically or electrical powered impact tools (e.g., jack hammers, pavement breakers, and rock drills) wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatically powered tools is unavoidable, an exhaust muffler on the compressed air exhaust should be used; this muffler could lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves should be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures should be used such as drilling rather than impact equipment whenever feasible.
3. Stationary noise sources should be located as far from adjacent uses as possible, particularly, any adjacent residences receptors. If they must be located near such receptors, they should be adequately muffled and enclosed within temporary sheds.
4. Where existing residences are located within 50 feet of the project construction activities, operation of heavy equipment should be limited to 10 or less days at one time and weekend construction activities should be prohibited.
5. Pile holes should be pre-drilled to reduce potential noise and vibration impacts. City pile driving noise attenuation requirements should be implemented as necessary. Limit pile driving from 8:00 a.m. to 4:00 p.m. Monday through Friday, with no pile driving or other extreme noise generating activity pennit1ed between 12:30 and 1:30 p.m., or other mid-day hour as established and noticed. Prohibit pile driving or other extreme noise generating activity on Sundays and holidays. Pile driving on Saturdays will be evaluated on a case-by-case basis, with criteria including the proximity of residential uses and a survey of business preferences for whether Saturday activity is acceptable if the overall duration of the pile driving is shortened. Avoid times when the most disturbance could occur, during business hours (to the extent practically feasible), the noon lunch hour, and evening and nighttime hours (7:00 p.m. to 7:00 a.m.). It is recommended that pile driving activities be limited to 1:00 p.m. to 7:00 p.m. on weekdays and 9:00 a.m. to 8:00 p.m. on Saturdays. Use sonic or vibratory pile drivers where feasible instead of impact pile drivers (sonic pile drivers are only effective in some soils). Vibratory pile drivers could reduce noise levels by as much as 16 dBA, but can cause disturbance to adjacent uses. Use engine and pneumatic exhaust controls on pile drivers as feasible to ensure that exhaust noise from pile driver engines is minimized. Such controls could reduce exhaust noise by up to 6 dBA.

CCERP EIR Mitigation Measure N-3: Noise Compatibility. In accordance with City Land Use Compatibility Guidelines for Community Noise, future residential development proposals within 5,000 feet of the I-880 freeway corridor, along major arterials identified in the LUTE, or possibly along some collectors where

noise levels could exceed 60 dBA CNEL (if a direct line-of-sight is available) shall be required to complete a detailed analysis of noise reduction requirements. A detailed analysis of noise reduction requirements shall also be required if any future commercial uses are proposed within approximately 1,500 feet of the I-880 freeway corridor, adjacent to major arterials identified in the LUTE, or within approximately 200 feet of elevated sections of BART tracks where noise levels could exceed 67 dBA CNEL (if a direct line-of-sight is available). Recommended noise installation features shall be included in the designs of future development.
Section 7.14: Public Services
LUTE EIR Mitigation Measure D.5-1a: In reviewing major land use or policy decisions, consider the availability of police and fire protection services, park and recreation services, schools, and library services in the affected areas, as well as the impact of the project on current service levels.
LUTE EIR Mitigation Measure D.5-1b: Develop target ratios of police officers and firefighters to population for annual budgeting purposes. These ratios should be used to assess the feasibility and merits of service fees on new development which finance additional police officers and fire fighters. (Neighborhood Working Group)
LUTE EIR Mitigation Measure D.5-1c: Increase police foot patrols and cruisers in high visibility downtown areas and locate funding sources to support them. (Downtown Working Group)
Mitigation Measure D.5-1d: Analyze the distribution of services provided by the public and privately operated civic and institutional uses, identify underserved areas of the City and increase services in those areas. (Neighborhood Working Group)
LUTE EIR Mitigation Measure D.5-1e: Solicit comments from the Oakland Police and Fire Departments on major new development proposals to ensure that law enforcement and fire protection impacts are appropriately addressed and mitigated.
LUTE EIR Mitigation Measure D.6-1a: In reviewing major land use or policy decisions, consider the availability of police and fire protection services, park and recreation services, schools, and library services in the affected areas, as well as the impact of the project on current service levels.
LUTE EIR Mitigation Measure D.6-1b: Develop target ratios of police officers and firefighters to population for annual budgeting purposes. These ratios should be used to assess the feasibility and merits of service fees on new development which finance additional police officers and fire fighters. (Neighborhood Working Group)
LUTE EIR Mitigation Measure D.6-1c: Retain the existing Fire Stations at all three military bases to facilitate the provision of adequate public services to users of these sites as well as to surrounding properties.
LUTE EIR Mitigation Measure D.6-1d: Solicit comments from the Oakland Police and Fire departments on major new development proposals to ensure that law enforcement and fire protection impacts are appropriately addressed and mitigated during project planning and design.
LUTE EIR Mitigation Measure D.7-1a: Mitigation measures available to the School District to reduce overcrowding include: 1. Reassigning students among district schools to account for changing population and new development; 2. Continuation and expansion of year-round school; 3. More efficient use of underutilized and/or abandoned school facilities; 4. Addition of portable classrooms; and 5. The busing of students to less crowded schools. If these measures do not reduce overcrowding, OUSD may have to expand existing schools or construct new schools. All of these measures would require varying amounts of funding. If current sources of funding including the City of Oakland school mitigation fees, increases in property taxes and sales tax revenues, and increases in state funding are insufficient to pay for the cost of these mitigating

overcrowding, the OUSD should formulate and implement specific measures to raise additional funds. Funding sources which may be considered by OUSD include: 1. Adjustments of school mitigation fees on commercial and residential development; 2. The creation of special assessment or Mello Roos districts or annexation to a Community Facilities District; 3. Sale of surplus OUSD property; and 4. Any other funding mechanisms available to the OUSD by state law or local ordinances, including those measures identified in the OUSD's 1996 Developer Fee Justification Study.
LUTE EIR Mitigation Measure D.7-1b: In reviewing major land use or policy decisions, the City will consider the availability of police and fire protection services, park and recreational services, schools, and library services in the affected areas and the impact of the project on the current service levels.
LUTE EIR Mitigation Measure D.7-1c: Support the School District's efforts to use local bond issues and voter approved assessment districts as a means of providing adequate school facilities.
LUTE EIR Mitigation Measure D.7-1d: Where feasible and appropriate, encourage the inclusion of child care centers in major residential and commercial developments near transit centers, community centers, and schools.
LUTE EIR Mitigation Measure D.7-1e: Continue to assist the Oakland Unified School District in securing all of the fees, grants, and other financial resources possible. (Neighborhood Working Group)
LUTE EIR Mitigation Measure D.7-1f: Work with the School District to coordinate land use and school facility planning and continue efforts by the City to collect impact fees and monitor the school capacity impacts of new development.
LUTE EIR Mitigation Measure D.7-1g: The Office of Parks and Recreation, Real Estate Division of the Office of Public Works, and the Oakland Unified School District should assess the use of City and school-owned parcels for use as civic, institutional, or recreational facilities. (Neighborhood Working Group)
LUTE EIR Mitigation Measure D.7-1h: Support state and federal legislation to promote affordable, safe, high-quality child care, including children with special needs
LUTE EIR Mitigation Measure D.8-1: In reviewing major land use or policy decisions, consider the availability of police and fire protection services, park and recreation services, schools, and library services in the affected areas, as well as the impact of the project on current service levels.
CCERP EIR Mitigation Measure 10.2-1: The City of Oakland and its Redevelopment Agency should coordinate with the OUSD to develop and initiate a land acquisition program for new schools. The School District's biggest challenge will be to find available land in appropriate areas to serve new student populations. The City and Agency may be able to assist, through the use of redevelopment tools, in the identification and acquisition of appropriate sites.
CCERP EIR Mitigation Measure 10.2-2: The City of Oakland, its Redevelopment Agency, and public and private land developers within the Project Area should work with the OUSD to identify possible joint use opportunities. Joint use may take many different forms. Examples of joint use may include the lease or sale of air rights above or below existing school grounds or facilities to private developers, or joint venturing with private developers, public entities, or other parties in the development of surplus school property. Other standard joint use opportunities include joint ventures with the City parks department in the development of shared school grounds/public park space.
CCERP EIR Mitigation Measure 10.2-3: The City of Oakland and its Redevelopment Agency should coordinate with the OUSD to identify and pursue local funding opportunities to match potential state grants. At the Redevelopment Agency's sole discretion, local funds could potentially include the use of redevelopment funds

Section 7.15: Recreation
CCERP EIR Mitigation Measure 10.1-1: The City of Oakland Redevelopment Agency should coordinate with the Office of Parks and Recreation to develop and initiate a land acquisition program for new parks in underserved areas. As with schools, the biggest challenge will be to find available land in appropriate areas to serve new residents. The Redevelopment Agency may be able to assist through the use of redevelopment tools in the identification and acquisition of appropriate new park sites.
CCERP EIR Mitigation Measure 10.1-2: The City of Oakland Redevelopment Agency should coordinate with the Ci ty Office of Parks and Recreation and the OUSD, local churches, private recreation providers and local non-profit agencies to promote joint use agreements and joint use partnerships that maximize the use of non-park recreational facilities.
CCERP EIR Mitigation Measure 10.1-3: The City of Oakland and its Redevelopment Agency should identify and pursue local funding opportunities to augment existing General Fund monies. At the Redevelopment Agency's sole discretion, redevelopment funds could potentially be used for parkland acquisitions and improvements.
Section 7.16: Transportation and Traffic
LUTE EIR Mitigation Measure B.3: The impacts at the intersection of 12th Street and Brush Street can be mitigated by increasing the cycle length to 120 seconds. This would result in a LOS D.
LUTE EIR Mitigation Measure B.4a: Install a traffic signal at the intersection of 66th Avenue and I-880 southbound ramps and restripe the lanes of the southbound off-ramp. This intersection meets the Caltrans peak hour signal warrants under PM peak hour conditions.
LUTE EIR Mitigation Measure B.4b: Install a traffic signal at the intersection of 66th Avenue and I-880 northbound ramps. This intersection meets the Caltrans peak hour signal warrants under PM peak hour conditions.
LUTE EIR Mitigation Measure B.4c: Install a traffic signal at the intersection of 66th Avenue and Oakport Street and widen Oakport Street to provide a through and turn lane in each direction. This intersection meets the Caltrans peak hour signal warrants under PM peak hour conditions.
LUTE EIR Mitigation Measure B.4d: Widen the northbound approach at the High Street and Coliseum Way intersection to provide an additional left-turn lane or restripe the eastbound approach to provide double left-turn lanes and a shared through/right-turn lane. This intersection may be subject to changes in traffic patterns as a result of the current studies being conducted to reconfigure the High Street and 42 Street intersection. The identified mitigation measure should be implemented only after the reconfiguration of the High Street and 42nd Street intersection is approved.
CCERP EIR Mitigation Measure 5.2A: Modify Traffic Signal Phasing at the High Street / International Boulevard Intersection. Individual redevelopment projects within the Project Area shall fund a pro-rata fair share of the cost to provide protected left-tum phasing for the turn lanes 011 International Boulevard.
CCERP EIR Mitigation Measure 5.2B: Add a Right-Turn Lane at the 73rd Avenue & Bancroft Avenue Intersection. District developers shall fund a pro-rata fair share of the cost to provide a right-tum lane for eastbound traffic on Bancroft Avenue at 73rd Street.
CCERP EIR Mitigation Measure 5.2C: **Add a Left-Turn Lane at the 73rd Avenue & MacArthur/Foothill Boulevard Intersection.** District developers shall fund a pro-rata fair share of the cost to provide a second left-tum lane for northbound traffic on 73rd Street at MacArthur/Foothill Boulevard and increase the signal cycle length to 104 seconds.
CCERP EIR Mitigation Measure 5.2D: **Increase the Traffic Signal Cycle Length at the 98th Avenue & MacArthur Boulevard Intersection**. District developers shall fund a pro-rata fair share of the cost to increase the signal cycle length to 82 seconds.
CCERP EIR Mitigation Measure 5.3A: Install a Traffic Signal at the Embarcadero / 5th Avenue Intersection. Installing a traffic signal at the Embarcadero / 5th Avenue intersection would provide for the orderly

movement of traffic. The traffic signal would be equipped with railroad preemption to prevent southbound motor vehicle queues from extending onto the UP railroad tracks that cross 5th Avenue just north of the intersection. The intersection would operate at LOS C during the a.m. and p.m. peak hours after installation of a traffic signal. District developers shall fund a pro-rata fair share of this mitigation measure.
CCERP EIR Mitigation Measure 5.3B: Install a Traffic Signal at the Embarcadero / I-880 NB Off-Ramp Intersection. Installing a traffic signal at the Embarcadero / 1-880 NB Off-Ramp would provide for the orderly movement of traffic. The intersection would operate at LOS A during the a.m. and p.m. peak hours after installation of a traffic signal. District developers shall fund a pro-rata fair share of this mitigation measure.
CCERP EIR Mitigation Measure 5.4: Provide Funding for AC Transit. District developers that would cause the average load factor on any specific AC Transit line to exceed 125 percent over a peak thirty minute period shall fund a pro-rata fair share of the cost to provide AC Transit service sufficient to reduce average load factors to that threshold.
CCERP EIR Mitigation Measure 5.5: Provide Adequate Gate Capacity at the Fruitvale BART Station. The City shall work with BART to assure that adequate fare gate capacity is available at the Fruitvale BART station to accommodate redevelopment, and possibly add one or mare new fare gates.
CCERP EIR Mitigation Measure 5.6: Design Redevelopment Projects in Accordance with City of Oakland Design Standards. Individual development projects constructed within the redevelopment area will be required to comply with City design standards. Compliance with City standards should prevent the creation of hazards to motor vehicles, bicycles, or pedestrians due to inadequate design feature or an incompatible use. District developers shall bear the cost of compliance with City standards.
CCERP EIR Mitigation Measure 5.7: Design Redevelopment Projects with Facilities that Support Alternative Transportation Modes. Individual development projects constructed within the redevelopment area will be required to conform to City of Oakland development standards with facilities that support transportation alternatives to the single-occupant automobile. Compliance with City standards should prevent conflict with adopted policies, plans, or programs supporting alternative transportation. District developers shall bear the cost of compliance with City standards.
CCERP EIR Mitigation Measure 5.8: Design Redevelopment Projects to Comply with City Code Requirements. The number of parking spaces provided in the district shall comply with City Code requirements. Compliance with City parking code requirements should prevent the creation of parking shortages. District developers shall bear the cost of compliance with City standards.
Section 7.17: Utilities and Service Systems
LUTE EIR Mitigation Measure D.1-2: Review major new development proposals to determine projected water, wastewater, and storm drainage loads compared with available water, sewer, and storm drain capacity. Where appropriate, determine appropriate capital improvement requirements, fiscal impacts, and funding sources prior to project approval.
LUTE EIR Mitigation Measure D.2-2: Review major new development proposals to determine projected water, wastewater, and storm drainage loads compared with available water, sewer, and storm drain capacity. Where appropriate, determine appropriate capital improvement requirements, fiscal impacts, and funding sources prior to project approval.
LUTE EIR Mitigation Measure D.3-2a: Review major new development proposals to determine projected water, wastewater, and storm drainage loads compared with available water, sewer, and storm drain capacity. Where appropriate, determine appropriate capital improvement requirements, fiscal impacts, and funding sources prior to project approval.
LUTE EIR Mitigation Measure D.3-2b: Require major new developments to include a combination of onsite and off-site drainage improvements to ensure that such projects do not create downstream erosion or flood hazards, or adversely impact the City's ability to manage stormwater runoff.

LUTE EIR Mitigation Measure D.3-2c: Address hill area drainage needs and develop additional drainage policies in the updated Safety Element.
LUTE EIR Mitigation Measure D.3-2d: Prepare a comprehensive study of hill area drainage needs and identify policies, programs, and capital improvements to address these needs in the future.
LUTE EIR Mitigation Measure D.4-1a: Continue to implement programs that reduce the amount of solid waste generated in the City by encouraging recycling, composting, and other activities consistent with the City's Source Reduction and Recycling Element.
LUTE EIR Mitigation Measure D.4-1b: Support solid waste collection, recycling, and disposal rates that are sufficient to cover the cost of adequate, efficient service delivery.
LUTE EIR Mitigation Measure D.4-1c: Establish guidelines and incentives for the recycling of construction and demolition debris and the use of recycled concrete and other recycled products in the construction of new buildings, roads, and infrastructure.
CCERP EIR Mitigation Measure 9.2: Major new development projects pursuant to or in furtherance of the Redevelopment Plan shall be reviewed to determine projected water and wastewater loads as compared to available capacity. Where appropriate, determine capital improvement requirements, fiscal impacts and funding sources prior to project approval.

ATTACHMENT L

Stantec

Memo

To:	City of Oakland 250 Frank H. Ogawa Plaza, Suite 2114 Oakland, CA 94612	From:	Stantec Consulting Services Inc. 1340 Treat Boulevard, Suite 300
File:	Aspire Eres Academy International Boulevard Project	Date:	March 9, 2018

Reference: **Construction Noise Reduction Memorandum for the Aspire ERES Academy International Boulevard Project**

This Memorandum (Memo) has been prepared in accordance with City of Oakland Standard Condition of Approval **(SCA) NOI-1(#61):** Project Specific Construction Noise Reduction Measures, to identify construction noise reduction measures for the Aspire ERES Academy International Boulevard Project (proposed project) CEQA Analysis. These noise reduction measures are to be implemented by the Applicant and its contractors during the construction of the proposed project.

As discussed in the CEQA Analysis, the proposed project will already implement the City of Oakland Construction Noise SCAs that apply to the specific conditions of the project site and surrounding noise-sensitive receptors; these include **SCA NOI-2 (#58)**: Construction Days/Hours, **SCA NOI-3 (#59)**: Construction Noise, **SCA NOI-4 (#60)**: Extreme Construction Noise, **SCA NOI-5 (#62)**: Construction Noise Complaints, **SCA NOI-6 (#64)**: Operation Noise, and **SCA NOI-7 (#63):** Exposure to Community Noise**.**

According to Table 13 in the "Aspire ERES Academy International Boulevard Project – Acoustic Technical Report", estimated noise levels at the closest sensitive receptors are not expected to exceed 90 dB(A) (i.e., "extreme noise" levels per the SCAs). That being said, the Applicant and its contracting team will incorporate site-specific measures consistent with those cited in the SCAs to ensure construction noise is minimized to the greatest extent feasible at the closest receptors. These site-specific measures may include the following:

1. Construction activities will be limited to between 7:00 a.m. and 7:00 p.m. Monday through Friday, except extreme noise generating activities greater than 90dBA will be limited to 8 a.m. and 4 p.m. Monday through Friday. Construction activities occurring on Saturdays will be limited to between 9:00 a.m. and 5:00 p.m. Any construction activities proposed outside of these timeframes will be evaluated on a case-by-case basis by the City. If construction activities will take place outside of these timeframes, neighbors will be notified 14 calendar days prior to construction activity occurring outside of the above days/hours. No construction activities will take place on Sundays or Federal holidays, unless it is an emergency and the Building Official has approved for the activities to occur.

2. Construction activities will follow the City of Oakland Noise Ordinance parameters to avoid nuisances:
   - All construction equipment powered by internal combustion engines will be properly muffled and maintained.
   - All idling equipment will be turned off when not in use.

- All stationary noise-generating construction equipment such as tree grinders and air compressors will be located as far as practical from existing residences, and they will be muffled and enclosed within temporary sheds, incorporate insulation barriers, or use other measures as determined by the City to provide equivalent noise reduction.
- Newer, smaller, or quieter equipment will be used wherever possible to minimize noise. Electric equipment is recommended over gas or pneumatic equipment.

3. Except as provided herein, impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for project construction will be hydraulically or electrically powered to avoid noise associated with compressed air exhaust from pneumatically powered tools. However, where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust will be used. External jackets on the tools themselves will be used, if available. Quieter procedures will be used, such as drills rather than impact equipment, whenever such procedures are available and consistent with construction procedures.
4. Temporary construction noise barriers shall be placed along the perimeter of the project site, and between the nearest sensitive receptors and the construction site.
5. The Applicant will use temporary power poles instead of generators where feasible.
6. The noisiest phases of construction will be limited to less than 10 days at a time. Exceptions may be allowed if the City determines an extension is necessary and all available noise reduction controls are implemented.
7. A noise disturbance coordinator will be designated to respond to neighborhood complaints about construction noise by determining the cause of the noise complaints and require implementation of reasonable measures to correct the problem. A telephone number to contact the disturbance coordinator will be placed at the construction site.
8. Schedule highest noise-generating activity and construction activity away from noise-sensitive land uses.
9. Signs prohibiting unnecessary idling of internal combustion engines will be posted.

The Applicant will submit a final site-specific construction noise reduction plan that the contracting team shall submit for City review and approval during the permit application. All coordinated and approved measures will be implemented at the project site.