First Amendment to the
Draft Supplemental Environmental Impact Report

Greyhound Residential Project

(File No. SP16-021 & T16-017)

SCH #1991093009

Prepared by the

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

April 2017

PREFACE

This document, together with the Draft Supplemental Environmental Impact Report (Draft SEIR or DSEIR), constitutes the Final Environmental Impact Report (FEIR) for the Greyhound Residential project. The Draft SEIR was circulated to affected public agencies and interested parties for a 62-day review period from December 22, 2016 to February 22, 2017.

The City undertook the following actions to inform the public of the availability of the Draft SEIR:

- The Draft SEIR and a "Notice of Availability of a Draft Supplemental Environmental Impact Report and Public Comment Period" was published on the City of San José's website,
- The Draft SEIR was delivered to the State Clearinghouse on December 22, 2016, as well as sent to various government agencies, organizations, businesses, and individuals (see Section 1.0), and
- Copies of the Draft SEIR were made available at the City of San José's website at http://www.sanjoseca.gov/index,aspx?nid=5204, the Dr. MLK Jr. Main Library, and the City of San José Department of Planning, Building, and Code Enforcement.

This volume consists of comments received by the City of San José (City), the Lead Agency on the Draft SEIR, during the public review period, responses to those comments, and revisions to the text of the Draft SEIR.

In conformance with the California Environmental Quality Act (CEQA) and the CEQA Guidelines, the FEIR provides objective information regarding the environmental consequences of the proposed project. The FEIR also examines mitigation measures and alternatives to the project intended to reduce or eliminate significant environmental impacts. The FEIR is intended to be used by the City and any Responsible Agencies in making decisions regarding the project. The CEQA Guidelines advise that, while the information in the FEIR does not control the agency's ultimate discretion on the project, the agency must respond to each significant effect identified in the Draft SEIR by making written findings for each of those significant effects.

According to the State Public Resources Code (Section 21081), no public agency shall approve or carry out a project for which an environmental impact report has been certified which identifies one or more significant effects on the environment that would occur if the project is approved or carried out unless both of the following occur:

(a) The public agency makes one or more of the following findings with respect to each significant effect:

(1) Changes or alterations have been required in, or incorporated into, the project which will mitigate or avoid the significant effect on the environment.

(2) Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency.

(3) Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities of highly trained workers, make infeasible the mitigation measures or alternatives identified in the environmental impact report.

(b) With respect to significant effects which were subject to a finding under paragraph (3) of subdivision (a), the public agency finds that specific overriding economic, legal, social, technological, or other benefits of the project outweigh the significant effects on the environment.

In accordance with CEQA and the CEQA Guidelines, the FEIR includes written responses to comments received from persons who reviewed the Draft SEIR and will be made available to the public prior to consideration of the Environmental Impact Report. All documents referenced in this FEIR are available for public review in the office of the Department of Planning, Building and Code Enforcement, 200 E. Santa Clara Street, Third Floor, San José, California, on weekdays during normal business hours.

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[1] This section includes updated graphics and technical reports as referenced in the responses to comments.

SECTION 1.0 LIST OF AGENCIES AND ORGANIZATIONS TO WHOM NOTICE OF THE DRAFT SEIR WAS SENT

State Agencies

California Air Resources Board
California Department of Transportation (District 4)
California Department of Fish and Wildlife (Region 3)
California Department of Housing and Community Development
Native American Heritage Commission
California Office of Historic Preservation
Regional Water Quality Control Board
San Francisco Bay Conservation and Development Commission
California Department of Toxic Substances Control
California Department of Parks and Recreation
California Department of Water Resources
California Office of Emergency Services
California Department of Health Services
Public Utilities Commission
CalEPA (email)
Air Resources Board (email)

Regional Agencies

Association of Bay Area Governments
Bay Area Air Quality Management District
Santa Clara Valley Transportation Authority (VTA)
Santa Clara Valley Water District
Metropolitan Transportation Commission (MTC)

Local, Public, and Quasi-Public Agencies

City of Campbell
City of Cupertino
City of Milpitas
City of Morgan Hill
City of Saratoga
City of Santa Clara
City of Sunnyvale
City of Fremont
City of Mountain View (email)
City of Palo Alto (email)
Santa Clara County Planning Department
Santa Clara County Roads & Airports Department
Town of Los Gatos
Campbell Union High School District
Campbell Union Elementary School District
San José Unified School District
San José Water Company

Pacific Gas and Electric Company
Airport Land Use Commission (email)

Organizations
Adams, Broadwell, Joseph & Cardoza (email)
Amah Mutsun Tribal Band (email)
Brooks & Hess (email)
California Native Plant Society – Santa Clara Valley Chapter
Coastanoan Rumsen Carmel Tribe (email)
Greenbelt Alliance
Guadalupe-Coyote Resource Conservation District
Indian Canyon Mutsun Band of Coastanoan (email)
Muwekma Ohlone Tribe (email)
North Valley Yokuts Tribe (email)
Ohlone Indian Tribe (email)
Open Space Authority (email)
Preservation Action Council of San José (email)
Santa Clara Valley Audubon Society
Sierra Club – Loma Prieta Chapter
SPUR (email)
Trina Marine Ruano Family (Ramona Garibay – Representative) (email)

Individuals
Ada Marquez (email)
Erik Schoennauer (email)
Jean Dresden (email)
Jeffrey B. Hare (email)
Kathy Sutherland (email)
Lawrence Ames (email)

Individuals who attended the Draft SEIR scoping meeting and/or expressed interested in the project also received a copy of the Notice of Availability.

SECTION 2.0 LIST OF COMMENT LETTERS RECEIVED ON THE DRAFT SEIR

Regional Agencies

A.	Santa Clara Valley Transportation Authority	February 22, 2017
B.	Santa Clara County Airport Land Use Commission	January 9, 2017

Organizations and Individuals

C.	Preservation Action Council of San José	February 14, 2017
D.	Historic Landmarks Commission	February 15, 2017
E.	Adams Broadwell Joseph & Cardozo	February 22, 2017
F.	Santa Clara Valley Audubon Society	February 24, 2017

SECTION 3.0 RESPONSES TO COMMENTS RECEIVED ON THE DRAFT SEIR

The following section includes all the comments on the Draft SEIR that were received by the City in letters and emails during the 62-day review period. The comments are organized under headings containing the source of the letter and the date submitted. The specific comments from each of the letters or emails are presented as "Comment" with each response to that specific comment directly following. Each of the letters submitted to the City of San José are attached in their entirety in Section 5.0 of this document.

CEQA Guidelines Section 15086 requires that a local lead agency consult with and request comments on the Draft SEIR prepared for a project of this type from responsible agencies (government agencies that must approve or permit some aspect of the project), trustee agencies for resources affected by the project, adjacent cities and counties, and transportation planning agencies. Section 1.0 of this document lists all of the recipients of the Draft SEIR.

Two comment letters were received from a public agency, which are not Responsible Agencies under CEQA for the proposed project.

Regarding mitigation measures identified by commenting public agencies, the CEQA Guidelines state that:

> Prior to the close of the public review period, a responsible agency or trustee agency which has identified what the agency considers to be significant environmental effects shall advise the lead agency of those effects. As to those effects relevant to its decisions, if any, on the project, the responsible or trustee agency shall either submit to the lead agency complete and detailed performance objectives for mitigation measures addressing those effects or refer the lead agency to appropriate, readily available guidelines or reference documents concerning mitigation measures. If the responsible or trustee agency is not aware of mitigation measures that address identified effects, the responsible or trustee agency shall so state. [§15086(d)]

The CEQA Guidelines state that the lead agency shall evaluate comments on the environmental issues received from persons who reviewed the DEIR and shall prepare a written response to those comments. The lead agency is also required to provide a written proposed response to a public agency on comments made by that public agency at least 10 days prior to certifying an environmental impact report. This FEIR contains written responses to all comments made on the Draft SEIR received during the advertised 62-day review period. Copies of this FEIR have been supplied to all persons and agencies that submitted comments.

A. RESPONSE TO COMMENTS FROM SANTA CLARA VALLEY TRANSPORTATION AUTHORITY, February 22, 2017:

Comment A1: Santa Clara Valley Transportation Authority (VTA) staff have reviewed the Supplemental Draft EIR (DEIR) for 781 residential units and 20,000 square feet of ground floor retail at 70 Almaden Avenue. We have the following comments.

Land Use

VTA strongly supports the proposed land use intensification of this site, strategically located on the transportation network within walking distance of multiple VTA Light Rail Transit lines and several Local Bus lines; the Rapid 522 line, currently undergoing enhancement as the Alum Rock-Santa Clara Bus Rapid Transit corridor; and future Downtown San Jose BART service. Additionally, by increasing the number of residences in close proximity to the numerous shops, restaurants, services and work sites in Downtown San Jose, the project will increase opportunities for daily tasks to be accomplished by walking and biking, thereby incrementally reducing automobile trips and greenhouse gas emissions generated by the project. Downtown San Jose is identified as a Regional Core in VTA's Community Design & Transportation (CDT) Program Cores, Corridors and Station Areas framework, which shows VTA and local jurisdiction priorities for supporting concentrated development in the County. The CDT Program was developed through an extensive community outreach strategy in partnership with VTA Member Agencies, and was endorsed by all 15 Santa Clara County cities and the county.

Response A1: VTA's support of the proposed project is acknowledged.

Comment A2: Pedestrian Accommodations

The Supplemental DEIR and corresponding Traffic Operations Analysis state that the Almaden Avenue sidewalk would be widened to 15 feet and the Post Street and S. San Pedro Street sidewalks would be widened to 12 feet. VTA supports the widening of surrounding sidewalks to enhance the pedestrian experience and recommends the inclusion of a pedestrian buffer. Resources on pedestrian quality of service, such as the Highway Capacity Manual 2010 Pedestrian Level of Service methodology, indicate that the accommodations such as a buffer containing a continuous green strip, closely planted street trees, and/or lamp posts improve pedestrian perceptions of comfort and safety on a roadway.

Response A2: VTA's comment regarding pedestrian accommodations is acknowledged.

Comment A3: Bicycle Accommodations

VTA supports the inclusion of 195 bicycle parking spaces as stated in the project description. Per VTA's Notice of Preparation (NOP) Scoping letter dated September 23, 2016, it was requested that further details on bicycle access to onsite facilities be clearly documented on the site plan. The Supplemental DEIR did not provide any further details as to the location of bicycle parking on the site plan or how bicyclists will access this parking location when patronizing onsite retail. The Traffic Operations Analysis displays a different ground level site plan, Figure 6, which appears to display the bike parking but in a different configuration. VTA requests additional clarity on how

many spaces the garage level parking area will support and how bicycle access to onsite facilities will be provided.

Bicycle parking facilities can include bicycle lockers or secure indoor parking for all-day storage and bicycle racks for short-term parking. VTA's Bicycle Technical Guidelines provide guidance for estimating supply, siting and design for bicycle parking facilities. This document may be downloaded from www.vta.org/bikeprogram.

> **Response A3:** As shown in the updated site plan (see Figure 2.2.1 - Rev in Section 4.0), bicycle parking will be provided within the ground level of the garage and will be accessible through the lobby on Almaden Avenue. The interior bicycle parking would be provided for residents of the building. Additional bicycle parking for retail customers would be provided along the adjacent sidewalks consistent with other downtown development projects in San José. Within the building, the project would provide a total of 195 bicycle parking spaces. Exterior bicycle parking would be provided consistent with Municipal Code requirements.

Comment A4: Transportation Demand Management – Transit Incentives

VTA continues to encourage the City to work with the applicant to explore Transportation Demand Management (TDM) measures that would reduce the number of single-occupant vehicle trips generated by the project and increase transit ridership. VTA recommends that the City work with the applicant to implement a parking management plan, parking cash-out, resident education program, reduced parking ratios, and transit fare incentives to residents of the development, such as free or discounted transit passes on a continuing basis.

> **Response A4:** As discussed in Section 4.3.3.2 of Appendix A of the Draft SEIR, the project includes TDM measures to reduce single-occupant vehicle trips associated with the project. Specifically, the project has been designed and located to facilitate transit access, provides on-site services, provides bicycle parking and enhanced pedestrian facilities, and is located within walking distance of goods, services, and jobs. VTA's recommendation that additional TDM measures be considered is acknowledged.

B. RESPONSE TO COMMENTS FROM AIRPORT LAND USE COMMISSION, January 9, 2017:

Comment B1:

1. Please ensure project conformance with the ALUC San Jose International Airport CLUP.

   Response B1: The proposed project was not subject to review by the ALUC. It is, however, acknowledged that the proposed Greyhound project site is located within the CLUP's projected 65 dBA CNEL impact area, and that per the CLUP policies, outdoor residential associated uses such as porches and balconies should not be allowed, and that passive outdoor uses, such as pools and cafés are acceptable pursuant to noise CLUP policies. The proposed project has a land use designation of Downtown on the Land Use/Transportation Diagram, and is located in the DC Downtown Primary Commercial Zoning District. This land use designation and zoning district permit residential uses. Per the Downtown Design Guidelines, residential units are encourage to have private outdoor space, which inevitably requires balconies. There are no performance standards related to noise in the DC Zoning District as it is acknowledged that achieving an exterior noise level expected in other parts of the city is not feasible given the location of downtown in the flight path and the mix of noise-generating uses that occur in the Downtown area. Furthermore, the General Plan notes in General Plan Policy EC-1.1 that the City's acceptable exterior noise level objective of 60 dB is established for areas in the City excluding Downtown for multi-family residential projects that are subject to aircraft overflights. Nevertheless, in accordance with the Envision San Jose 2040 General Plan and CLUP Policy N-4, the project will include a condition that the project be designed to ensure that no habitable rooms in residential units will be exposed to interior sound levels exceeding 45 dB CNEL. Finally, the ALUC based its consistency determination on an older (and larger) set of noise contours that do not match or conform to the City's official projections. Based on these counterbalancing considerations, staff believes that the project is consistent with the intent of the CLUP policies.

Comment B2: 2. If appropriate, please ensure the project proponents obtain an No Hazard determination from the FAA.

Response B1: As discussed in Section 4.8.4.4 of the Initial Study, the project would be required to obtain a Determination of No Hazard from the FAA prior to development permit approval. In addition, the project is identified as being within the Comprehensive Land Use Plan (CLUP) Airport Influence Area and having to meet all applicable regulations. The City has reviewed the project plans and confirmed the project conforms to the San José International Airport CLUP. Additionally, a Determination of No Hazard is currently under review by the FAA. The Special Use Permit includes the following condition of approval requiring all findings of Determination of No Hazard from the FAA be met:

1. FAA Clearance Required. Prior to the issuance of a building permit, the permittee shall obtain from the Federal Aviation Administration a "Determination of No Hazard to Air Navigation" for each building high point. The Permittee shall file a "Notice of Proposed Construction or Alteration" (FAA Form 7460-1) for the building corner points and two top mechanical overrun points on each building. The data on the FAA forms should be

prepared by a licensed civil engineer or surveyor using NAD83 location coordinates out to hundredths of seconds and NAVD88 elevations rounded off to next highest foot.

2. FAA Permit Adjustment. Prior to the issuance of a Building Permit, the Permittee shall obtain a Permit Adjustment to incorporate all FAA conditions identified in the Determinations of No Hazard (if issued), e.g., obstruction lights or construction-related notifications, into the Special Use Permit conditions of approval.

C. RESPONSE TO COMMENTS FROM PRESERVATION ACTION COUNCIL OF SAN JOSÉ, February 14, 2017:

Comment C1: Preservation Action Council of San Jose appreciates the opportunity to comment on DSEIR for the **Greyhound Residential Project**.

It is important that San Jose residents and our City's leaders be fully informed about potential project impacts on historic resources. That is why it is critical that the DSEIR examine different project alternatives. It appears only two project alternatives have been presented thus far. While leaving the Greyhound Bus building in place could "underutilize" the site, there are adaptive reuse projects in San Jose and across the country where incorporating an historic resource into a new project has been done. A variety of alternatives that reuse and incorporate the Greyhound Bus building need to be included in the DEIR.

The applicant is citing the deteriorated condition of the exterior of this Skidmore, Owings and Merrill (SOM) building as partial justification as to why reuse or incorporation of this existing building into the proposed project is not feasible. The fact that the current or previous owners allowed deferred maintenance or neglect to compromise the exterior of the building does not diminish the very clear fact that this building is a Structure of Merit and potential City Landmark. Allowing developers to justify demolition due to deteriorated condition of a building only creates a situation that perpetuates itself in the future. In addition, the developer is calling out the removal of interior elements, the deterioration, the existence of a mezzanine and even one wall being constructed of concrete block as impediments to adaptive reuse. Interior modifications that support a different use are allowed and exterior modifications could even be allowed with sufficient justification.

Response C1: As noted by the commenter, the Draft SEIR identifies two project alternatives to the proposed project: the No Project Alternative (No Development Alternative and Downtown Redevelopment Alternative) and the Design Alternative. The proposed project would demolish the existing Greyhound building. The No Project Alternative looks at two possible scenarios. The first scenario is retention of the Greyhound building with no new development on the site. The second scenario discusses the future potential for a new redevelopment proposal for the site based on the existing General Plan and zoning designations. The Design Alternative would maintain and reuse the existing Greyhound building by incorporating it into the proposed project as retail space and/or the lobby of the proposed building.

Pursuant to Section 15126.6 (a) of the CEQA Guidelines, "An EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project *but would avoid or substantially lessen any of the significant effects of the project*…(emphasis added)." While there may be intermediate variations of retention of portions of the building, only full retention of the building would reduce the impact to less than significant under CEQA. Preservation of one or more facades with demolition of the remainder of the building, as opposed to retention of the entire structure, is not consistent with the Secretary of Interior Standards for the Treatment of Historic Properties and would, therefore, be considered a significant impact under CEQA. Therefore, this alternative was not evaluated in the EIR.

Nevertheless, in response to comments received from Historic Landmarks Commissions, the applicant provided renderings to show conceptually how the project would appear under three design options: retention of the western façade of the Greyhound building facing S. Almaden Avenue, retention of the western façade with the modification of allowing clearstory windows, and an option to demolish the entire building and incorporate some structural similarities into the new building façade as well as designing the lobby to include public are/mural that outlines the historic of the site. The final design option would also include a sidewalk monument that commemorates the history of the Greyhound Bus Station. As previously stated, these design options would not reduce or avoid the significant Cultural Resources impact of the proposed project and are, therefore, not included as alternatives to the project. Please refer to the City's Staff Report for a detailed discussion of these design options and renderings of each option.

Comment C2: Secondly, the DSEIR must examine the cumulative impacts of the loss of historic resources in the area. While it is unlikely anyone could imagine the future demolition of the Sunol Building, what about the nearby Berger Building? The Greyhound Bus building appears to be the only mid-century work by Skidmore, Owings and Merrill left in the downtown. The applicant is calling out the presence of a similar building on N. 2nd Street that is in good shape as justification for removal of this "minor work" of SOM.

Response C2: The Draft SEIR addressed the cumulative impact of the loss of historic resources (see Section 4.0 Cumulative Impacts in the Draft SEIR). When addressing the cumulative impacts associated with historic buildings, it is necessary to look at the period of significance, style of architecture, or association with persons or points of history. The nearby Sunol and Berger buildings do not have the same period of significance as the Greyhound building. In addition, they do not share similar architecture styles or have any connection regarding association with persons or points of history. As a result, the loss of the Greyhound building relative to the nearby historic structures is not significant. The cumulative impact of the demolition of the Greyhound building was, however, assessed relative to other mid-century buildings and transit related facilities. Under this measure, the analysis found the demolition of the Greyhound building to be a cumulatively considerable impact which would be significant and unavoidable.

Comment C3: Finally, this building was constructed as part of a "$5 million statewide effort by Greyhound to modernize bus terminals". Certainly that was a lot of money in the mid-1950's. How many other cities received similar upgrades? The fact that they retained the services of a nationally known architectural firm points to Greyhound's confidence in the future of and the importance of bus transportation throughout California. Further research into how this contributes to an historic context in San Jose and California is justified.

Response C3: The Draft SEIR provided sufficient documentation to show that the building is potentially locally significant and, therefore, a significant historic resource under CEQA. Further research into the building would not change the conclusion in the Draft SEIR.

D. RESPONSE TO COMMENTS FROM HISTORIC LANDMARKS COMMISSION, February 15, 2017:

Comment D1: The City of San Jose Historic Landmarks Commission discussed the Greyhound Bus Station project and the associated Draft Environmental Impact Report (File #SP16-021) at its February 1, 2017 meeting. In a 4-0 decision (Joshua Marcotte absent) the Commission voted to forward this comment letter, signed by the Chair, to the Director of Planning, Building and Code Enforcement.

Overall, the Commission agreed with the findings and conclusions of the Historic Report, and they offered the following comments on the Draft SEIR:

1. The DEIR should include a broader range of design alternatives aimed at saving the historic aspects of the Greyhound Bus Station. The additional design alternatives should range from retention of the Greyhound Bus Station façade and construction of the tower project above the existing station to partial demolition of the Greyhound building but retention and repurposing of elements of the historic bus stations façade and materials.

Response D1: Please refer to Response C1, above, for a discussion of the selection of alternatives for the EIR. Any design option that demolishes the Greyhound building but retains the façade or elements of the building into the project design would still result in the same significant impacts as the proposed project, and therefore was not evaluated in the EIR. Response C1 does provide information and renderings on how the proposed project could be modified to incorporate the façade of the Greyhound building.

Comment D2: 2. The EIR's discussion of alternatives should include a more detailed analysis of the façade design, reuse with graphics if possible.

Response D2: Please refer to Response C1.

Comment D3: 3. The lobby of the new building should pay homage to the Greyhound Bus Station and some of the former history of the site pertaining to San Jose's history as the first electrified city west of the Rocky Mountains, and San Jose's Light Tower. The lobby should include an interpretative display of the history of the Greyhound Bus Station.

Response D3: The HLC's suggestions regarding the lobby of the new building are acknowledged. Mitigation Measure CUL-2.2 already requires a publicly accessible display, exhibit, or program developed through coordination with the City's Historic Preservation Officer. This display may also include murals and other interpretative displays within publicly accessible areas of the lobby. Please note that the San José Light Tower was not located on the project site. The Light Tower and the history of the City as the first electrified city west of the Rocky Mountains is not relevant to the historic impact resulting from demolition of the Greyhound building, which is from a different era than the Light Tower and contains no existing structures on site that are historically connected to the Light Tower. References to these components of San José history would not mitigate the identified impact.

E. RESPONSE TO COMMENTS FROM ADAMS BROADWELL JOSEPH & CARDOZO, February 22, 2017:

Refer to Comment Letter E in Section 5.0 of this Final SEIR/Responses to Comments document for footnotes included with the comments below.

Comment E1: We write on behalf of San Jose Residents for Responsible Development to provide comments on the Draft Supplemental Environmental Impact Report ("DSEIR") prepared by the City of San Jose ("City"), pursuant to the California Environmental Quality Act ("CEQA"),[1] for the Greyhound Residential Project ("Project"). The Project would be located on a 1.74-acre site on five parcels located on the block defined by S. Almaden Avenue, W. San Fernando Street, S. San Pedro Street and Post Street in the downtown core of San Jose. The Project includes demolition of existing structures and construction of two residential towers with 781 residential units and 20,000 square feet of ground floor commercial space. The proposed building towers would be 242 and 252 feet tall. The Project would include four levels of below-grade parking and two levels of above-grade parking.

The purpose of the DSEIR is to provide a project-level review supplementing the program-level Downtown Strategy 2000 Final Environmental Impact Report (Downtown Strategy 2000 FEIR) certified by the San Jose City Council in 2005, and the San Jose 2040 General Plan Final Environmental Impact Report (General Plan FEIR) certified by the San Jose City Council in 2011.

As explained more fully below, the DSEIR fails to adequately evaluate the Project's air quality, greenhouse gas emissions, hazardous materials and public health impacts. As a result of its shortcomings, the DSEIR lacks substantial evidence to support its conclusions and fails to properly mitigate the Project's significant environmental impacts. The DSEIR's numerous defects in its air quality modeling and impact analyses render it inadequate as an informational document. In light of the DSEIR's fundamentally flawed nature, the comments contained in this letter should be viewed as illustrative of the problems with the document, rather than as a comprehensive catalogue of the document's deficiencies. Based on the findings of this comment letter, a revised DSEIR must be prepared and recirculated before the City may legally approve the Project.

> **Response E1:** This general comment stating that the Draft SEIR is fundamentally flawed and lacks substantial evident to support its conclusions provides no specific information or details to which the City can respond. Please refer to Responses E4 through E41 for responses to specific comments on the content of the environmental analysis.

Comment E2: We have reviewed the DSEIR and its technical appendices with assistance from Matt Hagemann and Jessie Jaeger from Soil / Water / Air Protection Enterprise ("SWAPE"). The City must respond to these consultants' comments separately and individually.

> **Response E2:** The DSEIR comments provided by SWAPE are included as Attachment A to the Adams Broadwell Joseph & Cardozo comment letter and are included as a subset of this comment letter with responses below.

Comment E3: I. STATEMENT OF INTEREST

San Jose Residents for Responsible Development ("San Jose Residents") is an unincorporated association of individuals and labor unions that may be adversely affected by the potential public and worker health and safety hazards and environmental impacts of the Project. The association includes: City of San Jose residents Jeff Dreyer, Gabriel Montes and Eric Comstock; the International Brotherhood of Electrical Workers Local 332, Plumbers & Steamfitters Local 393, Sheet Metal Workers Local 104, Sprinkler Fitters 483, and their members and their families; and other individuals that live and/or work in the City of San Jose and Santa Clara County.

Individual members of San Jose Residents and the affiliated unions live, work, recreate and raise their families in Santa Clara County, including the City of San Jose. They would be directly affected by the Project's environmental and health and safety impacts. Individual members may also work on the Project itself.

Accordingly, they will be first in line to be exposed to any health and safety hazards that exist onsite. San Jose Residents has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making it less desirable for businesses to locate and people to live there.

> **Response E3:** This comment identifies the individuals and organizations the commenter represents and offers the opinion of the commenter regarding the economic and social issues of encouraging sustainable development, a safe working environment and desirability for businesses and people to be located in the region. As it does not comment on the environmental effects of the project addressed in the Draft SEIR, the comment is acknowledged and no further response is required.

Comment E4: II. THE CITY FAILED TO PROVIDE ACCESS TO ALL DOCUMENTS REFERENCED IN THE DSEIR FOR THE ENTIRE COMMENT PERIOD

CEQA requires that all documents referenced in an environmental review document be made available to the public for the entire comment period. Once documents are properly made available, CEQA requires a minimum of 45 days for public review and comment. The City violated CEQA when it failed to make all documents referenced in the DSEIR available for public review during the entire comment period.

The DSEIR was released on December 22, 2016. On December 27, pursuant to CEQA, we requested that all documents referenced in the DSEIR be made available for public review. On January 11, 2017, the City provided a link to documents which purportedly included those responsive to our request for all documents referenced in the DSEIR. However, the documents provided did not include reference documents. We informed the City that the link did not contain the referenced documents, and on January 23, nearly a month after our original request, the City provided some documents referenced in the DSEIR. On January 25, we notified the City that that not all referenced documents were included in the linked documents. We also explained that because the City failed to

provide all documents referenced in the DSEIR for the entire public comment period as required by CEQA, the City must extend the public comment deadline.

The City denied our request for an extension on January 30, incorrectly stating that all referenced documents were publicly available for the entire comment period. On January 31, we again requested that the City make available all documents referenced in the DSEIR, and again requested an extension of the comment period. We even provided a list of many of the documents that were referenced in the DSEIR, but were not made available. We also explained that, without reviewing the documents, it is impossible to meaningfully assess and comment on the DSEIR's analyses of the Project's potentially significant impacts.

On February 10, five days before the comment deadline, the City called to request an additional two weeks to respond to our request for all documents referenced in the DSEIR. At 4:24 p.m. on February 15, 2017, the day of the comment deadline, the City extended the comment deadline by one week. That same evening, the City provided nearly 750 pages of additional reference documents related to potentially significant impacts from hazardous materials. While we appreciate the City finally providing additional reference documents, four business days to review, analyze and comment on 750 pages of technical material is insufficient and violates CEQA.

The City has clearly violated CEQA by failing to make available all documents referenced in the DSEIR during the entire comment period. We reserve the right to supplement these comments once the City makes all referenced documents available for public review.

> **Response E4:** The City responded to the commenter's December 27, 2016 request for access to documents referenced in the Draft SEIR on January 11, 2017. In addition to documents already provided as appendices to the Draft SEIR and posted to the City's website, the City responded with documentation on sources referenced in the text of the Draft SEIR. On January 25, 2017, the commenter responded with a clarification of their request for references, citing specific air quality output files beyond those included in the air quality report and documents referenced within the Phase I Environmental Site Assessment in Appendix E of the Draft SEIR.
>
> During the 55-day public circulation period of the Draft SEIR, all the documents referenced specifically in the Draft SEIR were provided to the public on the City's website. The additional requested documents were references cited in the Phase I Environmental Site Assessment in Appendix E of the Draft SEIR. These references were incorporated into the analysis by summary and updated analysis in the Phase I Environmental Site Assessment.
>
> Although not referenced in the Draft SEIR document itself, the City contacted the Phase I consultant and requested copies of the cited references. These reference documents were provided to the commenter on February 15, 2017. In order to allow for review time of the requested documentation, the public circulation period was extended by one additional week to February 22, 2017. The reference documents in the Phase I Environmental Site Assessment were provided as disclosure and do not affect the impact determinations as outlined in the Draft SEIR. For that reason, the City believes that there was sufficient information and time to respond to the Draft SEIR.

It should be noted that the commentator requested documents contained in various appendices of the Draft SEIR. The Draft SEIR and supporting documents made available to the public on December 22, 2016 contained thousands of pages of documents including the Draft SEIR, appendixes, studies and other related documents. The documents made publicly available clearly provided the public with sufficient information to (i) understand the environmental impacts of the proposed project on the environment; (ii) proposed mitigations to reduce certain significant impacts; and (iii) substantial evidence to support the analysis and conclusions contained within the Draft SEIR. None of the additional documents or information requested by the commentator provide any new information than what was already summarized or contained within the Draft SEIR (made available to the public) nor did any of the additional requested information or documents changed the analysis or conclusions of the Draft SEIR.

Last, the commentator reserved its right to provide additional comments or to supplement its comments based on additional information or documents provided by the City. As of the date of this First Amendment, months have expired and commentator has not provided any additional comments on the Draft SEIR.

Comment E5: III. CEQA REQUIRES THE DISCLOSURE OF ALL POTENTIALLY SIGNFICANT IMPACTS AND THE INCORPORATION OF ALL FEASIBLE MITIGATION MEASURES NECESSARY TO REDUCE SUCH IMPACTS TO BELOW A LEVEL OF SIGNFICANCE.

CEQA has two basic purposes. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental effects of a project. Except in certain limited circumstances, CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an environmental impact report. An EIR's purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, an EIR "protects not only the environment but also informed self-government."

To fulfill this function, the discussion of impacts in an EIR must be detailed, complete, and "reflect a good faith effort at full disclosure." CEQA requires an EIR to disclose all potential direct and indirect, significant environmental impacts of a project. In addition, an adequate EIR must contain the facts and analysis necessary to support its conclusions.

The second purpose of CEQA is to require public agencies to avoid or reduce environmental damage when possible by requiring appropriate mitigation measures and through the consideration of environmentally superior alternatives. If an EIR identifies potentially significant impacts, it must then propose and evaluate mitigation measures to minimize these impacts. CEQA imposes an affirmative obligation on agencies to avoid or reduce environmental harm by adopting feasible project alternatives or mitigation measures. Without an adequate analysis and description of feasible mitigation measures, it would be impossible for agencies relying upon the EIR to meet this obligation.

As discussed in detail below, the DSEIR fails to meet either of these two key goals of CEQA. The DSEIR fails to disclose and evaluate all potentially significant environmental impacts of the Project.

In addition, it fails to propose all feasible measures to mitigate the Project's potentially significant impacts to a less than significant level. The DSEIR fails to satisfy the basic purposes of CEQA. The DSEIR's conclusions regarding impacts to air quality and greenhouse gas emissions, hazardous materials and public health are not supported by substantial evidence. An EIR may conclude that impacts are insignificant only after providing an adequate analysis of the magnitude of the impacts and the degree to which they will be mitigated. Thus, if the City fails to fully investigate a potential impact, its finding of insignificance will not withstand legal scrutiny. The City must address these shortcomings and recirculate a revised DSEIR for public review and comment.

> **Response E5:** This general comment is acknowledged. Since this comment fails to provide any specific details, information or analysis to support the general comment no further response is required. Specific responses to the issues listed in this comment are provided in the following pages.

Comment E6: IV. THE DSEIR FAILS TO ADEQUATELY DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S IMPACTS FROM HAZARDOUS MATERIALS

The DSEIR fails to adequately evaluate the Project's impacts from hazardous materials. The DSEIR fails to disclose key baseline information, fails to fully evaluate the Project's impacts and fails to support significance findings with substantial evidence. The City must prepare a revised DSEIR that adequately addresses these issues.

The Project site is located just northeast of a Pac Bell site, which is listed on the State Water Resources Control Board Geotracker website. The Pac Bell site is under active regulatory oversight for cleanup of contaminated soil and groundwater. SWAPE explains in their comments that an August 2015 report prepared for the Pac Bell site documented the presence of a light nonaqueous phase liquid ("LNAPL") from past diesel spills originating from an underground storage tank pit. SWAPE explains that the LNAPL is a continuing source of dissolved phase diesel contamination of groundwater. Notably, groundwater flows from the Pac Bell site directly to the Project site.

The August 2015 report documents the presence of total petroleum hydrocarbons as diesel ("TPH-d") in the groundwater monitoring wells closest to the Project site, just southwest of S. Almaden Avenue. SWAPE notes that the northeastern down gradient edge of the TPH-d plume has not been defined and no groundwater monitoring data have been recently collected at the Project site. SWAPE explains that monitoring data must be collected at the Project site to ensure that contamination does not exist that would pose a risk to construction workers or future residents. This is because day lighting of the water table will result in the potential for TPH-d vapors to off-gas to ambient air, providing an exposure pathway for breathing contaminated vapors. The DSEIR fails to analyze potentially significant health impacts from TPH-d vapors.

Groundwater monitoring data is also necessary to ensure that dewatering of the Project site will not result in the unpermitted discharge of TPH-d contamination to the sanitary sewer. Groundwater at the Project site is at a depth of 20 feet. The Project requires excavation of the entire site to 41 feet below the ground surface for underground parking. SWAPE explains that "interception of the water table will result in the need to dewater the Project site for construction," resulting in potentially significant groundwater impacts. The DSEIR failed to disclose or analyze this potentially significant impact. Without groundwater monitoring data, it is impossible to determine the extent of the

Project's potentially significant impacts from dewatering. The groundwater monitoring results must be included in a revised DSEIR that is circulated for public review and comment.

The TPH-d groundwater plume originating at the Pac Bell site was not identified or analyzed in the DSEIR, the Downtown Strategy 2000 FEIR or the General Plan FEIR. No mitigation measures have been required that would reduce potentially significant impacts from the plume to a less than significant level. A revised DSEIR must disclose, analyze and mitigate potentially significant public health and water quality impacts from the plume.

> **Response E6:** Page 66-67 of Appendix A of the DSEIR identified the "Pac Bell" site, referenced in the Draft SEIR as AT&T (95 S. Almaden Avenue) as being up-gradient of the project site and as having had two releases in 1992 and 2010. While the Downtown Strategy 2000 FEIR identified some specific contaminate sources within the plan area, the Downtown Strategy 2000 FEIR is primarily a programmatic level analysis of the Downtown Plan. Furthermore, one of the two releases on the "Pac Bell" site occurred after completion of the Downtown Strategy 2000 FEIR. Nevertheless, program-level mitigation was identified for all development within the plan area to address both identified and unknown hazardous materials impacts. The General Plan FEIR is not intended to be a project level analysis and, as a result, would not have identified every recorded LUST within the City. As with the Downtown Strategy 2000 FEIR, however, the General Plan FEIR identified program-level mitigation measures for future development projects to address hazardous materials impacts.
>
> The data referenced by SWAPE is from the August 2015 Groundwater Monitoring Report. The most recent groundwater monitoring report for the "Pac Bell" site is dated January 30, 2017. The January 2017 report, provided as Appendix I in this First Amendment, shows that wells MW-2 and MW-3 have no detected diesel on the eastern portion of the "Pac Bell" property. As such, contamination from the site is not migrating across the roadway to the project site and there is no risk of TPH-d vapors during construction of the project.
>
> Furthermore, the concentrations of diesel reported by SWAPE for wells MW-2 and MW-3 (70 ug/L and 82 ug/L, respectively) are below the most conservative Regional Water Quality Control Board (RWQCB) environmental screening levels for diesel in groundwater which is 100 ug/L. Therefore, the concentrations are not sufficient to pose a health risk to construction workers or other nearby persons, nor would further investigation be required. For reference, the direct exposure risk threshold for construction workers is 150 ug/L.
>
> With regards to dewatering and the potential for discharge of TPH-d contamination to the sanitary sewer, page 72 of Appendix A of the DSEIR states that discharge of groundwater into the sanitary sewer system is only allowed under by the City of San José Environmental Service Department Watershed Protection Division and requires approval from the San Francisco Bay RWQCB. The City's permit process requires testing of the groundwater and City oversight of the discharge. There would be no "unpermitted" discharge of groundwater into the sanitary sewer system.

Comment E7: **V. THE DSEIR FAILS TO ADEQUATELY DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S AIR QUALITY AND PUBLIC HEALTH IMPACTS**

The DSEIR fails to adequately evaluate the Project's air quality and public health impacts. Air pollutant emissions associated with the Project are underestimated and result in new and more significant impacts when correctly evaluated. A revised DSEIR should be prepared to adequately address these issues and incorporate all feasible mitigation measures.

A. The DSEIR Relies on Air Quality Modeling that Underestimates Project Construction and Operation Emissions

The DSEIR relies on emissions calculated from the California Emissions Estimator Model Version CalEEMod.2013.2.2 ("CalEEMod"). CalEEMod provides recommended default values based on site specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but CEQA requires that such changes be justified by substantial evidence. Once all values are inputted into the model, the project's construction and operational emissions are calculated and "output files" are generated. These output files disclose to the reader what parameters were used in calculating a project's emissions, and make known which default values were changed.

Here, several of the values used in the Project's CalEEMod output files are incorrect and are not consistent with information disclosed in the DSEIR. As a result, emissions associated with the Project are underestimated. When corrected, modeling shows that the Project would have significant air quality impacts.

> **Response E7:** This comment offers the opinion of the commenter regarding the emissions calculations completed for the project. Specific responses to the issues listed in this comment are provided below.

Comment E8: **1. The Modeling Fails to Account for Total Parking Area**

The DSEIR states that the Project includes 786 parking spaces. The CalEEMod output files, however, show that only 736 parking spaces were used to model the Project's emissions. By using 50 less parking spaces, the model underestimates the Project's construction and operation emissions. SWAPE explains that paving for parking spaces involves laying concrete or asphalt, and architectural coating activities involve the use of paint and other coating materials. These activities result in construction air pollutant emissions. During operation, architectural coating activities and electricity usage from outdoor lighting, ventilation and elevators in the parking structures will result in air pollutant emissions. By underestimating the total number of parking spaces, Project construction and operation emissions are underestimated. A revised DSEIR must be prepared that includes an updated CalEEMod model that accurately assesses Project emissions.

> **Response E8:** The commenter is correct that the air quality analysis notes 50 fewer parking spaces than the project description in the DSEIR. Nevertheless, the construction schedule and proposed construction equipment list did not change with this change in parking spaces to the project. Furthermore, the additional parking spaces are the result of refinement of the building and garage design, and not an increase in overall building square footage. As a

result, there would be no additional emissions resulting from construction of the proposed project compared to the emissions estimated in the air quality analysis.

While not specified in the comment, it is assumed that the commenter's concern regarding operational emissions is that emissions from automobiles would be higher than estimated with the higher number of parking spaces. This assumption is incorrect. The analysis of operational emissions related to traffic generated by the project is based on the total number of daily trips estimated for the project, not the number of vehicles which can park on-site. The daily traffic trips are based on the number of residential units and retail square footage, not parking. As a result, the operational emissions estimated for the project are correct.

Comment E9: 2. The Model's Use of Alternatively Fueled Equipment is Unsupported
The model assumes that Project construction will use off-road construction equipment fueled by compressed natural gas ("CNG") and bio-diesel. However, there are no conditions or mitigation measures in the DSEIR that require the use of non-diesel equipment for Project construction. As a result, the model (and the DSEIR) underestimates the Project's construction emissions.

Response E9: The analysis included the use of alternative-powered equipment for some construction activities based on the construction data provided by the project applicant. Specifically, the project applicant would use electric line power, CNG-powered forklifts, and generators that run on bio-diesel. No condition of approval or mitigation measure is required as this is proposed by the applicant. Use of this specific equipment would be enforced by the City through the required construction operations plan outlined in mitigation measure AIR-1.2 on page 34 of Appendix A of the Draft SEIR.

As discussed in detail in Response E11 below, the construction air quality analysis has been updated. Since publication of the Draft EIR, the project applicant has entered into an agreement with PG&E to provide electric power to the project site from the beginning of project construction. The electric power would provide the power source for stationary equipment including cranes and man lifts. In addition, it would eliminate the use of diesel cranes and the need for diesel generators on-site. The project would continue to use CNG-powered forklifts.

Comment E10: 3. The Model Uses an Incorrect Intensity Factor
SWAPE explains that the model relies on an incorrect carbon dioxide ("CO_2") intensity factor to estimate the Project's operation emissions. When PG&E is the utility provider, as it would be for the Project, CalEEMod assumes a default CO_2 intensity factor of 641.35 pounds per megawatt-hour. The intensity factor is used to estimate the CO_2 emissions generated from electricity usage during Project operation. The intensity factor used in the CalEEMod model for the Project, however, was 429.6 pounds per megawatt-hour. There is no justification for reducing the intensity factor to estimate Project emissions.

Response E10: The carbon dioxide intensity factor is not used to estimate operational toxic air contaminant pollutant emissions. The carbon dioxide intensity factor is only relevant to the computation of greenhouse gas emissions. As with all projects, the carbon intensity factor was changed upon project start-up to be consistent with the most recent and verified

PG&E carbon intensity factory, thought it was not used since GHG emissions were not quantified for the project.

<u>Comment E11:</u> 4. The Model Uses Incorrect Off-Road Equipment and Off-Road Equipment Usage Hours

The off-road construction equipment list and usage hours used to estimate the Project's construction emissions are inconsistent with the off-road construction equipment list and duration disclosed in the DSEIR. SWAPE explains in their comments that the equipment and usage hours used in the model underestimate the Project's construction emissions. Specifically, the emissions were modeled assuming that most of the off-road equipment would operate for 30 minutes to two hours per day. The DSEIR, however, shows that this is not the case. According to the DSEIR, every piece of off-road construction equipment would be used for a minimum of eight hours per day. Moreover, the model does not include all of the equipment necessary to construct the Project. Several pieces of equipment listed in the DSEIR were omitted from the model, including dump trucks and water trucks. Thus, the Project's construction emissions are substantially underestimated.

<u>Response E11:</u> The commenter correctly noted that the use of lower off-road equipment usage hours. This was corrected in an updated analysis that included revised equipment assumptions as noted in Response E9. The analysis was updated because the assumptions for equipment hour usage were understated by error in interpretation of the construction information provided. The previous analysis did not omit any equipment.

The construction information provided by the project applicant was misinterpreted as it did not correctly state the number of days for which each piece of equipment would be used during a phase. The City requested revised construction information which was provided by the applicant (see attached *construction worksheet* at the end of Section 4.0 of this First Amendment). The updated information includes the installation of line power to the site for portable equipment (including cranes), use of CNG-fueled forklifts, and elimination of diesel generators. The project applicant has an agreement with PG&E that will provide the necessary electric power on-site at the beginning of project construction to power stationary equipment including cranes and man lifts. This would eliminate the use of diesel-powered cranes and generators.

Based on updated construction information, construction period emissions were remodeled using CalEEMod 2013.2.1. The results of the updated analysis are provided in the responses below.

As noted in the CalEEMod User's Guide, water trucks are included as vendor trips and, as a result, have been included in the estimate and not omitted. Haul trucks such as dump trucks were included in hauling truck trips and were also not omitted. The location, size and type (vertical construction) of the project would not require extensive use of water trucks.

<u>Comment E12:</u> 5. The Model Incorrectly Assumes the Use of a Tier 4 Construction Fleet

The DSEIR states that "all diesel-powered off-road equipment larger than 25 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent." To determine the emission reductions from this mitigation measure, the Project's construction emissions were calculated with the assumption

that every piece of heavy-duty machinery greater than 25 hp would be equipped with Tier 4 Final engines. SWAPE explains that this assumption is unsubstantiated and unrealistic.

The U.S. Environmental Protection Agency's ("EPA") 1998 non road engine emission standards were structured as a three-tiered progression. Tier 1 standards were phased-in from 1996 to 2000 and Tier 2 emission standards were phased in from 2001 to 2006. Tier 3 standards, which applied to engines from 37-560 kilowatts (kW) only, were phased in from 2006 to 2008. The Tier 4 emission standards were introduced in 2004, and were phased in from 2008 to 2015. SWAPE explains that these tiered emission standards, however, are only applicable to newly manufactured non road equipment. According to the EPA "if products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements." Therefore, pieces of equipment manufactured prior to 2000 are not required to adhere to Tier 2 emission standards, and pieces of equipment manufactured prior to 2006 are not required to adhere to Tier 3 emission standards. SWAPE explains that construction equipment often lasts more than 30 years and, therefore, Tier 1 equipment and non-certified equipment are currently still in use.

Although Tier 4 Final engines are currently being produced and installed in new off-road construction equipment, the majority of existing diesel off-road construction equipment in California is not currently equipped with Tier 4 Final engines. According to the *San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects*, in 2014, 25% of all off-road equipment in the state of California were equipped with Tier 2 engines, approximately 12% were equipped with Tier 3 engines, approximately 18% were equipped with Tier 4 Interim engines, and only 4% were equipped with Tier 4 Final engines. Thus, the DSEIR relies on a construction equipment fleet that only accounts for 4% of all off-road equipment available in the state of California.

SWAPE notes that there are construction equipment regulations that apply to construction companies. For example, the California Air Resources Board ("CARB") prohibits smaller construction companies from adding construction equipment with Tier 0 engines to their fleets, and prohibits medium and large construction companies from adding equipment with Tier 1 engines to their fleets. However, CARB does not require that off-road construction fleets be comprised solely of Tier 4 Final engines. According to CARB, regulations requiring that new additions to off-road vehicle fleets be equipped with Tier 4 engines will not take effect for years. CARB states, "Beginning January 1, 2018, for large and medium fleets, and January 1, 2023, for small fleets, a fleet may not add vehicles with a Tier 2 engine to its fleet. The engine tier must be Tier 3 or higher." Therefore, SWAPE concludes that "it is highly unrealistic to assume that the entire construction fleet used during Project construction will be made up of construction machinery equipped with Tier 4 Final engines, exclusively."

The assumption that the Project will use an entire fleet of off-road equipment with Tier 4 Final engines during the construction phase is unsupported and results in an underestimation of emissions.

> **Response E12:** As required by CEQA (Guidelines Section 15097), a Mitigation Monitoring or Reporting Program (MMRP) would be adopted with the Draft SEIR. The MMRP will include the impacts of the project, mitigation for those impacts, the relative responsibilities of various City departments for various aspects of the monitoring and reporting, and general standards for determining project compliance with the mitigation measures or revision and

related conditions of approval. The project will be required to implement mitigation measure MM AIR-1.1 as described in the Draft SEIR, and will print these requirements on construction documents, contracts, and/or project plans. Mitigation requiring the use of Tier 4 engines in construction equipment has been successfully implemented in other projects in San José, including the Communications Hill 2 project, which is currently under construction. In addition, to ensure compliance, MM AIR-1.2 requires a construction operations plan that includes equipment specifications and a verification letter by a qualified air quality specialist confirming the plan meets the standards set forth in MM AIR-1.1 to be submitted to the City for review and approval.

Comment E13: 6. An Updated Analysis Shows that the Project Would Result in Significant Pollutant Emissions

SWAPE prepared an updated CalEEMod model to accurately determine the Project's emissions. SWAPE's analysis shows that, when the various inconsistencies, inaccuracies and unsupported assumptions described above are corrected, the Project's emissions significantly increase. ROG emissions increase by about 28%, NOx emissions increase by about 282%, PM10 exhaust emissions increase by about 800% and PM2.5 exhaust emissions increase by about 760%.

SWAPE found that the Project's construction-related NOx emissions rise from 27.1 pounds per day to 103.5 pounds per day, which exceeds the Bay Area Air Quality Management District's ("BAAQMD") significance threshold of 54 pounds per day. SWAPE's corrected model shows that the Project would result in a significant impact that was not identified or mitigated in the DSEIR. The City must prepare a revised DSEIR that accurately analyzes the Project's emissions.

Response E13: The Draft SEIR air quality analysis used project-specific construction data that was available for this project. The CalEEMod default assumptions for this project are not realistic given the type of project, which requires vertical construction. Under the CalEEMod default assumptions, the proposed project would be constructed in one year and this is not a reasonable assumption for the project. The construction period, based on the schedule and equipment assumptions provided by the project applicant, is estimated at 528 workdays or approximately two years.

As discussed in Responses E9 and E11, the construction analysis was updated to correct construction equipment assumptions that were inputted into CalEEMod. As a result, the updated analysis yielded higher total construction period emissions than those reported earlier. These emissions would not, however, exceed the BAAQMD significance thresholds and would result in a less than significant air quality impact from construction activities.

The following table compares the emissions from the previous analysis provided in the Draft EIR and those from the updated analysis:

Table 1 – Construction Period Criteria Air Pollutant Emissions					
Project Scenario		**ROG**	**NOx**	**PM_{10}**	**$PM_{2.5}$**
Previous Analysis	Total Construction Emissions (tons)	8.06 tons	7.16 tons	0.13 tons	0.12 tons
	Average Daily Emissions (pounds)[2]	30.5 lbs	27.1 lbs	0.5 lbs	0.5 lbs
Updated Analysis	Total Construction Emissions (tons)	10.47 tons	11.3 tons	0.37 tons	0.35 tons
	Average Daily Emissions (pounds)[3]	39.7 lbs	42.8 lbs	1.4 lbs	1.3 lbs
BAAQMD Thresholds (pounds per day)		54 lbs	54 lbs	82 lbs	54 lbs
Exceed Threshold?		No	No	No	No

As is shown in the table above, the average daily construction period criteria pollutant emissions would not exceed the thresholds.

<u>Comment E14:</u> B. The DSEIR Fails to Adequately Evaluate Health Risks from Diesel Particulate Matter Emissions

The DSEIR's analysis of health risks from diesel particulate matter ("DPM") emissions is inadequate in two ways. First, the City's health risk assessment ("HRA") for the Project's constructed-related health risks from DPM emissions is unsupported. The HRA relies on emission estimates from the DSEIR's CalEEMod model. As described in detail above, the model relies upon incorrect input parameters that artificially reduce the Project's construction emissions. Therefore, the City must prepare an updated construction-related HRA to accurately determine the Project's health risk impact.

Second, the DSEIR concludes that exposure to DPM during Project operation would be less than significant, but there is no operational HRA to support this conclusion. The DSEIR attempts to justify the omission of an operational HRA, stating "[o]peration of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project." This is incorrect. SWAPE explains that "the Project will, in fact, generate localized toxic air contaminant (TAC) emissions during operation that may have adverse health impacts on the surrounding sensitive receptors." The Project will generate additional vehicle trips that would emit substantial amounts of DPM during operation, potentially exposing nearby sensitive receptors to substantial air pollutants. This may result in long term exposure to DPM and other TACs, causing a significant health risk impact. Therefore, the City must conduct an operational HRA.

The omission of a quantified HRA is inconsistent with the most recent guidance published by the Office of Environmental Health Hazard Assessment ("OEHHA"), the organization responsible for

[2] Based on 528 workdays.
[3] Based on 528 workdays.

providing recommendations and guidance on how to conduct health risk assessments in California. In February of 2015, OEHHA released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, which was formally adopted in March of 2015. This guidance document describes the types of projects that warrant the preparation of a HRA.

Construction of the Project will produce DPM emissions from exhaust stacks of construction equipment and on-road heavy duty trucks over a construction period of 528 days. The OEHHA recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors. Once construction is complete, Project operation will generate truck trips, which will produce additional exhaust emissions, thus continuing to expose nearby sensitive receptors to DPM emissions. The OEHHA recommends that exposure from projects lasting more than 6 months be evaluated for the duration of the project, and recommends that an exposure duration of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident. We can reasonably assume that the Project will operate for at least 30 years, if not more. Therefore, health risks from Project operation should have been evaluated as a 30-year exposure duration, which vastly exceeds the OEHHA's 6-month threshold. These recommendations reflect the most recent health risk policy.

To demonstrate the potential health risks to nearby sensitive receptors from Project construction and operation, SWAPE prepared a simple screening-level HRA. SWAPE used the OEHHA- and EPA-recommended AERSCREEN as the air dispersion model. SWAPE used the annual PM10 exhaust estimates from its updated CalEEMod model and the location of the closest sensitive receptors described in the DSEIR. Consistent with recommendations set forth by OEHHA, SWAPE used a residential exposure duration of 30 years, starting from the infantile stage of life. SWAPE's detailed calculations are provided in their comments.

SWAPE found that the excess cancer risk to adults, children, and infants at a sensitive receptor located 75 meters away over the course of Project construction and operation are 81, 530, and 1,300 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years) is approximately 1,922 in one million. The infantile, child, adult, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million. SWAPE notes that their analysis is a screening-level HRA, which is known to be more conservative, and tends to err on the side of health protection. If the results of a screening-level HRA are above applicable thresholds, then a more refined HRA must be conducted.

SWAPE's screening-level HRA shows that construction and operation of the Project could result in potentially significant health risk impacts. Therefore, a refined HRA must be prepared using site-specific meteorology and specific equipment usage schedules. The refined HRA must be included a revised DSEIR that is circulated for public review and comment.

> **Response E14:** The commenter raised two issues, construction emissions and operational emissions; this response will first address the issues pertaining to operational emissions.
>
> The proposed residential mixed-use project with 20,000 square feet of retail would have minimal diesel truck deliveries. BAAQMD has published screening criteria of 10,000 ADT for roadways that may expose sensitive receptors to substantial pollutant concentrations, resulting in significant community risk impacts. The project would add fewer than 5,000

vehicles trips per day and, therefore, operational emissions resulting from project vehicular travel would not have the potential to result in a significant community risk impact. Therefore, no health risk assessment of operations is required.

As noted by the commenter, SWAPE used AERSCREEN to complete their construction emissions health risk assessment. Consistent with BAAQMD Guidelines, construction emissions and health risk to nearby sensitive receptors was completed using the AERMOD model. The construction risk assessment for the project utilized a refined air quality dispersion modeling approach in order to provide a real-world estimate of potential cancer risks from diesel particulate matter (DPM) based on actual conditions rather than using a simplified screening modeling approach that does not rely on actual meteorological conditions and has limitations on simulating actual emission source characteristics.

The refined modeling approach has the ability to:

1. Use actual hourly meteorological conditions to simulate pollutant transport from the source to receptor on an hour-by-hour basis. For this project, 43,848 hours (five years) of actual meteorological conditions measured at the San José International Airport were used to calculate hourly construction period DPM concentrations which were then used by the dispersion model to calculate actual annual average DPM concentrations.

2. Calculate concentrations during specified hours of the day when construction activities would actually occur. For this project, construction activities were modeled as occurring during the daytime for 9 hours per day.
3. Simulate emissions from an area based on the actual size, configuration, and orientation of the construction area relative to the receptor locations where concentrations are calculated.

A screening modeling approach, such as the one described in the comment letter using the AERSCREEN model is a simplified version of a refined model and is limited to:

1. Use theoretical, or synthetic, meteorological conditions that are designed to encompass the spectrum of potential meteorological conditions that may be present at the location being modeled, but are not actual measured data. The meteorological conditions used in the screening modeling include conditions representative of daytime and nighttime hours.

2. Only calculates a one-hour concentration for each of the theoretical meteorological conditions. An average scaling factor is then used to estimate what the annual average concentration may be based on the modeled on-hour concentration.

3. Does not differentiate between daytime and nighttime conditions. As such, the model calculates one hour concentrations under conditions that would occur during the nighttime when the project construction activities would not be occurring.

Due to their simplicity and reliance on limited actual site-specific physical and meteorological conditions, screening models are designed to provide conservative one-hour concentrations when compared to the use of more refined dispersion models. That is, screening models will generally produce concentrations that are greater than would be calculated using a refined dispersion model. Screening models, such as the AERSCREEN model, are used for what are called Tier 1 screening-level health risk assessments. This method was used is estimating the cancer risks presented in the comment letter.

As described in the BAAQMD Recommended Methods for Screening and Modeling Local Risks and Hazards, more refined modeling is recommended for projects in which the screening analysis exceeds the thresholds or a more site specific characterization is required because it is complex with multiple sources. Refined models such as ISC3 and AERMOD require much more site-specific information, but yield greater characterization of the project and more representative results.

For these reasons, the commenter has overestimated project construction risk impacts.

The commenter noted that the risks reported in the Draft SEIR rely on incorrectly computed CalEEMod construction period exhaust emissions. As has been mentioned earlier, updated construction information was acquired and the resulting emissions were remodeled. The health risks were also computed again to account for the change in emissions. The temporary impacts were found to be significant. But, with the use of the previously identified construction period mitigation measures included in the Draft SEIR, the risk would be reduced to a less than significant level. To ensure that construction period cancer risks and annual $PM_{2.5}$ concentrations are less than significant through the use of electrical line power for cranes, man lifts, and to eliminate use of diesel-powered generators, the following has been added as a Condition of Project Approval (please see page 57 of the First Amendment for the text amendment).

- The project will acquire electrical power to the site from PG&E so that portable diesel engines that operate more than 20 hours shall be prohibited.

The table below compares the exhaust emissions reported in the original analysis and the results from the updated analysis. Table 3 compares the uncontrolled and mitigated community risk levels for both the original and updated analyses.

Table 2 – Unmitigated Exhaust Emissions Summary							
Year	**Activity**	**DPM (tons/year)**	**DPM Emissions**			**Modeled Area (m^2)**	**DPM Emission Rate ($g/s/m^2$)**
			lb/yr	**lb/hr**	**g/s**		
Original Analysis							
2017	Construction	0.0144	28.8	0.00877	1.10E-03	6,683	1.65E-07
2018	Construction	0.0223	44.6	0.01358	1.71E-03	6,683	2.56E-07
2019	Construction	0.0026	5.2	0.00159	2.00E-04	6,683	3.00E-08
Updated Analysis							
2017	Construction	0.1838	367.6	0.11190	1.41E-02	6,683	2.11E-6
2018	Construction	0.0855	171.0	0.05205	6.56E-03	6,683	9.82E-7
2019	Construction	0.0091	18.2	0.00555	6.99E-04	6,683	1.05E-7

Based on the updated emission results, the health risks were recalculated. As previously stated, the maximum impact would occur at the second floor level of the Plaza Hotel. The Plaza Hotel does include some long-term occupants, as it is being converted into a homeless shelter. The shelter would provide temporary housing to the homeless and the maximum length of stay of the occupants would range from four to nine months. For the purposes of the analysis, it was assumed that residents would occupy the property for one year.

The other nearest sensitive receptor would be the Post and San Pedro towers, located north of the project site, that are under construction. These are assumed to be occupied with residents when the project is under construction. Cancer risk and annual $PM_{2.5}$ concentration were computed at both locations as shown in Table 3.

Table 3 – Unmitigated and Mitigated Risk Levels			
Scenario	**Cancer Risk**	**Hazard Index**	**Maximum Modeled $PM_{2.5}$ Concentration**
Original Analysis			
Unmitigated	36.5	0.03	0.40
Mitigated	6.0	<0.01	0.14
Updated Analysis			
Unmitigated	181.1	0.22	1.29
Mitigated	9.0	<0.01	<0.20

<u>Comment E15:</u> C. The City Must Require All Feasible Mitigation Measures for the Project's Air Quality and Public Health Impacts

SWAPE's updated air quality analysis and HRA provides substantial evidence that the Project would result in significant air quality and public health impacts that were not identified in the DSEIR. The City must prepare a revised DSEIR that discloses and mitigates these impacts to a less than significant level.

SWAPE provides examples of some of the kinds of feasible mitigation measures to reduce the Project's air quality and public health impacts that should be required. They include, for example,

limiting the idling of heavy duty vehicles to five minutes or less, requiring that diesel generators present on site for more than 10 days be equipped with emission control technology and using electric and hybrid construction equipment. SWAPE's recommended measures are more prescriptive than those included in the DSEIR and would help reduce the Project's NOx, PM and DPM emissions. The City must consider these measures and identify and explore other measures to reduce air quality and public health impacts below a level of significance.

> **Response E15:** The DSEIR proposed mitigation for all identified impacts. The mitigation measures proposed would reduce all significant air quality impacts to a less than significant level, as is required by CEQA. The mitigation measures recommended by SWAPE are from the Sacramento Metropolitan Air Quality Management District, not BAAQMD.

Comment E16: VI. THE DSEIR FAILS TO DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S IMPACTS FROM GREENHOUSE GAS EMISSIONS

The DSEIR fails to adequately evaluate the Project's impacts on global climate change. The DSEIR concludes, without support, that the Project's impact from greenhouse gas ("GHG") emissions would be less than significant. In fact, the DSEIR does not even quantify the GHGs associated with the Project. Instead, the DSEIR states:

> Because construction would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32… Since the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy. Projects that are consistent with the GHG Reduction Strategy (such as the proposed project) would have a less than significant impact related to GHG emissions.

This is not an "analysis," as required by CEQA. Moreover, the statements are unsupported.

The DSEIR states that the Project is consistent with the City's GHG Reduction Strategy and General Plan, but the DSEIR fails to demonstrate compliance with all of the applicable Voluntary and Mandatory Criteria in the GHG Reduction Strategy. The City provides that "[a]pplicants can complete the 'Evaluation of Project Compliance with the City of San Jose Greenhouse Gas Reduction Strategy' worksheet to demonstrate conformance to the Greenhouse Gas Reduction Strategy."

Appendix A of the DSEIR shows that the Project complies with three of the applicable Mandatory Criteria, but there is no evidence that the Project complies with the fourth mandatory criterion or with any of the voluntary measures. The DSEIR states that "compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy." Because compliance with all applicable Voluntary and Mandatory Criteria set forth in the GHG Reduction Strategy is not demonstrated, the City cannot conclude that the Project is consistent with the City's GHG Reduction Strategy. Therefore, there is no support for the DSEIR's conclusion that the Project would have a less than significant impact from GHG emissions.

In addition, while a lead agency enjoys substantial discretion in its choice of methodology to analyze impacts, the methodology must still be supported by substantial evidence. Under CEQA, a lead agency may consider the use of a qualitative analysis that relies upon consistency with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions when assessing the significance of impacts from GHGs, but such regulations or requirements must be adopted by the agency through a public review process and must include specific requirements that reduce or mitigate a project's incremental contribution of greenhouse gas emissions. In this case, the DSEIR's method was not adopted by an agency and there is no evidence that compliance with this very limited list of measures would actually result in compliance with the statewide goals in AB 32. The DSEIR fails to provide substantial evidence to support the use of a consistency analysis with the City's General Plan and GHG Reduction Strategy to determine the Project's impacts.

Response E16: The City's GHG Reduction Strategy is an adopted plan that meets the mandates outlined in the *CEQA Guidelines* and the standards for "qualified plans" as set forth by BAAQMD. As such, projects which are consistent with the development assumptions and the mandatory measures of the GHG Reduction Strategy are deemed to have a less than significant impact consistent with the findings of the General Plan FEIR.

As discussed in the DSEIR, the project is consistent with the development assumptions in the General Plan. Furthermore, the project is consistent with all applicable mandatory measures. Consistency with voluntary measures is at the discretion of the City and is not required for consistency with the GHG Reduction Strategy. The project is consistent with mandatory measures 1-4. Measures 5-7 are not applicable as they apply to business development. While the text of the DSEIR is not explicit regarding consistency with measure 3, the project description outlines improvements to the adjacent pedestrian facilities. In addition, the project would not preclude the construction of planned pedestrian and bicycle improvements as discussed in Section 4.16 of Appendix A of the Draft SEIR.

Regarding construction GHG emissions, the analysis provided by the City is accurate. There are no local, regional, or statewide adopted thresholds for GHG construction emissions. Without an adopted threshold, quantification of an impact is not possible. Furthermore, these emissions are temporary and would not preclude the achievement of the State's GHG reduction goals.

The City of San José has determined that the best methodology to address GHG construction emissions is to utilize the same criteria as operational GHG emissions. Therefore, if a project is consistent with the GHG Reduction Strategy and land use development assumptions of the General Plan, it would be less than significant. If the project is inconsistent with either of these parameters and GHG emissions must be quantified, the BAAQMD numeric thresholds are utilized. For reference, BAAQMD identifies a significance threshold of 1,100 metric tons of CO_2e per year. In addition to this bright-line threshold, an "efficiency" threshold is identified for urban high density, transit-oriented development projects that are intended to reduce vehicle trips but that may still result in overall emissions greater than 1,100 metric tons per year. This efficiency

threshold is 4.6 metric tons of CO_2e per service population (e.g., residents and employees) per year.

Comment E17: The BAAQMD's recommended GHG significance thresholds (discussed below) must be used to determine the Project's impacts from GHG emissions. The BAAQMD's thresholds have undergone a public review process as part of stakeholder working group meetings that are open to the public, and the BAAQMD's Guidance document provides the substantial evidence relative to the methodology for developing the interim GHG significance thresholds, consistent with requirements set forth by CEQA.

To determine the Project's impact on global climate change, SWAPE conducted a simple analysis using the emission estimates provided in the DSEIR and the BAAQMD's Air Quality Guidelines. As stated in the City's GHG Reduction Strategy, the BAAQMD Air Quality Guidelines are intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects (Project-level) and plans (Plan-level) in the San Francisco Bay Area.

The Guidelines include information on legal requirements, BAAQMD rules, plans and procedures, methods of analyzing air quality impacts, thresholds of significance, mitigation measures and background air quality information. In June 2010, the BAAQMD Board of Directors set forth new CEQA thresholds of significance and updated their CEQA Guidelines. The BAAQMD's updated Guidelines recommend quantifying a project's indirect and direct GHG emissions, and comparing these emissions to the BAAQMD's screening threshold of 1,100 metric tons per year of carbon dioxide equivalents (MT CO_2e/year). If a project would generate GHG emissions greater than 1,100 MT CO_2e/year, it would make a cumulatively considerable contribution to GHG emissions and result in a cumulatively significant impact to global climate change.

Consistent with BAAQMD Guidelines, SWAPE quantified the Project's construction and operational GHG emissions and compared the emissions to the BAAQMD recommended thresholds of 1,100 MT CO_2e/year. SWAPE found that the Project's total GHG emissions, where construction emissions were amortized over 30 years then added to the Project's operational emissions, were 5,855 MT CO_2e/year, which clearly exceeds the BAAQMD threshold of 1,100 MT CO_2e/year. This is a significant impact that the DSEIR fails to disclose or mitigate. The City must prepare a revised DSEIR that adequately analyzes and mitigates the Project's impacts from GHG emissions.

SWAPE provides examples of some of the kinds of feasible measures that would reduce the Project's impact from GHG emissions. Notably, some of the measures would also reduce the Project's operational DPM emissions. The measures include, for example, limiting the hours of operation of outdoor lighting, using CARB-certified or electric landscaping equipment and providing electric vehicle charging stations that are accessible for trucks. SWAPE's recommended measures provide a feasible way to incorporate lower-emitting design features into the Project, thereby reducing GHG emissions. The City must require these measures and identify and explore other measures to reduce the Project's GHG emissions and climate change impacts. The City must prepare a revised DSEIR that includes a GHG analysis that is supported by substantial evidence.

Response E17: The methodology used by SWAPE is not consistent with BAAQMD Guidelines. By combining construction and operational emissions together and amortizing them over 30 years, the commenter has provided an inaccurate representation of the GHG

emissions resulting from the project. Construction emissions are temporary and would occur for a total of 24 months. During this time, emissions would vary substantially based on the phase of construction as heavy equipment is only used for excavation and construction of the structure. Interior finishing of the building, including electrical, plumbing, drywall, and finishes would not require use of heavy equipment. Operational emissions would occur only after construction is complete.

As discussed in Section 4.13, Population and Housing, the project would generate a maximum of 2,468 residents. Based on SWAPE's estimated 5,855 MT CO_2e/year, the resident population would result in 2.37 MT of CO_2e per service population. With inclusion of the on-site employees, the MT of CO_2e per service population would be even less. As noted in Response E16, BAAQMD's efficiency threshold is 4.6 metric tons of CO_2e per service population (e.g., residents and employees) per year. Therefore, even using SWAPE's data, the project would have a less than significant GHG emissions impact.

It should be noted that the project's resident population would need to be reduced by approximately 49 percent to result in a significant GHG emissions impact based on the service population.

Comment E18: **VII. CONCLUSION**

The DSEIR fails to adequately disclose and evaluate the full extent of the Project's air quality, greenhouse gas emissions, hazardous materials and public health impacts. The City must prepare a revised DSEIR that addresses these inadequacies and recirculate the revised DSEIR for public review and comment.

Response E18: This comment is acknowledged. Please refer to all previous responses to this comment letter.

Comment Letter D Attachment (SWAPE)

Comment E19: We have reviewed the December 2016 Draft Supplemental Environmental Impact Report (DSEIR) and associated appendices for the Greyhound Residential Project ("Project") located in the City of San Jose. A one-story commercial building and Greyhound bus station are currently located on the Project site. The proposed Project would demolish both buildings and construct two residential towers with ground floor retail. The north tower would be 23 stories (242 feet tall) with up to 371 residential units and the south tower would be 24 stories (252 feet tall) with up to 410 residential units, for a combined total of 781 residential units (449 dwelling units/acre). Approximately 20,000 square feet of ground floor retail would be located within the towers along S. Almaden Avenue, Post Street, and San Pedro Street. The first floor would include the retail space and parking and the second floor would be for parking. The residential units would be located on the remaining floors. The building would have a total square footage of 1,029,065, with a floor area ratio (FAR) of 13.6.
Our review concludes that the DSEIR fails to adequately evaluate the Project's Hazards and Hazardous Waste, Air Quality, and Greenhouse Gas (GHG) impacts. As a result, emissions and health impacts associated with construction and operation of the proposed Project are underestimated

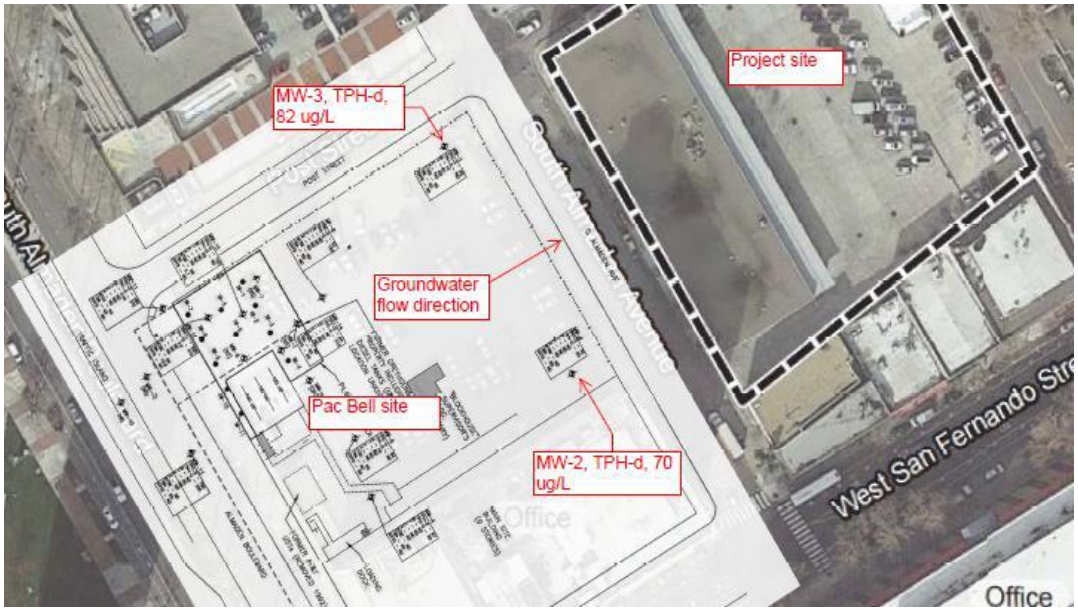
and inadequately addressed. An updated DSEIR should be prepared to adequately assess and mitigate the hazards, air quality, greenhouse gas, and potential health impacts the Project may have on the surrounding environment.

Response E19: Please refer to Response E1.

Comment E20: Hazards and Hazardous Waste

The Project site is directly northeast of a Pac Bell site that is under active regulatory oversight for cleanup of contaminated soil and groundwater. The Pac Bell site is listed on the California State Water Resources Control Board Geotracker website. An August 2015 report prepared for the Pac Bell site documented the presence of a light nonaqueous phase liquid (LNAPL) from past diesel spills originating from an underground storage tank pit. The LNAPL serves as a continuing source of dissolved phase diesel contamination of groundwater. Groundwater flow from the Pac Bell site is northeastward, in the direction of the Project Site.

The August 2015 report documents the presence of total petroleum hydrocarbons as diesel (TPH-d) in the groundwater monitoring wells closest to the Project site, just southwest of South Almaden Ave. The northeastern downgradient edge of the TPH-d plume has not been defined; no groundwater monitoring data have been recently collected at the Project site.



Because the plume of TPH-d in groundwater is flowing directly from the Pac Bell site toward the Project site, and because the downgradient edge of the plume has not been defined, groundwater monitoring data should be collected at the Project site to ensure contamination does not exist that would pose a risk to construction workers and future residents. Daylighting of the water table will result in the potential for TPH-d vapors to off-gas to ambient air, posing an exposure pathway for construction workers to breathe contaminated vapors. The DSEIR should be revised to consider this potential and to provide for protective measures to safeguard worker safety.

The collection of groundwater monitoring data is also necessary to ensure that dewatering of the Project site will not result in the unpermitted discharge of TPH-d contamination to the sanitary sewer. The results of the groundwater monitoring should be presented in a revised DSEIR.

The presence of the plume originating from the Pac Bell site was not identified in the DSEIR. The presence of the plume originating from the Pac Bell site was not identified in the Downtown Strategy 2000 FEIR or in the San Jose 2040 General Plan FEIR. The Phase I ESA prepared for the Project site (appendix E) did not identify the plume originating from the Pac Bell site and moving in the direction of the Project site as a potential source of contamination. No mitigation measures have been prepared in these three documents that would address the potential presence of groundwater contamination beneath the Project site.

On the basis of data from the Pac Bell site, groundwater is present at the Project site at a depth of about 20 feet. The DSEIR states that Implementation of the proposed project will require excavation of the entire site to approximately 41 feet below the ground surface for construction of the underground parking structure (p. 26). The interception of the water table will result in the need to dewater the Project site for construction, an eventuality not contemplated in the DSEIR. A DSEIR should be prepared to include provisions for the proper disposal of contaminated groundwater, based on water-quality testing that should be required as described above. Contaminated groundwater that may be generated from the dewatering process needs to be handled and disposed in accordance with the San Francisco Bay Regional Water Quality Control Board's NPDES General Permit requirements.

The presence of the TPH-d groundwater plume, located upgradient and adjacent to the Project site, is significant new information that needs to be evaluated in a revised DSEIR. The DSEIR should consider health impacts on the basis of site-specific information, from the collection and analysis of groundwater samples beneath the Project site. Any health or environmental impacts should be mitigated in a revised, DSEIR.

Response E20: Please refer to Response E6.

Comment E21: Air Quality
Unsubstantiated Input Parameters Used to Estimate Project Emissions

The DSEIR relies on emissions calculated from the California Emissions Estimator Model Version CalEEMod.2013.2.2 ("CalEEMod"). CalEEMod provides recommended default values based on site specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act (CEQA) requires that such changes be justified by substantial evidence. Once all the values are inputted into the model, the Project's construction and operational emissions are calculated, and "output files" are generated. These output files, which can be found in Appendix C of the DSEIR, disclose to the reader what parameters were utilized in calculating the Project's air pollutant emissions, and make known which default values were changed as well as provide a justification for the values selected.

When we reviewed the Project's CalEEMod output files, we found that several of the values inputted into the model were not consistent with information disclosed in the DSEIR. When the Project's emissions are modeled using correct input parameters, we found that the Project will have a significant impact on regional air quality and global climate change. An updated DSEIR should be

prepared to include an air quality analysis that adequately evaluates the impacts that the construction and operation of the Project will have.

Response E21: This comment is acknowledged. Specific responses to the issues listed in this comment are provided as referenced for each specific issue.

Comment E22: ***Failure to Account for Total Parking Area***
The proposed Project's CalEEMod output files utilized "Land Uses" inconsistent with information disclosed in the DSEIR, and as a result, the Project's construction and operational emissions are underestimated.

According to the DSEIR, the Project proposes to construct a total of 786 parking spaces in a multi-level parking garage (p. 5). In an effort to accurately estimate the Project's construction and operational emissions, this value should have been used within the air model. However, according to the Project's CalEEMod output files, located in Appendix C, Project emissions were estimated assuming that only 736 parking spaces would be constructed, underestimating the total number of parking spaces anticipated to be constructed by 50 spaces. (see excerpt below) (Appendix C, pp. 63, pp. 88).

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	736.00	Space	0.00	294,400.00	0
Apartments High Rise	785.00	Dwelling Unit	1.74	785,000.00	2245
Strip Mall	20.00	1000sqft	0.00	20,000.00	0

This discrepancy between the DSEIR and the air model provided in Appendix C presents a significant issue. As previously stated, the land use type and size features are used throughout CalEEMod in determining default variable and emission factors that go into the model's calculations. By underestimating the number of parking spaces within the model, the emissions that would be produced during construction and operation of the proposed parking structure are underestimated. Paving for the parking spaces involves laying concrete or asphalt, and architectural coating activities involve the use of paint and other coating materials to mark each parking space, both of which will result in air pollutant emissions during construction. Furthermore, during operation, architectural coating activities and electricity usage from outdoor lighting, ventilation, and elevators in the proposed parking structures will also result in air pollutant emissions. Therefore, by underestimating the total number of parking spaces, the Project construction and operational emissions are underestimated. An updated CalEEMod model must be prepared in an updated DSEIR in order to accurately estimate Project emissions.

Response E22: Please refer to Response E8.

Comment E23: ***Incorrectly Modeled Emissions Assuming Use of Alternatively Field Equipment***
The DSEIR incorrectly assumes the use of off-road equipment fueled by compressed natural gas (CNG) and bio-diesel during construction, even though the DSEIR does not mention the use of alternatively fueled off-road equipment as a mitigation measure, nor does it make any sort of commitment to using alternatively fueled equipment once the Project is approved. As a result, the Project's construction and operational emissions are artificially reduced.

As previously stated, the DSEIR relies upon CalEEMod to model emissions. Review of the modeling output files provided in Appendix C of the DSEIR demonstrate that the Project's construction-related emissions were estimated assuming the use of off-road equipment fueled by CNG and bio-diesel (see excerpt below) (Appendix C, pp. 64).

tblConstEquipMitigation	FuelType	Diesel	CNG
tblConstEquipMitigation	FuelType	Diesel	Bio-diesel

The use of alternatively-fueled construction equipment, however, is incorrect, as nowhere in the DSEIR does it mention the use of non-diesel equipment, let alone propose it as mitigation. The only reference to the Project's use of non-diesel equipment during construction is in the Project's Air Quality Analysis, located in Appendix C, which states,

"Other measures may be the use of added exhaust devices, alternatively- fueled equipment (i.e. non-diesel), or a combination of measures, provided that these measures are approved by the City and demonstrated to reduce community risk impacts to less than significant" (Appendix C, pp. 22)."

As you can see in the excerpt above, Appendix C mentions that alternatively fueled equipment could be implemented as a mitigation measure; however, the DSEIR would have to first identify the use of nondiesel equipment as a mitigation measure, and then demonstrate a commitment to actually implementing this measure, and would have to obtain City approval prior to Project construction. Nothing in the DSEIR indicates that the required steps have been taken to adequately demonstrate a commitment to the use of alternatively fueled equipment. The DSEIR makes no mention of the use of alternatively fueled off-road equipment during construction, and does not include it as a mitigation measure or mandatory condition of approval. As a result, there is no way to ensure that the proposed measure will be implemented once the Project is approved.

Because the DSEIR does not include details of how the alternatively-fueled equipment will be used, its inclusion within the Project's air model is unsubstantiated and results in an artificial reduction of the Project's construction emissions. Unless the Project Applicant can demonstrate how CNG or bio-diesel fuel will be used and implemented into Project activities, the Project cannot claim the emissions reductions from this mitigation measure.

Response E23: Please refer to Response E9.

Comment E24: ***Use of Incorrect Intensity Factor***

The CalEEMod model relies upon an incorrect carbon dioxide (CO_2) intensity factor to estimate the Project's operational emissions. When Pacific Gas & Electric (PG&E) is chosen as the utility provider for the proposed Project, CalEEMod assumes a default CO_2 intensity factor of 641.35 pounds per megawatthour (lb/MWhr). This intensity factor is used to estimate the CO_2 emissions generated from electricity usage during Project operation. The intensity factor used in the Project's operational CalEEMod model, however, was adjusted from the default value to 429.6 lb/MWhr (see excerpt below) (Appendix C, pp. 66, pp. 91).

tblProjectCharacteristics	CO2IntensityFactor	641.35	429.6

The User Entered Comments & Non-Default Data section in the Project's CalEEMod output files fails to offer a reason for this reduction, only stating, "Revised Carbon Dioxide Emission Intensity" (Appendix C, pp. 63, pp. 88). Furthermore, there is no discussion anywhere in the DSEIR that supports the use of this other CO_2 intensity factor in place of the CalEEMod default value. As a result, the source of this 429.6 lb/MWhr value is unknown. CalEEMod allows users to change default values, but these changes are required to be justified by substantial evidence. By failing to provide proper justification for changing this intensity factor, the accuracy of this value cannot be verified, and thus, should not be relied upon to determine Project significance.

Response E24: Please refer to Response E10.

Comment E25: ***Use of Incorrect Off-Road Equipment and Off-Road Equipment Usage Hours***
The off-road construction equipment list and usage hours used to estimate the proposed Project's construction emissions are inconsistent with the off-road construction equipment list and duration disclosed in the DSEIR. As a result, the Project's construction emissions are incorrect and underestimated. According to the Project's CalEEMod output files, the following equipment and usage hours were used to estimate the Project's construction emissions (see excerpt below) (Appendix C, pp. 69-70).

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	2	1.90	162	0.38
Demolition	Rubber Tired Dozers	1	1.90	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	1.90	97	0.37
Site Preparation	Graders	0	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	2	3.70	255	0.40
Site Preparation	Scrapers	0	8.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	3.70	97	0.37
Grading	Excavators	3	0.30	162	0.38
Grading	Graders	0	6.00	174	0.41
Grading	Rubber Tired Dozers	0	6.00	255	0.40
Grading	Rubber Tired Loaders	2	0.30	199	0.36
Grading	Scrapers	2	0.30	174	0.41
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	2	0.30	226	0.29
Building Construction	Forklifts	2	0.20	89	0.20
Building Construction	Generator Sets	4	0.60	84	0.74
Building Construction	Graders	1	0.20	174	0.41
Building Construction	Pumps	2	0.20	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Architectural Coating	Air Compressors	0	6.00	78	0.48
Architectural Coating	Cranes	1	0.20	226	0.29
Architectural Coating	Forklifts	2	0.20	89	0.20
Architectural Coating	Generator Sets	2	0.20	84	0.74
Architectural Coating	Graders	1	0.20	174	0.41
Paving	Cement and Mortar Mixers	1	1.80	9	0.56
Paving	Concrete/Industrial Saws	1	1.80	81	0.73
Paving	Pavers	1	1.80	125	0.42
Paving	Paving Equipment	1	1.80	130	0.36
Paving	Rollers	1	1.80	80	0.38
Paving	Tractors/Loaders/Backhoes	0	1.80	97	0.37

As demonstrated above, the Project's construction emissions were modeled assuming that the majority of the off-road equipment to be used during construction would be operating for less than 8 hours a day, with several pieces of equipment operating for only a maximum of 20 or 30 minutes a day. According to CalEEMod model's User Entered Comments and Non-Default Data, the off-road equipment list and usage hours used to estimate emissions reflect the construction schedule and equipment list disclosed in the DSEIR (Appendix C, pp. 63, pp. 88). Review of the DSEIR, however, demonstrates that this is not the case. As you can see in the excerpt below, the equipment types and usage hours provided within the DSEIR's construction list do not reflect the equipment and usage hours inputted into the air model (see excerpt below) (Appendix C, pp. 57).

Project Name: Greyhound Residential					
Construction Phase	Equipment (*See next page for example of commonly used equipment*)	Quantity	Average Hours Used Per Day	How Many Work Days	Fuel Type - if other than Diesel
Demolition	• Excavator	2	8	5	
	• Dump Truck	2	8	5	
	• Rubber Tire Dozer	1	8	5	
Start Date: 4/1/17	• Backhoe	1	8	5	
End Date: 5/1/17	•				
Site Preparation	• Rubber Tire Dozer	2	8	5	
	• Backhoe	1	8	5	
	• Water Truck	1	8	5	
Start Date: 5/1/17	•				
End Date: 5/15/17	•				
Grading/Excavation	• Excavator	3	8	5	
	• Grader/Scraper	2	8	5	
	• Dump Truck	6	8	5	
Start Date: 5/15/17	• Loader	2	8	5	
End Date: 12/1/17	• Water Truck	1	8	5	
Trenching	• Backhoe	1	8	5	
	• Dump Truck	1	8	5	
	•				
Start Date: 12/1/17	•				
End Date: _2/1/17	•				
Building – Exterior	• Crane	2	12	5	
	• Forklift	2	8	5	Propane
	• Grader all	1	8	5	
Start Date: 12/1/17	• Generators	4	24	6	Bio
End Date: 12/1/18	• Concrete Pumps	2	8	5	
Building – Interior/ Architectural Coating	• Crane	1	8	5	
	• Forklift	2	8	5	Propane
	• Grader all	1	8	5	
	• Generators	2	8	5	Bio
Start Date: 6/1/17					
End Date: 4/1/19	•				
Paving	• Cement and Mortar Mixers	1	8	5	
	• Pavers	1	8	5	
	• Paving Equipment	1	8	5	
Start Date: 3/1/19_	• Rollers	1	8	5	
End Date: 4/1/19	• Concrete Saw	1	8	5	

While the CalEEMod model assumes that the majority of the Project's construction equipment will be used for 30 minutes to 2 hours every day, the equipment list provided in the DSEIR proposes to use every piece of off-road construction equipment for a minimum of 8 hours a day, approximately 40 times more than the minimum usage hours utilized in the CalEEMod model. By failing to use the correct usage hours within the CalEEMod model, the Project's construction emissions are greatly underestimated.

Not only did the CalEEMod model fail to rely upon the correct usage hours to model the Project's construction emissions, but it also failed to include all of the proposed construction equipment. When we compared the DSEIR's equipment list to the list used in the air model, we found that several pieces of equipment provided in the DSEIR's equipment list were omitted from the CalEEMod model. Specifically, we found that the CalEEMod model failed to include the off-road dump and water trucks needed throughout the entire construction period (see table below).

Missing Pieces of Off-Road Construction Equipment in CalEEMod Model		
Phase	**Equipment Type**	**Amount**
Demolition	Dump Trucks	2
Site Preparation	Water Trucks	1
Grading	Dump Trucks	6
	Water Trucks	1
Trenching	Dump Trucks	1

By failing to use the correct usage hours and include all of the pieces of off-road equipment anticipated for use during Project construction, emissions from Project construction are greatly underestimated. An updated air quality analysis should be prepared to adequately evaluate the Project's construction emissions.

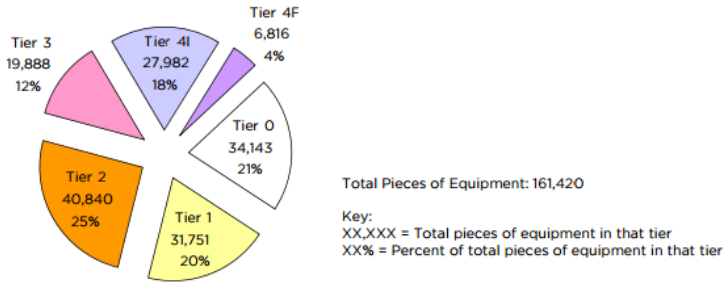
Response E25: Please refer to Response E11.

Comment E26: ***Failure to Demonstrate Feasibility of Obtaining Tier 4 Construction Fleet***
According to the DSEIR, "all diesel-powered off-road equipment larger than 25 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent" (MM AIR-1.1, p. ix). In order to determine the emission reductions that this mitigation measure will result in, the Project's construction emissions were calculated with the assumption that every piece of heavy-duty machinery greater than 25 hp used during construction will be equipped with Tier 4 Final engines (Appendix C, pp. 64-65). This assumption, however, is unsubstantiated and unrealistic, as the DSEIR fails to evaluate the feasibility of actually obtaining a construction fleet composed entirely of Tier 4 Final equipment. As a result, we find the Project's air quality analysis and DSEIR to be inadequate and require that an updated DSEIR be prepared to assess the feasibility of obtaining an entirely Tier 4 Final construction fleet.

The United States Environmental Protection Agency's (USEPA) 1998 nonroad engine emission standards were structured as a three-tiered progression. Tier 1 standards were phased-in from 1996 to 2000 and Tier 2 emission standards were phased in from 2001 to 2006. Tier 3 standards, which applied to engines from 37-560 kilowatts (kW) only, were phased in from 2006 to 2008. The Tier 4 emission standards were introduced in 2004, and were phased in from 2008 to 2015. These tiered emission standards, however, are only applicable to newly manufactured nonroad equipment. According to the United States Environmental Protection Agency (USEPA) "if products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements." Therefore, pieces of equipment manufactured prior to 2000 are not required to adhere to Tier 2 emission standards, and pieces of equipment manufactured prior to 2006 are not required to adhere to Tier 3 emission standards. As previously mentioned, construction equipment often lasts more than 30 years; as a result, Tier 1 equipment and non-certified equipment are currently still in use.

Although Tier 4 Final engines are currently being produced and installed in new off-road construction equipment, the majority of existing diesel off-road construction equipment in California is not currently equipped with Tier 4 Final engines. According to the *San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects*, in 2014, 25% of all off-road equipment in the state of California were equipped with Tier 2 engines, approximately 12% were equipped with Tier 3 engines, approximately 18% were equipped with Tier 4 Interim engines, and only 4% were equipped with Tier 4 Final engines (see excerpt below).

Figure 4: 2014 Statewide All Fleet Sizes (Pieces of Equipment)



As demonstrated in the figure above, Tier 4 Final equipment only accounts for 4% of all off-road equipment currently available in the state of California. Thus, by stating that the Project proposes to use Tier 4 Final equipment during construction, the DSEIR is relying on a fleet of construction equipment that only accounts for 4% of all off-road equipment currently available in the state of California.

It should be noted that there are several construction equipment regulations that apply to construction companies. For example, CARB currently prohibits smaller construction companies from adding construction equipment with Tier 0 engines to their fleets, and prohibits medium and large construction companies from adding equipment with Tier 1 engines to their fleets. However, it is not required that off-road construction fleets be comprised solely of Tier 4 Final engines. According to CARB, regulations requiring that new additions to off-road vehicle fleets be equipped with Tier 4 engines will not take effect for years. CARB states, "Beginning January 1, 2018, for large and medium fleets, and January 1, 2023, for small fleets, a fleet may not add vehicles with a Tier 2 engine to its fleet. The engine tier must be Tier 3 or higher." Therefore, it is highly unrealistic to assume that the entire construction fleet used during Project construction will be made up of construction machinery equipped with Tier 4 Final engines, exclusively.

The presumption that the Project will use an entire fleet of off-road equipment with Tier 4 Final engines during the construction phase is incorrect and unsupported by substantial evidence, and results in an underestimation of emissions. Due to the unlikelihood that the Project will utilize an exclusively Tier 4 Final construction fleet, substantial evidence shows that the Project may result in potentially significant, unmitigated air quality impacts.

Response E26: Please refer to Response E12.

Comment E27: ***Updated Analysis Indicates Significant Pollutant Emissions***

In an effort to accurately determine the Project's emissions, we prepared an updated CalEEMod model that includes more site-specific information and corrected input parameters. In the updated model, we inputted a total of 786 parking spaces, consistent with the DSEIR, and adjusted the off-road equipment list and usage hours to more accurately reflect the equipment identified in the DSEIR. We also assumed that Tier 4 Final and non-diesel equipment would not be used during Project construction, as nothing in the DSEIR indicates that the use of these cleaner burning equipment will actually occur once the Project is approved. Finally, we relied upon the default carbon dioxide intensity factor provided by CalEEMod, as the intensity factor used in the DSEIR is unsubstantiated, and its source is unknown.

When correct, site-specific input parameters are used to model emissions, we find that the Project's construction-related criteria air pollutant emissions increase significantly when compared to the DSEIR's model. Furthermore, we find that the Project's construction-related NOx emissions exceed the 54 pounds per day construction threshold set forth by the Bay Area Air Quality Management District (BAAQMD) (see table below).

Average Daily Construction Emissions (lbs/day)				
Model	**ROG**	**NO_x**	**PM10 Exhaust**	**PM2.5 Exhaust**
DSEIR	30.5	27.1	0.50	0.50
SWAPE	38.9	103.5	4.50	4.30
Percent Increase	**28%**	**282%**	**800%**	**760%**
BAAQMD Regional Threshold	**54**	**54**	**82**	**54**
Threshold Exceeded?	*No*	***Yes***	*No*	*No*

When correct input parameters are used to model emissions, ROG emissions increase by approximately 28%, NOx emissions increase by approximately 282% and exceed the BAAQMD's established threshold, PM10 exhaust emissions increase by approximately 800%, and PM2.5 exhaust emissions increase by approximately 760%.

These updated emission estimates demonstrate that when the Project's construction emissions are estimated correctly, the Project would result in a significant impact that was not identified in the DSEIR. As a result, an updated DSEIR should be prepared that includes an updated model to adequately estimate the Project's construction-related emissions, and additional mitigation measures should be identified and incorporated to reduce these emissions to a less-than-significant level.

Response E27: Please refer to Response E13.

Comment E28: ***Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated***
The DSEIR concludes that exposure to diesel particulate matter (DPM) during operation is anticipated to be less than significant without actually conducting a health risk assessment (HRA) (Appendix C, p. 8). The DSEIR attempts to justify the omission of an operational HRA by stating,

"Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project" (Appendix C, p. 8).

This justification, however, is incorrect, as the Project will, in fact, generate localized toxic air contaminant (TAC) emissions during operation that may have adverse health impacts on the surrounding sensitive receptors. As stated in the DSEIR, substantial sources of TACs include freeways, highways, and busy surface streets due to vehicle exhaust emissions, and stationary sources identified by the BAAQMD (Appendix C, p. 9). The Project will generate additional vehicle trips that would emit substantial amounts of DPM during operation, potentially exposing nearby sensitive receptors to substantial air pollutants. As such, the DSEIR should have conducted an operational HRA, as long term exposure to DPM and other TACs may result in a significant health risk impact. While the DSEIR did not conduct an operational HRA, it did prepare a HRA to determine the Project's construction-related health risk impacts (Appendix C, p. 18). However, according to Appendix C of the DSEIR, the Project's construction HRA relies upon emission

estimates from the DSEIR's CalEEMod model (Appendix C, p. 18). Appendix C of the DSEIR states,

"Construction period emissions were computed using CalEEMod along with projected construction activity, as described above. The CalEEMod model provided total annual PM2.5 exhaust emissions (assumed to be DPM) for the off road construction equipment used for construction of the project and for the exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles) of 0.0393 tons (80 pounds) over the construction period. A trip length of one-half mile was used to represent vehicle travel while at or near the construction site. For modeling purposes, it was assumed that these emissions from on-road vehicles would occur at the construction site. Fugitive dust PM2.5 emissions were also computed and included in this analysis. The model predicts emissions of 0.0406 tons (80 pounds) of fugitive PM2.5 over the construction period" (Appendix C, p. 18).

As stated in the previous sections, the DSEIR's CalEEMod model relies upon incorrect input parameters that artificially reduce the Project's construction emissions. Therefore, an updated construction-related HRA should also be prepared in an effort to adequately determine the Project's health risk impact. The DSEIR's omission of a quantified health risk is inconsistent with the most recent guidance published by the Office of Environmental Health Hazard Assessment (OEHHA), the organization responsible for providing recommendations and guidance on how to conduct health risk assessments in California. In February of 2015, OEHHA released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, which was formally adopted in March of 2015. This guidance document describes the types of projects that warrant the preparation of a health risk assessment. Construction of the Project will produce emissions of DPM through exhaust stacks of construction equipment and on-road heavy duty trucks over a construction period of 528 days (Appendix C, p. 5). The OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors. Once construction is complete, Project operation will generate truck trips, which will generate additional exhaust emissions, thus continuing to expose nearby sensitive receptors to DPM emissions. The OEHHA document recommends that exposure from projects lasting more than 6 months should be evaluated for the duration of the project, and recommends that an exposure duration of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident (MEIR). Even though we were not provided with the expected lifetime of the Project, we can reasonably assume that the Project will operate for at least 30 years, if not more. Therefore, health risks from Project operation should have also been evaluated by the DSEIR, as a 30 year exposure duration vastly exceeds the 6-month requirements set forth by OEHHA. These recommendations reflect the most recent health risk policy, and as such, an updated assessment of health risks to nearby sensitive receptors from construction and operation should be included in a revised CEQA analysis for the Project.

In an effort to demonstrate the potential risk posed by Project construction and operation to nearby sensitive receptors, we prepared a simple screening-level health risk assessment. The results of our assessment, as described below, provides substantial evidence that the Project's operational and construction-related DPM emissions may result in a potentially significant health risk impact that was not previously identified.

As of 2011, the Environmental Protection Agency (EPA) recommends AERSCREEN as the leading air dispersion model, due to improvements in simulating local meteorological conditions based on simple input parameters. The model replaced SCREEN3, and AERSCREEN is included in the OEHHA23 and the California Air Pollution Control Officers Associated (CAPCOA) guidance as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

We prepared a preliminary health risk screening assessment of the Project's construction and operational impact to sensitive receptors using the annual PM10 exhaust estimates from the updated CalEEMod model prepared by SWAPE, which is attached to this letter for reference. According to Appendix A of the DSEIR, the closest sensitive receptors to the Project site are located within 250 feet, or approximately 76 meters away from the Project site (Appendix A, p. 26). Consistent with recommendations set forth by OEHHA, we used a residential exposure duration of 30 years, starting from the infantile stage of life. We also assumed that construction and operation of the Project would occur in quick succession, with no gaps between each Project phase. The CalEEMod model's annual emissions indicate that construction activities will generate approximately 2,373 pounds of DPM "over a period of approximately 24 months beginning in April 2017, or an estimated 528 construction workdays (assuming an average of 22 construction days per month)" (Appendix C, p. 5). The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project construction we calculated an average DPM emission rate by the following equation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{2{,}373\ lbs}{528\ days} \times \frac{453.6\ grams}{lb} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.0236\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.0236 grams per second (g/s). Subtracting the approximately 528-day construction duration from the total residential exposure duration of 30 years, we can reasonably assume that after Project construction, the MEIR would be exposed to the Project's operational DPM emissions for an additional 28.5 years.

The CalEEMod model's annual emissions indicate that operational activities will generate approximately 488 pounds of DPM per year over a 28.5-year operational period. Applying the same equation used to estimate the construction DPM emission rate, we estimated the following emission rate for Project operation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{488\ lbs}{365\ days} \times \frac{453.6\ grams}{lb} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00701\ g/s}$$

Using this equation, we estimated an operational emission rate of 0.00701 g/s. Construction and operational activity was simulated as a 1.74-acre rectangular area source in AERSCREEN, with dimensions of 87 meters by 81 meters. A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy duty vehicles, and an initial

vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. A urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generated maximum reasonable estimates of single hour DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10%. There are residences located approximately 76 meters away from the Project boundary. The single-hour concentration estimated by AERSCREEN for Project construction is approximately 49.40 $\mu g/m^3$ DPM at approximately 75 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 4.94 $\mu g/m^3$ for construction. For Project operation, the single-hour concentration in AERSCREEN is approximately 14.68 $\mu g/m^3$ DPM at approximately 75 meters downwind. Again, multiplying this single-hour concentration by 10%, we get an annualized average concentration of 1.47 $\mu g/m^3$ for operation.

We calculated the excess cancer risk for each sensitive receptor for infant receptors using applicable HRA methodologies prescribed by OEHHA. Consistent with the construction schedule proposed by the DSEIR, the annualized average concentration for construction was used for 1.45 years of the infantile stage of life (0-2 years). The annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the rest of the infantile stage of life (0-2 years), as well as the child (2 to 16 years) and adult stages of life (16 to 30 years). OEHHA recommends the use of Age Sensitivity Factors (ASFs) to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution. According to the revised guidance, quantified cancer risk should be multiplied by a factor of ten during the first two years of life (infant) and should be multiplied by a factor of three during the child stage of life (2 to 16 years). Furthermore, in accordance with guidance set forth by OEHHA, we used 95th percentile breathing rates for infants. We used a cancer potency factor of 1.1 $(mg/kg\text{-}day)^{-1}$ and an averaging time of 25,550 days. The results of our calculations are shown below.

The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)					
Activity	**Duration (years)**	**Concentration (ug/m^3)**	**Breathing Rate (L/kg-day)**	**ASF**	**Cancer Risk**
Construction	1.45	4.94	1090	10	1.2E-03
Operation	0.55	1.47	1090	10	1.3E-04
Infant Exposure Duration	***2.00***			***Infant Exposure***	***1.3E-03***
Operation	14.00	1.47	572	3	5.3E-04
Child Exposure Duration	***14.00***			***Child Exposure***	***5.3E-04***
Operation	14.00	1.47	261	1	8.1E-05
Adult Exposure Duration	***14.00***			***Adult Exposure***	***8.1E-05***
Lifetime Exposure Duration	**30.00**			**Lifetime Exposure**	**1.92E-03**

The excess cancer risk to adults, children, and infants at a sensitive receptor located 75 meters away, over the course of Project construction and operation are 81, 530, and 1,300 in one million, respectively. Furthermore, the excess cancer risk over the course of a residential lifetime (30 years) is approximately 1,922 in one million. Consistent with OEHHA guidance, exposure was assumed to begin in the infantile stage of life to provide the most conservative estimates of air quality hazards. The infantile, child, adult, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million.

It should be noted that our analysis represents a screening-level health risk assessment, which is known to be more conservative, and tends to err on the side of health protection. The purpose of a screening level health risk assessment, however, is to determine if a more refined health risk assessment needs to be conducted. If the results of a screening-level health risk are above applicable thresholds, then the Project needs to conduct a more refined health risk assessment that is more representative of site specific concentrations. Our screening-level health risk assessment demonstrates that construction and operation of the Project could result in a potentially significant health risk impact. As a result, a refined health risk assessment must be prepared to examine air quality impacts generated by Project construction and operation using site-specific meteorology and specific equipment usage schedules. An updated DSEIR must be prepared to adequately evaluate the Project's health risk impact, and should include additional mitigation measures to reduce these impacts to a less-than-significant level.

Response E28: Please refer to Response E14.

Comment E29: ***Additional Mitigation Measures Available to Reduce Construction Emissions***
Our updated air quality analysis and health risk assessment demonstrates that, when Project activities are modeled correctly, construction-related DPM and NOx emissions would result in significant air quality and health risk impacts. Therefore, additional mitigation measures must be identified and-incorporated in an updated DSEIR to reduce these emissions to a less than significant level. Additional mitigation measures can be found in CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures,* which attempt to reduce Greenhouse Gas (GHG) levels, as well as reduce Criteria Air Pollutants such as particulate matter and NOx. Diesel particulate matter ("DPM") and NOx are a byproduct of diesel fuel combustion, and are emitted by on-road vehicles and by off-road construction equipment. Mitigation for criteria pollutant emissions should include consideration of the following measures in an effort to reduce construction emissions.

Response E29: Please refer to Response E15.

Comment E30: ***Limit Construction Equipment Idling Beyond Regulation Requirements***
Heavy duty vehicles will idle during loading/unloading and during layovers or rest periods with the engine still on, which requires fuel use and results in emissions. The California Air Resources Board (CARB) Heavy-Duty Vehicle Idling Emissions Reduction Program limits idling of diesel-fueled commercial motor vehicles to five minutes. Reduction in idling time beyond the five minutes required under the regulation would further reduce fuel consumption and thus emissions. The Project applicant must develop an enforceable mechanism that monitors the idling time to ensure compliance with this mitigation measure.

Response E30: The Draft SEIR proposed mitigation for all identified impacts. The mitigation measures proposed would reduce all significant air quality impacts to a less than significant level, as is required by CEQA. As required by BAAQMD and implemented through standard permit conditions (see Section 4.3.3.3, Construction Impacts to Regional and Local Air Quality, in the Draft SEIR), construction equipment idling times shall be minimized by 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 California Code of Regulations [CCR]). This will be enforced through the MMRP.

Comment E31: ***Require Implementation of Diesel Control Measures***
The Northeast Diesel Collaborative (NEDC) is a regionally coordinated initiative to reduce diesel emissions, improve public health, and promote clean diesel technology. The NEDC recommends that contracts for all construction projects require the following diesel control measures:

- All diesel onroad vehicles on site for more than 10 total days must have either (1) engines that meet EPA 2007 onroad emissions standards or (2) emission control technology verified by EPA or the California Air Resources Board (CARB) to reduce PM emissions by a minimum of 85 percent.
- All diesel generators on site for more than 10 total days must be equipped with emission control technology verified by EPA or CARB to reduce PM emissions by a minimum of 85 percent.
- All diesel nonroad construction equipment on site for more than 10 total days must have either (1) engines meeting EPA Tier 4 nonroad emission standards or (2) emission control technology verified by EPA or CARB for use with nonroad engines to reduce PM emissions by a minimum of 85 percent for engines 50 horse power (hp) and greater and by a minimum of 20 percent for engines less than 50 hp.
- All diesel vehicles, construction equipment, and generators on site shall be fueled with ultra-low sulfur diesel fuel (ULSD) or a biodiesel blend approved by the original engine manufacturer with sulfur content of 15 parts per million (ppm) or less.

Response E31: The Draft SEIR proposed mitigation for all identified impacts. The mitigation measures proposed would reduce all significant air quality impacts to a less than significant level, as is required by CEQA. The mitigation measures recommended by SWAPE are from the NEDC, not BAAQMD. Mitigation Measure AQ AIR-1.2 would require that the project develop a plan demonstrating the necessary particulate matter reductions. One feasible plan to achieve this reduction would include, but is not limited to, all mobile diesel-powered off-road equipment larger than 25 horsepower and operating on site for more than two days meeting, at a minimum, U.S. EPA particulate matter emissions for Tier 4 engines or equivalent. Other measures such as the use of equipment that includes CARB-certified Level 3 Diesel Particulate Filters, added exhaust devices, alternatively-fueled equipment, or a combination of measures, provided that they are approved by the City and demonstrated to reduce community risk impacts to less than significant.

Comment E32: ***Repower or Replace Older Construction Equipment Engines***
The NEDC recognizes that availability of equipment that meets the EPA's newer standards is limited. Due to this limitation, the NEDC proposes actions that can be taken to reduce emissions from existing equipment in the *Best Practices for Clean Diesel Construction* report. These actions include but are not limited to:

- Repowering equipment (i.e. replacing older engines with newer, cleaner engines and leaving the body of the equipment intact).

Engine repower may be a cost-effective emissions reduction strategy when a vehicle or machine has a long useful life and the cost of the engine does not approach the cost of the entire vehicle or machine. Examples of good potential replacement candidates include marine vessels, locomotives, and large construction machines. Older diesel vehicles or machines can be repowered with newer

diesel engines or in some cases with engines that operate on alternative fuels (see section "Use Alternative Fuels for Construction Equipment" for details). The original engine is taken out of service and a new engine with reduced emission characteristics is installed. Significant emission reductions can be achieved, depending on the newer engine and the vehicle or machine's ability to accept a more modern engine and emission control system. It should be noted, however, that newer engines or higher tier engines are not necessarily cleaner engines, so it is important that the Project Applicant check the actual emission standard level of the current (existing) and new engines to ensure the repower product is reducing emissions for DPM.

- Replacement of older equipment with equipment meeting the latest emission standards.

Engine replacement can include substituting a cleaner highway engine for a nonroad engine. Diesel equipment may also be replaced with other technologies or fuels. Examples include hybrid switcher locomotives, electric cranes, LNG, CNG, LPG or propane yard tractors, forklifts or loaders.

Replacements using natural gas may require changes to fueling infrastructure. Replacements often require some re-engineering work due to differences in size and configuration. Typically, there are benefits in fuel efficiency, reliability, warranty, and maintenance costs.

Response E32: The project proposes the use of CNG forklifts and biodiesel-powered generators. Please refer to Response E31.

Comment E33: ***Install Retrofit Devices on Existing Construction Equipment***
PM emissions from alternatively-fueled construction equipment can be further reduced by installing retrofit devices on existing and/or new equipment. The most common retrofit technologies are retrofit devices for engine exhaust after-treatment. These devices are installed in the exhaust system to reduce emissions and should not impact engine or vehicle operation. Below is a table, prepared by the EPA, that summarizes the commonly used retrofit technologies and the typical cost and emission reductions associated with each technology. It should be noted that actual emissions reductions and costs will depend on specific manufacturers, technologies and applications.

Technology	Typical Emissions Reductions (percent)				Typical Costs ($)
	PM	NOx	HC	CO	
Diesel Oxidation Catalyst (DOC)	20-40	-	40-70	40-60	Material: $600-$4,000 Installation: 1-3 hours
Diesel Particulate Filter (DPF)	85-95	-	85-95	50-90	Material: $8,000-$50,000 Installation: 6-8 hours
Partial Diesel Particulate Filter (pDPF)	up to 60	-	40-75	10-60	Material: $4,000-$6,000 Installation: 6-8 hours
Selective Catalyst Reduction (SCR)	-	up to 75	-	-	$10,000-$20,000; Urea $0.80/gal
Closed Crankcase Ventilation (CCV)	varies	-	-	-	-
Exhaust Gas Recirculation (EGR)	-	25-40	-	-	-
Lean NOx Catalyst (LNC)	-	5-40	-	-	$6,500-$10,000

Response E33: Please refer to Response E31.

Comment E34: ***Use Electric and Hybrid Construction Equipment***
CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* report also proposes the use of electric and/or hybrid construction equipment as a way to mitigate DPM emissions. When construction equipment is powered by grid electricity rather than fossil fuel, direct emissions from fuel combustion are replaced with indirect emissions associated with the electricity used to power the equipment. Furthermore, when construction equipment is powered by hybrid-electric drives, emissions from fuel combustion are also greatly reduced. Electric construction equipment is available commercially from companies such as Peterson Pacific Corporation, which specialize in the mechanical processing equipment like grinders and shredders. Construction equipment powered by hybrid-electric drives is also commercially available from companies such as Caterpillar. For example, Caterpillar reports that during an 8-hour shift, its D7E hybrid dozer burns 19.5 percent fewer gallons of fuel than a conventional dozer while achieving a 10.3 percent increase in productivity. The D7E model burns 6.2 gallons per hour compared to a conventional dozer which burns 7.7 gallons per hour. Fuel usage and savings are dependent on the make and model of the construction equipment used. The Project Applicant should calculate project-specific savings and provide manufacturer specifications indicating fuel burned per hour.

Response E34: Please refer to Response E31.

Comment E35: ***Implement a Construction Vehicle Inventory Tracking System***
CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* report recommends that the Project Applicant provide a detailed plan that discusses a construction vehicle inventory tracking system to ensure compliances with construction mitigation measures. The system should include strategies such as requiring engine run time meters on equipment, documenting the serial number, horsepower, manufacture age, fuel, etc. of all onsite equipment and daily logging of the operating hours of the equipment. Specifically, for each onroad construction vehicle, nonroad construction equipment, or generator, the contractor should submit to the developer's representative a report prior to bringing said equipment on site that includes:

- Equipment type, equipment manufacturer, equipment serial number, engine manufacturer, engine model year, engine certification (Tier rating), horsepower, and engine serial number.
- The type of emission control technology installed, serial number, make, model, manufacturer, and EPA/CARB verification number/level.
- The Certification Statement48 signed and printed on the contractor's letterhead.

Furthermore, the contractor should submit to the developer's representative a monthly report that, for each onroad construction vehicle, nonroad construction equipment, or generator onsite, includes:

- Hour-meter readings on arrival on-site, the first and last day of every month, and on off-site date.
- Any problems with the equipment or emission controls.
- Certified copies of fuel deliveries for the time period that identify:
    - Source of supply
    - Quantity of fuel
    - Quality of fuel, including sulfur content (percent by weight).

Response E35: As required by CEQA (Guidelines Section 15097), a Mitigation Monitoring or Reporting Program (MMRP) will be adopted with the Draft SEIR. The MMRP will include the impacts of the project, mitigation for those impacts, the relative responsibilities of various City departments for various aspects of the monitoring and reporting, and general standards for determining project compliance with the mitigation measures or revision and related conditions of approval.

Comment E36: In addition to these measures, we also recommend that the Applicant implement the following mitigation measures, called "Enhanced Exhaust Control Practices," that are recommended by the Sacramento Metropolitan Air Quality Management District (SMAQMD):

1. The project representative shall submit to the lead agency a comprehensive inventory of all offroad construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the construction project.
    - The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment.
    - The project representative shall provide the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman.
    - This information shall be submitted at least 4 business days prior to the use of subject heavy-duty off-road equipment.
    - The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.

2. The project representative shall provide a plan for approval by the lead agency demonstrating that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet average 20% NOx reduction and 45% particulate reduction compared to the most recent California Air Resources Board (ARB) fleet average.

    - This plan shall be submitted in conjunction with the equipment inventory.
    - Acceptable options for reducing emissions may include use of late model engines, low emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.
    - The District's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction.

3. The project representative shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40% opacity for more than three minutes in any one hour.

    - Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. Non-compliant equipment will be documented and a summary provided to the lead agency monthly.
    - A visual survey of all in-operation equipment shall be made at least weekly.

- A monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey.

4. The District and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this mitigation shall supersede other District, state or federal rules or regulations.

These measures are more stringent and prescriptive than those measures identified in the DSEIR. When combined, the measures that we recommend in these comments offer a cost-effective, feasible way to incorporate lower-emitting equipment into the Project's construction fleet, which subsequently reduces NOx, PM and DPM emissions released during Project construction. An updated DSEIR must be prepared to include additional mitigation measures, as well as include an updated air quality assessment to ensure that the necessary mitigation measures are implemented to reduce construction emissions. Furthermore, the Project Applicant needs to demonstrate commitment to the implementation of these measures prior to Project approval to ensure that the Project's construction-related emissions are reduced to the maximum extent possible.

> **Response E36:** The Draft SEIR proposed mitigation for all identified impacts. The mitigation measures proposed would reduce all significant air quality impacts to a less than significant level, as is required by CEQA. The mitigation measures recommended by SWAPE are from the Sacramento Metropolitan Air Quality Management District, not BAAQMD.

Comment E37: Greenhouse Gas
Failure to Adequately Assess the Project's Greenhouse Gas Impacts

The DSEIR concludes that the Project's greenhouse gas (GHG) impacts would be less than significant, yet fails to provide proper justification to support this claim. As a result, the Project's GHG impacts are inadequately addressed. Until an updated analysis is conducted that correctly and thoroughly assesses the Project's GHG impacts, the conclusions made within the DSEIR and associated appendices should not be relied upon to determine Project significance.

The DSEIR fails to prepare an updated analysis to determine the GHG impact that Project construction and operation may have. Rather, the DSEIR relies upon the GHG analysis prepared within the Initial Study, which is included as Appendix A of the DSEIR, to determine Project significance. Appendix A concludes that the Project's GHG impact resulting from Project construction and operation would be less than significant, yet fails to compare the Project's GHG emissions to applicable thresholds. Appendix A attempts to justify how this significance determination was made, stating,

"The proposed mixed-use development would result in temporary increases in GHG emissions associated with construction activities including operation of construction equipment and emissions from construction workers' personal vehicles traveling to and from the project site. Construction related GHG emissions vary depending on the level of activity, length of the construction period, specific construction operations, types of equipment, and number of personnel. Because construction

would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32… Since the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy. Projects that are consistent with the GHG Reduction Strategy (such as the proposed project) would have a less than significant impact related to GHG emissions" (Appendix A, p. 59).

As you can see in the excerpt above, the DSEIR concludes that "because construction would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32" (Appendix A, p. 59). Similarly, Appendix A concludes that Project operation "would have a less than significant impact related to GHG emissions" because "the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy" and "projects that are consistent with the GHG Reduction Strategy would have a less than significant impact related to GHG emissions" (Appendix A, p. 59). This conclusion, as well as the justification provided in Appendix A of the DSEIR, however, are incorrect and inadequate for several reasons.

First, while the DSEIR states that the Project is consistent with the City's GHG Reduction Strategy and General Plan, the DSEIR fails to demonstrate compliance with all of the applicable Voluntary and Mandatory Criteria disclosed in the GHG Reduction Strategy. According to the City of San Jose, "Applicants can complete the 'Evaluation of Project Compliance with the City of San Jose Greenhouse Gas Reduction Strategy' worksheet to demonstrate conformance to the Greenhouse Gas Reduction Strategy". While the Appendix A of the DSEIR demonstrates compliance with three of the applicable Mandatory Criteria included in the Evaluation of Project Compliance document, it fails to demonstrate compliance with the fourth Mandatory applicable criterion, and fails to demonstrate compliance with any of the Voluntary measures. As stated in the DSEIR, "compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy" (Appendix A, p. 59). Therefore, by not fully implementing all applicable Voluntary and Mandatory Criteria set forth in the GHG Reduction Strategy, the DSEIR cannot claim that it is consistent with the City's GHG Reduction Strategy, and thus, cannot claim that the Project would have a less than significant GHG impact.

Second, while a lead agency enjoys substantial discretion in its choice of methodology to determine Project significance, when the agency chooses to rely completely on a single method to justify a no significance finding, CEQA demands the agency research and document the parameters essential to that method. According to Section 15064.4(b) of the CEQA Guidelines, a lead agency may consider the use of a qualitative analysis that relies upon consistency with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions when assessing the significance of impacts from greenhouse gas emissions on the environment; however, such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. The DSEIR fails to provide substantial evidence to support the use of compliance with the City of San Jose's General Plan and GHG Reduction Strategy to determine Project significance, and as a result, the validity of

this method is called into question. The BAAQMD's recommended GHG significance thresholds (as discussed below), on the other hand, have undergone a public review process as part of stakeholder working group meetings that are open to the public, and the BAAQMD's Guidance document provides the substantial evidence relative to the methodology for developing the interim GHG significance thresholds, consistent with requirements set forth by CEQA. Therefore, reliance on the BAAQMD's quantitative thresholds, rather than the methods used in the DSEIR, should be considered, as the DSEIR's current method of evaluating the Project's GHG impact is flawed.

Finally, the use of the DSEIR's method as a significance threshold has not been established by any public or regulatory agency, so there is no way of determining whether compliance with this very limited list of regulations would allow the Project to remain consistent with the statewide goals set forth by AB 32. It's not enough to simply state that since the Project's emissions would be less than significant because it complies with these regulations. Rather, a thorough analysis where the lead agency researches and documents the parameters essential to that method must be conducted to determine the adequacy of this threshold, and it must be demonstrated by substantial evidence that compliance with this method would indeed result in a less than significant GHG impact and would not conflict with applicable regulations, plans, and policies set to reduce GHG emissions. By failing to provide substantial evidence to support the use of the DSEIR's threshold, the Project's GHG impact is inadequately addressed.

Response E37: Please refer to Response E16.

Comment E38: ***Updated Analysis Demonstrates Significant Greenhouse Gas Impact***
In an effort to determine whether or not compliance with the City's GHG Reduction Strategy and General Plan would result in a less than significant impact, we conducted a simple analysis using the emission estimates provided in the DSEIR and the BAAQMD's Air Quality Guidelines. As stated in the City's GHG Reduction Strategy, the BAAQMD Air Quality Guidelines are intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects (Project-level) and plans (Planlevel) in the San Francisco Bay Area. The Guidelines include information on legal requirements, BAAQMD rules, plans and procedures, methods of analyzing air quality impacts, thresholds of significance, mitigation measures, and background air quality information. In June 2010, the Air District's Board of Directors set forth new CEQA thresholds of significance and updated their CEQA Guidelines.

According to the BAAQMD's updated Guidelines, it is recommended that the proposed Project quantify the Project's indirect and direct GHG emissions, and compare these emissions to the BAAQMD's screening threshold of 1,100 metric tons per year of carbon dioxide equivalents (MT CO_2e/year). If a Project would generate GHG emissions greater than 1,100 MT CO_2e/year, it would make a cumulatively considerable contribution to greenhouse gas emissions and result in a cumulatively significant impact to global climate change. Consistent with BAAQMD Guidelines, in order to adequately determine the Project's GHG impact, we quantified the Project's construction and operational GHG emissions and compared the emissions to the BAAQMD recommended thresholds of 1,100 MT CO_2e/year. When the Project's GHG emissions are quantified and compared to these thresholds, we find that the Project could have a potentially significant impact on global climate change (see table below).

Estimated Annual Greenhouse Gas Emissions	
Emission Source	**Proposed Project (MT CO_2E)**
Construction (Amortized)	162
On-Road Mobile	3,772
Area	44
Electricity	1,243
Natural Gas	277
Water and Wastewater	182
Solid Waste	174
Total	**5,855**
BAAQMD Significance Threshold	**1,100**
Exceed?	***Yes***

The Project's total GHG emissions were estimated using CalEEMod, where construction emissions were amortized over 30 years then added to the Project's operational emissions. When correct input parameters are used, the Project's total GHG emissions clearly exceed the BAAQMD threshold of 1,100 MT CO_2e/year, thus resulting in a significant impact not previously assessed or identified in the DSEIR. As a result, an updated DSEIR should be prepared that includes an updated CalEEMod model with a more accurate assessment of the Project's construction-related criteria air pollutants and total GHG emissions, and additional mitigation should be identified to reduce the Project's air quality and GHG impacts to a less-than-significant level.

Response E38: Please refer to Response E17.

Comment E39: ***Additional Mitigation Measures Available to Reduce Greenhouse Gas Emissions***
We identified several additional mitigation measures that the DSEIR failed to incorporate, which would further reduce the Project's operational GHG emissions. It should be noted that some of these mitigation measures would also reduce the Project's operational DPM emissions, which we found to be significant, as discussed in the sections above. Therefore, these measures should also be considered when mitigating the Project's operational DPM emissions. Additional mitigation measures that could be implemented to reduce GHG emissions include, but are not limited to, the following:

- Use passive solar design, such as:
  - Orient buildings and incorporate landscaping to maximize passive solar; heating during cool seasons, and minimize solar heat gain during hot seasons; and
  - Enhance natural ventilation by taking advantage of prevailing winds.
- Reduce unnecessary outdoor lighting by utilizing design features such as limiting the hours of operation of outdoor lighting.
- Develop and follow a "green streets guide" that requires:
  - Use of minimal amounts of concrete and asphalt;
  - Installation of permeable pavement to allow for storm water infiltration; and
  - Use of groundcovers rather than pavement to reduce heat reflection.
- Implement Project design features such as:
  - Shade HVAC equipment from direct sunlight;
  - Install high-albedo white thermoplastic polyolefin roof membrane;
  - Install high-efficiency HVAC with hot-gas reheat;

    - Install formaldehyde-free insulation; and
    - Use recycled-content gypsum board.
- Provide education on energy efficiency to residents, customers, and/or tenants. Provide information on energy management services for large energy users.
- Meet "reach" goals for building energy efficiency and renewable energy use.
- Install solar, wind, and geothermal power systems and solar hot water heaters.
- Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on all building roofs and/or on the Project site to generate solar energy for the facility.
- Include energy storage where appropriate to optimize renewable energy generation systems and avoid peak energy use.
- Plant low-VOC emitting shade trees, e.g., in parking lots to reduce evaporative emissions from parked vehicles.
- Use CARB-certified or electric landscaping equipment in project and tenant operations; and introduce electric lawn, and garden equipment exchange program.
- Install an infiltration ditch to provide an opportunity for 100% of the storm water to infiltrate on-site.

Response E39: As discussed in Response E17, the proposed project would have less than significant GHG emissions impacts. As such, there is no nexus to require mitigation to further reduce GHG emissions. The City may, at its discretion, condition the project to include additional measures, but it is not a requirement under CEQA.

Comment E40: In addition to the measures discussed above, the SCAQMD has previously recommended additional mitigation measures for operational NOx emissions that result primarily from truck activity emissions for industrial and commercial projects. Since the Project includes the development of 20,000 square feet of ground floor retail, these measures would also effectively reduce the operational GHG emissions generated by the proposed commercial uses. Measures recommended for the Waterman Logistic Center that are also applicable for this Project's commercial land uses include:

- Provide electric vehicle charging stations that are accessible for trucks.
- Provide electrical hookups at the onsite loading docks and at the truck stops for truckers to plug in any onboard auxiliary equipment
- Require the proposed warehouse to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in.
- Provide minimum buffer zone of 300 meters (approximately 1,000 feet) between truck traffic and sensitive receptors.
- Limit the daily number of trucks allowed at the facility to levels analyzed in the DSEIR and associated appendices. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the project through CEQA prior to allowing this higher activity level.
- Design the site such that any check-in point for trucks is well inside the facility to ensure that there are no trucks queuing outside of the facility.
- On-site equipment should be alternative fueled.

- Provide food options, fueling, truck repair and or convenience stores on-site to minimize the need for trucks to travel through residential neighborhoods.
- Improve traffic flow by signal synchronization.
- Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.
- Should the proposed Project generate significant emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in emissions, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Final CEQA document, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce project impacts.

  Response E40: This comment is acknowledged. Please note that the project is located within the BAAQMD air basin and not the SCAQMD air basin.

Comment E41: When combined, these measures offer a cost-effective, feasible way to incorporate lower-emitting design features into the proposed Project, which subsequently, reduces GHG emissions released during Project operation. An updated DSEIR must be prepared to include additional mitigation measures, as well as include an updated greenhouse gas analysis to ensure that the necessary mitigation measures are implemented to reduce operational emissions. Furthermore, the Project Applicant needs to demonstrate commitment to the implementation of these measures prior to Project approval, to ensure that the Project's operational emissions are reduced to the maximum extent possible.

Response E41: As discussed in Response E17, using the commenter's data, the project is shown to have a less than significant GHG emissions impact. As a result, no mitigation measures are required or proposed and no update to the DSEIR is required.

F. RESPONSE TO COMMENTS FROM SANTA CLARA VALLEY AUDUBON SOCIETY, February 24, 2017:

Comment F1: The Santa Clara Valley Audubon Society (SCVAS) appreciates the opportunity to submit the following comments on the Draft Supplemental Environmental Impact Report (SEIR) for the proposed Greyhound Residential Project in San Jose. SCVAS was founded in 1926 and is one of the largest Audubon chapters in California with over 3,000 members in Santa Clara County. Our members share a passion for the protection of birds and their habitats, and are especially concerned with the increasing risks to resident and migratory birds in our region.

Impacts of Bird Collision are potentially significant and should be evaluated and mitigated

As demonstrated by architectural renderings, the proposed Project incorporates a large amount of glass material into the design of the building. For this reason, we are concerned with the potential for birds to collide with the glass façade. The SEIR prepared for this project does not provide discussion, evaluation or mitigation of potential bird collision.

Recent studies estimate that between 365 and 988 million birds are killed annually from colliding with buildings in the United States, leading to local, regional, and national declines in bird populations (Loss et al., see attached). Project related bird collisions might contribute directly and cumulatively to population decline of migratory and resident bird populations. This potential should be discussed and mitigated in the SEIR.

Mitigation measures may include a reduction in the amount of glass material used in the buildings design, avoidance of materials that reflect the sky and surrounding vegetation, and incorporation of visual cues to alert birds of the structure. Additional mitigations may be achieved by following San Jose's Bird-Friendly Building design guidelines (see attached).

We thank you for your time and consideration. Please do not hesitate to call on us if we can be of help.

> **Response F1:** While bird strikes are a known issue in areas of Santa Clara County, the project site is located in a dense urban area away from riparian habitat. The site is located approximately 0.25 miles east of the Guadalupe River, but is separated from the river by an elevated freeway and multiple buildings exceeding 60 feet in height. The project site is also surrounded by tall buildings to the north, east, and south and there is minimal bird habitat in the immediate project area.
>
> The greatest risk of avian collisions with buildings occurs in the area within 60 feet of the ground, particularly in areas adjacent to vegetation, riparian areas, or water bodies. Although the project is not located in an area prone to bird collisions, the proposed structure would have glass panes with varying colors, metal panels, and variation in the articulation of the facades. In addition, the building would have vertical and horizontal elements that break up the glazing. All these elements combined would reduce the likelihood of bird strikes on the building.

SECTION 4.0 REVISIONS TO THE TEXT OF THE DRAFT SEIR

The following section contains revisions/additions to the text of the *Supplemental Draft Environmental Impact Report, Greyhound Residential Project,* dated December 2016. Revised or new language is underlined. All deletions are shown ~~with a line through the text.~~

4.1 REVISIONS TO DRAFT SEIR

Page 5 The sixth paragraph is **REVISED** as follows:

The proposed building would have no setback from the sidewalks along the street frontages. A five-foot-wide setback would be located along the southern boundary of the project site (between the building and the existing commercial structures along W. San Fernando Street) ~~to allow for pedestrian access through the site~~. In addition, new 12-foot sidewalks would be installed along the project frontages on Post and San Pedro Streets.

4.2 REVISIONS TO APPENDIX A, INITIAL STUDY, OF THE DRAFT SEIR

Page 7 The fifth paragraph is **REVISED** as follows:

The proposed building would have no setback from the sidewalks along the street frontages. A five-foot-wide setback would be located along the southern boundary of the project site (between the building and the existing commercial structures along W. San Fernando Street) ~~to allow for pedestrian access through the site~~. In addition, new 12-foot sidewalks would be installed along the project frontages on Post and San Pedro Streets.

Page 34 The following language is **ADDED** after mitigation measure MM AIR-1.2:

In addition to the mitigation measures listed above, the project would be required to comply with the following condition of project approval:

- The project will acquire electrical power to the site from PG&E so that portable diesel engines that operate more than 20 hours shall be prohibited.

Page 34 The third and fourth paragraphs under Mitigation and Avoidance Measures is **REVISED** as follows:

These Standard Permit Conditions, conditions of project approval, and the mitigation measures are intended to establish a process that minimizes fugitive dust and exhaust emissions that protect the health and safety of nearby sensitive receptors such that temporary construction emissions would not exceed the BAAQMD significance thresholds for community risk and hazard impacts.

With implementation of the identified Standard Permit Conditions, conditions of project approval, and Mitigation Measures, the residential child cancer risk during construction would be reduced to 6.0 cases per million which is below the 10 per one million cases threshold. The annual $PM_{2.5}$ concentration would be reduced to 0.14 $\mu g/m^3$, which is less than BAAQMD's single- source significance threshold of 0.3 $\mu g/m^3$**.** Therefore, the proposed project would result in a less than significant community risk impact due to construction activities. **[New Impact (New Less Than Significant Impact With Mitigation)]**

Page 122 Table 4.16-2 is **REVISED** as follows:

Table 4.16-2: Project Trip Generation Estimates

Land Use	Daily	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	~~4,710~~ 4,686	~~165~~ 164	~~306~~ 305	~~471~~ 469	~~306~~ 305	~~165~~ 164	~~471~~ 469
Internalization Reduction	---	-1	-3	-4	-6	-5	-11
Transit Reduction	~~-425~~ -422	-15	-27	-42	~~-28~~ -27	~~-14~~ -15	-42
Retail	800	17	7	24	36	36	72
Internalization Reduction	-120	-3	-1	-4	-5	-6	-11
Pass-by Trips	---	---	---	---	-8	-8	-16
Net Project Trips	**~~4,966~~** **4,944**	**~~163~~** **162**	**~~282~~** **281**	**~~445~~** **443**	**295**	**~~168~~** **166**	**~~463~~** **461**

Page 124 The first two paragraphs of Section 4.16.2.3, Site Access, are **REVISED** as follows:

The project proposes ~~two~~ one full-access driveway~~s~~ on Almaden Avenue and one full-access driveway (in addition to two loading/truck driveways) along S. San Pedro Street. Access to the parking garage would be gated at the proposed driveways. Based on the site plan provided, the proposed driveway~~s~~ along Almaden Avenue would be approximately 26 feet wide and the driveway on S, San Pedro Street appear to be approximately ~~26~~ 24 feet in width. ~~This meets~~ The driveway on S. San Pedro Street does not meet the City of San Jose Municipal Code standard as proposed, but would be required to meet the standard as a condition of project approval. There are existing driveways along S. San Pedro Street across from the proposed project driveways.

The proposed residential component of the project is projected to generate approximately ~~149~~ 148 inbound and ~~276~~ 275 outbound trips during the AM peak hour and 272 inbound and ~~146~~ 144 outbound trips during the PM peak hour. Assuming these trips would use the two garage entrances equally, a maximum of 136

trips would access each of the project driveways during the PM peak hour (only about ~~75~~ 74 trips during the AM peak hour), representing two to three vehicles per minute at each project driveway. An automated entrance gate should have the ability to serve ~~three~~ two vehicles per minute. Therefore, it is not anticipated that vehicle queues at the project garage entrances would hinder access, in particular since traffic volumes along this segment of San Pedro Street and Almaden Avenue are relatively low.

Page 123 The first three paragraphs of Section 4.16.2.2 are **REVISED** as follows:

The addition of project traffic would not result in left-turn queues in excess of existing lane storage capacity at ~~five~~ of the seven intersections. ~~The San Pedro Street/Santa Clara Street westbound left-turn queues would exceed the existing turn lane capacity under existing plus project and background plus project conditions by one car (25 feet) in both the AM and PM Peak Hour. It is not feasible to extend the left-turn pocket because the lane backs up to the left-turn lane at Market Street/Santa Clara Street.~~

At the Almaden Avenue/San Fernando Street intersection, both the southbound and westbound left-turn queues would exceed the existing turn lane capacity under multiple scenarios. In the southbound direction, the queue is exceeded under existing and background conditions[4] in both the AM and PM Peak Hours. The project would add ~~two~~ five cars in the AM ~~Peak Hour~~ and three cars in the PM Peak Hour under ~~both~~ existing plus project ~~and background plus project~~ conditions. Under background plus project conditions, the project would add four cars in the AM Peak Hour and five cars in the PM Peak Hour.

In the westbound direction, the queue is exceeded under existing and background conditions in the PM Peak Hour. The project would result in queues that exceed the lane capacity in both the AM and PM Peak Hours under existing plus project and background plus project conditions. Under existing plus project conditions, three cars would be added in the AM Peak Hour and ~~two~~ 11 cars would be added in the PM Peak Hour. Under background plus project conditions, ~~four~~ three cars would be added in the AM Peak Hour and ~~two~~ 12 cars would be added in the PM Peak Hour.

Page 125 The second paragraph of Section 4.16.2.3, Site Circulation, is **REVISED** as follows:

On-site vehicle circulation was reviewed for the project in accordance with generally accepted traffic engineering standards. As proposed, vehicles would enter the parking area via one of two project driveways from S. San Pedro Street and Almaden Avenue. These driveways ~~appear to~~ would provide access to separate parking areas: the ~~northern driveway (driver closer to the San Pedro Street/Post Street intersection)~~ San Pedro Street driveway would provide access to the above ground-level parking while the ~~southern~~ Almaden Avenue driveway would provide access to the below

[4] Background conditions are existing conditions plus trip volumes from approved but not yet constructed development projects.

ground-level parking. Circulation through the garages appears to be efficient with two-way rectangular circulation aisles within at least the first level of parking.

Page 127 The following statement is **ADDED** after the section title:

The following discussion is based on a Water Supply Assessment prepared by the *San Jose Water Company* in December 2016. This study is included in Appendix H.

Page 127 Section 4.17.1.1 will be **REVISED** as follows:

Water service to the site is supplied by the San José Water Company. Based on usage data from 2013, the project site has a water demand of 11,750 gallons per day (gpd). ~~Due to the limited use of the project site, for the purposes of this analysis, it is assumed that there is no water usage currently on-site~~.

Page 129 The first two paragraphs of Section 4.17.2.1 will be **REVISED** as follows:

The proposed project would demolish the existing bus station and commercial building. The proposed development would use approximately ~~52,394 gpd of water.~~[5] 305,650 gpd of water.

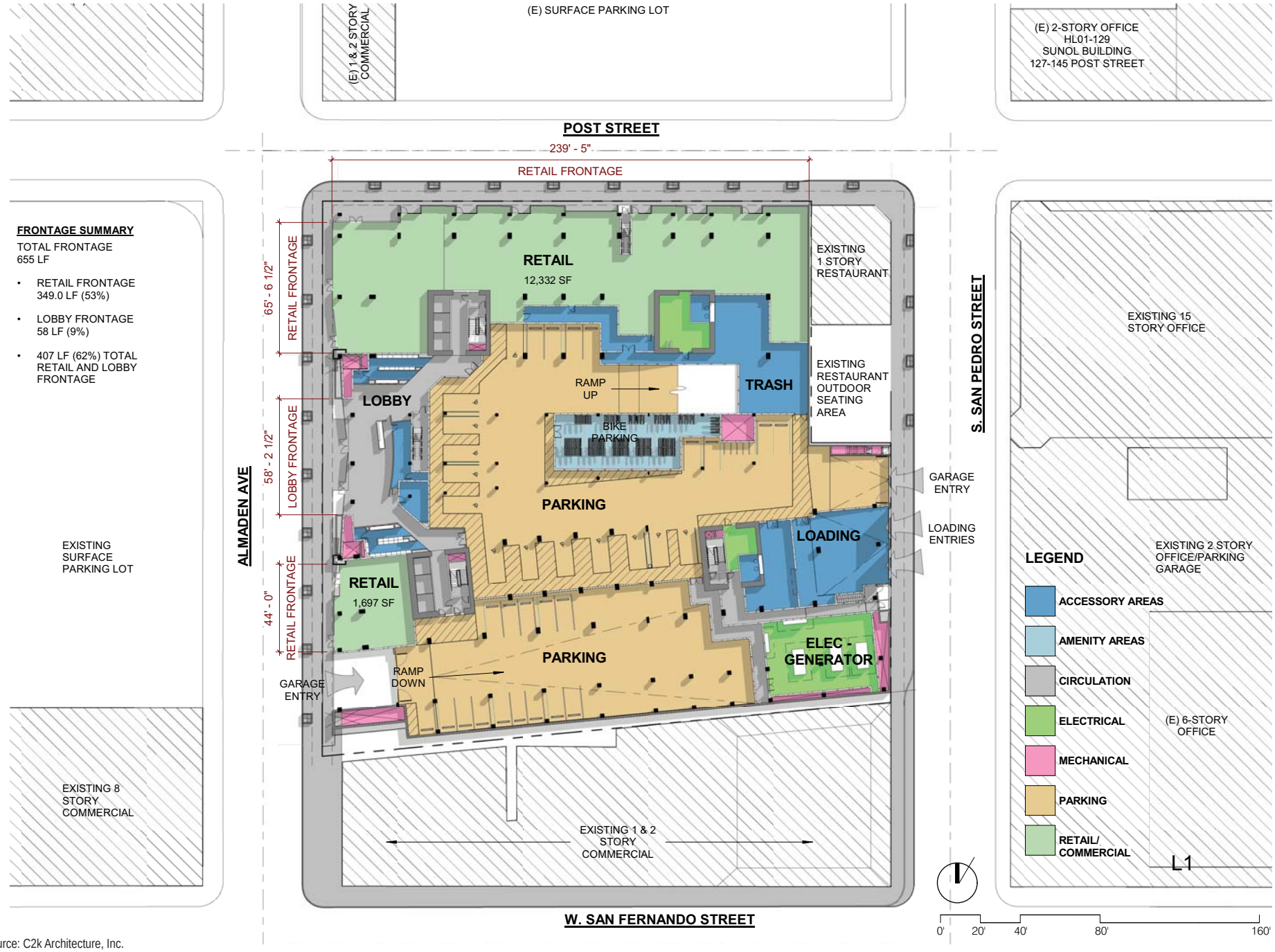
The General Plan FEIR determined that the three water suppliers for the City Water demand could exceed water supply with implementation of the General Plan during dry and multiple dry years after 2025. The General Plan policies, existing regulations, adopted plans and other City policies would continue to require water conservation measures be incorporated in new development which would substantially reduce water demand. The General Plan FEIR concluded that with implementation of General Plan policies and regulations, full build out under the General Plan would not exceed the available water supply under standard conditions and drought conditions. The Water Supply Assessment also concluded that the increase in water demand on the project site is within the normal growth projections for the San Jose Water Company system.

Appendix G Appendix G has been **REVISED** and is attached to this report.

Appendix H The Water Supply Assessment has been included in the Draft SEIR as Appendix H and is attached to this report.

Appendix I The November 2016 Quarterly Groundwater Monitoring and Remedial Progress Report, Pacific Bell Telephone Company Facility has been included in the Draft SEIR as Appendix I and is attached to this report.

[5] ~~The project annual water usage was estimated by the project architect to be 19,123,920 gallons per year.~~



Source: C2k Architecture, Inc.

CONCEPTUAL SITE PLAN

FIGURE 2.2-1 REV

HEXAGON TRANSPORTATION CONSULTANTS, INC.

Memorandum

To: Joseph Dyke, City of San Jose

From: Robert Del Rio, T.E.

Date: April 27, 2017

Subject: Greyhound Site Residential Development Traffic Operations Analysis

Introduction

Hexagon Transportation Consultants, Inc. has completed a traffic operations study for the proposed residential development on the Greyhound site in Downtown San Jose. The project as proposed would consist of two towers providing up to 781 residential units with up to 20,000 square feet (s.f.) of ground floor retail. The site was formerly occupied by the Greyhound Bus Station. The site is located along the south side of Post Street, between South Almaden Avenue and South San Pedro Street. Figure 1 shows the project site location. Parking for the proposed project would be provided within a five-level parking garage that includes three below-grade parking levels and a total of 610 parking spaces. The project will be accessed via one full-access residential driveway on Almaden Avenue, one full-access residential driveway on S. San Pedro Street and one driveway serving two loading docks on S. San Pedro Street.

Since the project site is located in the Downtown Core area boundary, it is covered under the San Jose Downtown Strategy 2000 Environmental Impact Report (EIR). Accordingly, City staff has already concluded that the project is in conformance with the City of San Jose Transportation Level of Service Policy (Council Policy 5-3) and will not require preparation of a comprehensive Transportation Impact Analysis (TIA). The Public Works department has indicated, however, that a traffic operations study is required to identify potential operational issues that could occur as a result of the proposed project. This traffic study is intended to satisfy the City's request.

Scope of Study

The purpose of the traffic operations study was to identify any potential operational issues that could occur as a result of the project. Based on the proposed project size, site-generated traffic was estimated. Vehicular site access was evaluated based on the project's proposed driveway locations. Truck access, including trash pickup and loading activities, were evaluated. Parking and on-site vehicular circulation also was analyzed.

Existing Conditions

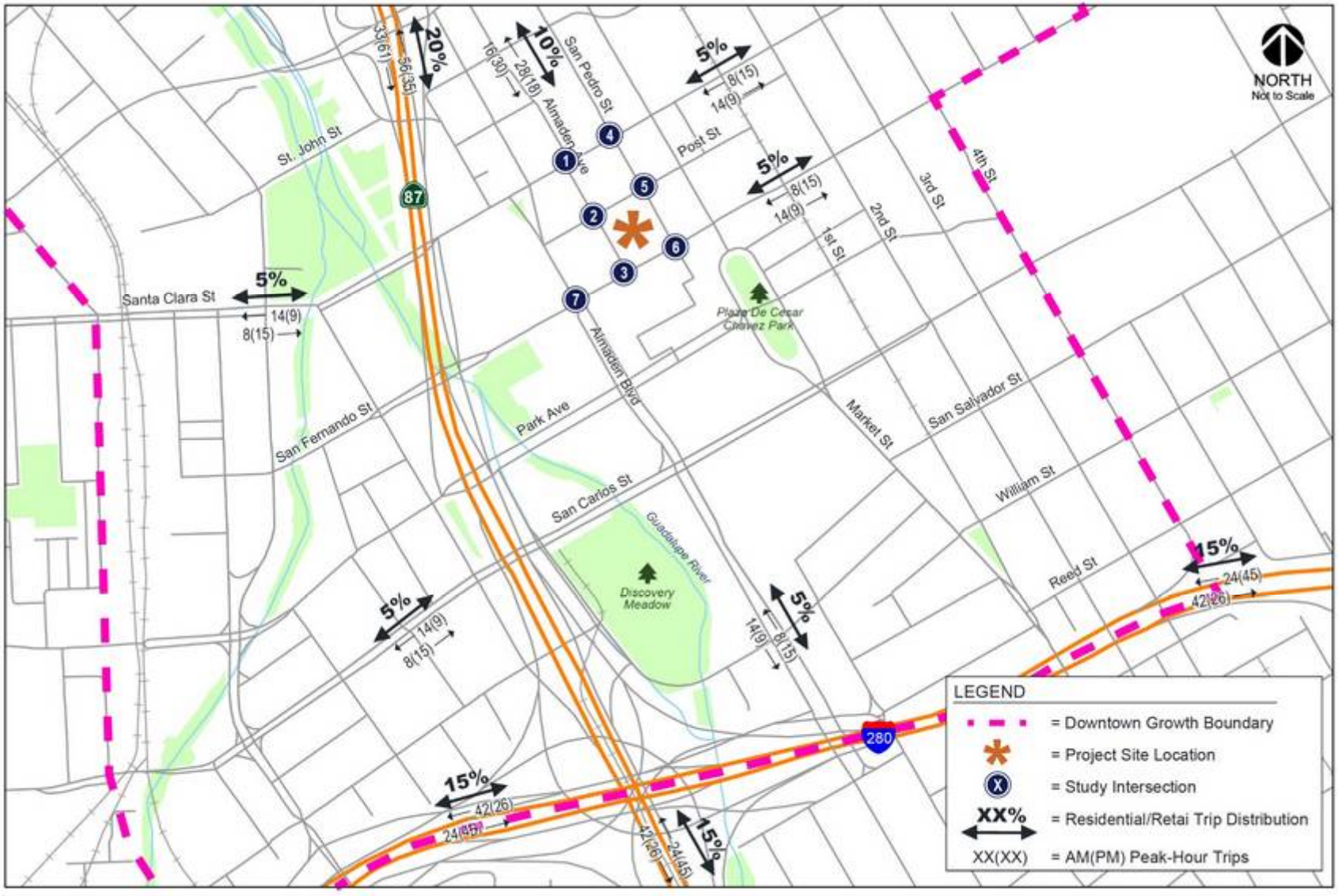
This section describes the existing conditions for all of the major transportation facilities in the vicinity of the site, including the roadway network, transit service, and bicycle and pedestrian facilities.

Existing Roadway Network

Regional access to the project site is provided by SR 87 and I-280. Local site access is provided by Almaden Boulevard, Santa Clara Street, San Fernando Street, Almaden Avenue, San Pedro Street, and Post Street. The local and regional roadways are described below.

SR 87 is primarily a six-lane freeway (four mixed-flow lanes and two HOV lanes) that is aligned in a north-south orientation within the project vicinity. SR 87 begins at its interchange with SR 85 and extends northward, terminating at its junction with US 101. SR 87 provides access to US 101 and I-280/I-680. Access to the site to

Figure 1
Site Location, Study Intersections and Project Trip Distributions, and Project Trip Assignments



and from SR 87 is provided via interchanges at Julian Street/St. James Street, Santa Clara Street, Woz Way, and Auzerais Avenue/Delmas Avenue.

Interstate-280 is an eight-lane freeway in the vicinity of the site. It extends northwest to San Francisco and east to King Road in San Jose, at which point it makes a transition into I-680 to Sacramento. Access to and from the site is provided via its ramps at 1st Street, 7th Street, and Almaden Boulevard/Vine Street, and via SR 87.

Almaden Boulevard is a north-south four-lane street that extends between St. John Street and Grant Street, just south of I-280. Almaden Boulevard provides access to and from the project site via Post Street and San Fernando Street.

Santa Clara Street is an east-west four-lane street located north of the project site. Santa Clara Street provides access to and from the project site via San Pedro Street and Almaden Avenue.

San Fernando Street is generally an east-west two-lane street that extends intermittently as East San Fernando Street from 1st Street to King Road in East San Jose and as West San Fernando Street from 1st Street to Race Street. Class II bike lanes are provided along both sides of San Fernando Street, between 11th Street and Montgomery Street (Diridon Station). San Fernando Street provides access to the project site via Almaden Avenue and Post Street.

Almaden Avenue is a north-south street that extends between San Fernando Street and St. James Street along the project site's western frontage. South of the project site, Almaden Avenue continues from Viola Avenue (just south of the San Jose Convention Center) southward to Alma Avenue, where it transitions into Almaden Expressway. Almaden Avenue is a two-lane street with on-street metered parking along both sides of the street and 25 mph speed limit between San Fernando Street and Santa Clara Street. Near the project frontage, there are loading zones provided along the east side of the street for the former Greyhound Bus Station and along the east side of the street near San Fernando Street. Access to the parking garage of a commercial building along the west side of Almaden Avenue is provided north of Post Street. The street width along the project frontage is approximately 50 feet. However, the street narrows to 40 feet near its intersection with San Fernando Street and 40 feet between Post Street and Santa Clara Street. Almaden Avenue is proposed to provide direct access to the project site via one full access driveway, based on the provided site plan.

San Pedro Street is a north-south street that extends intermittently as North San Pedro Street between Basset Street and Santa Clara Street, and as South San Pedro Street between Santa Clara Street and San Fernando Street. San Pedro Street is a two-lane street with on-street metered parking along the west side of the street and 25 mph speed limit. San Pedro Street is generally 40 feet wide. However, the street narrows to approximately 35 feet near its intersections with San Fernando Street and Santa Clara Street. Along the project frontage, the east side of San Pedro Street includes landscape islands adjacent to loading zones and an entrance and exit as well as truck dock for the Market Post Tower building. The landscape islands narrow the street width to approximately 30 feet. North of Post Street, San Pedro Street provides access to two commercial buildings via several garage entrances/exist and truck docks. San Pedro Street runs along the project's eastern site boundary and is proposed to provide direct access to the project site via one full access driveway and two truck docks served by a single driveway..

Post Street is an east-west two-lane street that extends between Almaden Boulevard and 1st Street. Post Street runs along the project's northern boundary, providing access to and from the site via Almaden Avenue and San Pedro Street.

Existing Bicycle and Pedestrian Facilities

Pedestrian facilities in the study area consist mostly of sidewalks along all of the surrounding streets including the project frontages along Post Street, S. Almaden Avenue and S. San Pedro Street. Overall, the existing sidewalks have good connectivity and provide pedestrians with safe routes to the surrounding land uses in the area. Crosswalks and pedestrian signal heads are located at all signalized intersections within the project area, including the intersections of Almaden Avenue and San Pedro Street with Santa Clara Street. Crosswalks are provided along all four legs of the unsignalized intersections of S. San Pedro Street with Post Street and W. San Fernando Street. There is no crosswalk provided on the east approach of the S.

Almaden Avenue and W. San Fernando Street intersection. There also are no crosswalks provided at the S. Almaden Avenue and Post Street intersection.

Class II bicycle facilities (striped bike lanes) are not provided along the roadways fronting the project site (Post Street, S. Almaden Street, and S. San Pedro Street). However, there are Class II bicycle facilities provided along both sides of San Fernando Street, between 11th Street and Montgomery Street. East of 11th Street, San Fernando Street is a designated Class III bike path and provides "sharrow" or shared-lane pavement markings from 11th to 17th Streets. Other bike lanes along roadways within the larger study area include the following:

- Woz Way, between San Carlos Street and Almaden Avenue
- Park Avenue, between Woz Way and Market Street, and west of Montgomery Street
- Almaden Boulevard, between Woz Way and Santa Clara Street
- Santa Clara Street, west of Almaden Boulevard
- 2nd Street, between San Salvador Street and Keyes Street
- 3rd Street, between Jackson Street and Humboldt Street
- 4th Street, between Jackson Street and I-280

The Guadalupe River multi-use trail system runs through the City of San Jose along the Guadalupe River and is shared between pedestrians and bicyclists and separated from motor vehicle traffic. The Guadalupe River trail is an 11-mile continuous Class I bikeway that extends from Curtner Avenue in the south to Alviso in the north. This trail system can be accessed via W. San Fernando Street approximately ¼ mile west of the project site.

The City of San Jose has developed a public Bike Share system that allows users to rent and return bicycles at various popular locations. Bike Share and Zip Car locations are provided throughout the Downtown area. The nearest bike share and Zip car locations are within walking distance, at the intersections of Almaden Boulevard and Almaden Avenue with Santa Clara Street. Figure 2 shows the existing bicycle facilities and Zip car locations.

Existing Transit Services

Existing transit services to the study area are provided by the Santa Clara Valley Transportation Authority (VTA), Caltrain, Altamont Commuter Express (ACE), and Amtrak. The transit stations and local VTA bus lines near the project site are shown on Figure 3.

Bus Service

The downtown area is served by many local bus lines. The bus lines that operate within ¼ mile walking distance of the project site are listed in Table 1, including their route description and commute hour headways.

The VTA also provides a shuttle service within the downtown area. The downtown area shuttle (DASH) provides shuttle service from the San Jose Diridon Caltrain Station to San Jose State University, and the Paseo De San Antonio and Convention Center LRT Stations via San Fernando and San Carlos Streets.

VTA Light Rail Transit (LRT) Service

The Santa Clara Valley Transportation Authority (VTA) currently operates the 42.2-mile VTA light rail line system extending from south San Jose through downtown to the northern areas of San Jose, Santa Clara, Milpitas, Mountain View and Sunnyvale. The service operates nearly 24-hours a day with 15-minute headways during much of the day.

The Mountain View–Winchester and Alum Rock–Santa Teresa LRT lines operate within walking distance of the project site. The Santa Clara LRT stations are located approximately ¼ mile east of the project site on 1st and 2nd Streets, between E. Santa Clara and E. San Fernando Streets. The San Jose Diridon Station is located along the Mountain View–Winchester LRT line and is served by Caltrain, ACE, and Amtrak.

Figure 2
Existing Bicycle Facilities and Zip Car Locations

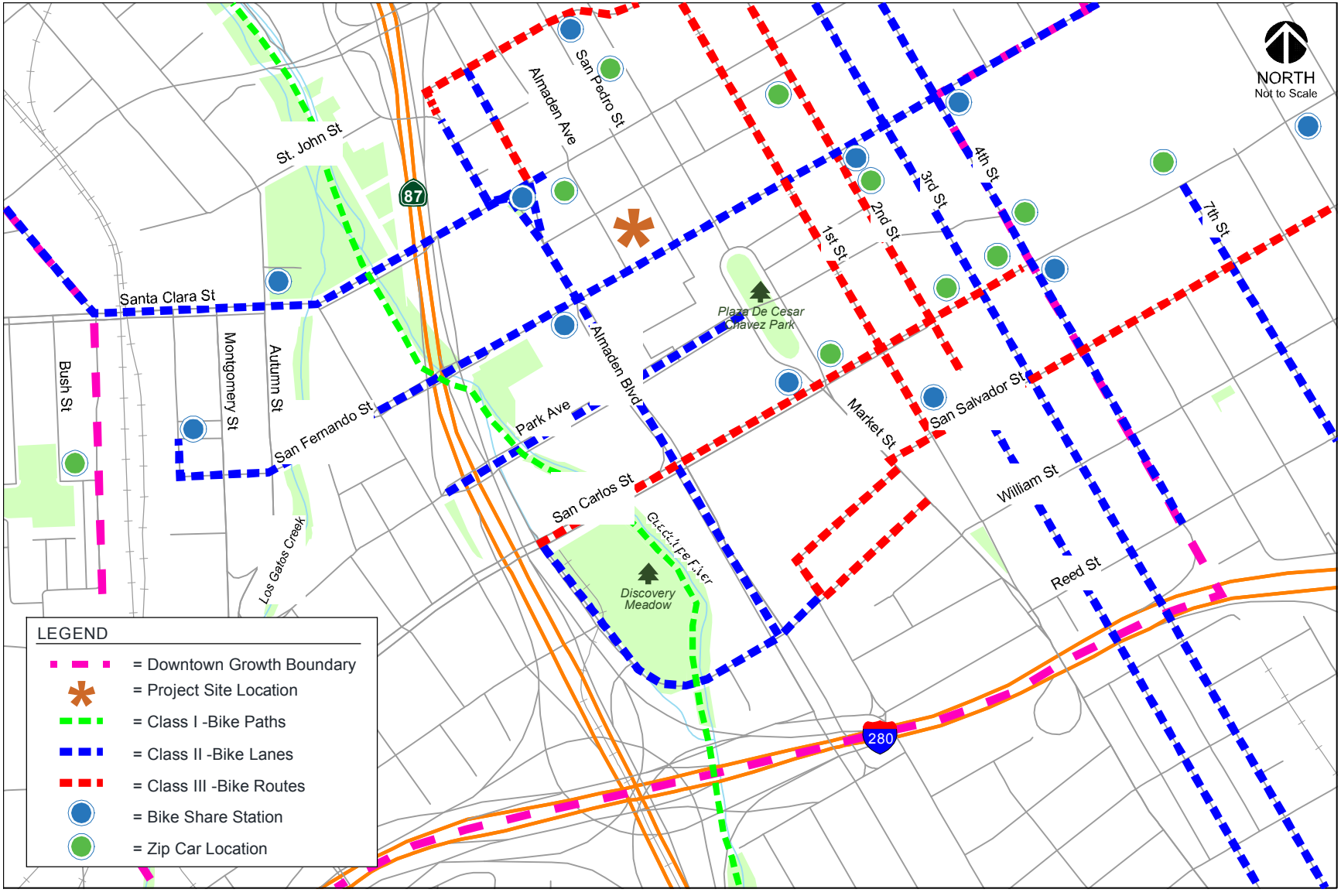


Figure 3
Existing Transit Facilities

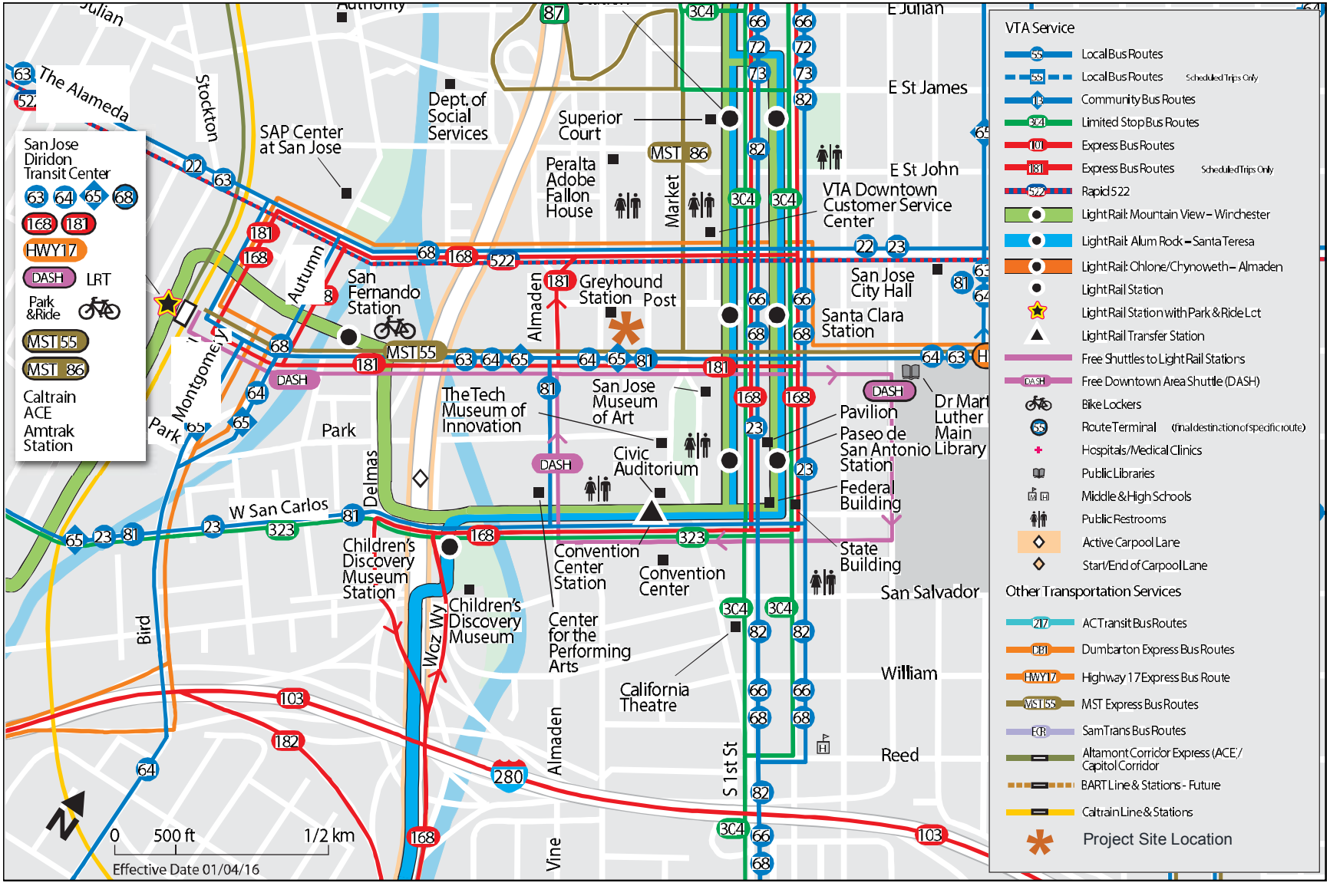


Table 1
Existing Bus Service Near the Project Site

Bus Route	Route Description	Headway /a/
Local Route 22	Palo Alto Transit Center to Eastridge Transit Center via El Camino	12 min
Local Route 63	Almaden Expwy. & Camden to San Jose State University	30 min
Local Route 64	Almaden LRT Station to McKee & White via Downtown San Jose	15 min
Community Route 65	Kooser & Blossom Hill to 13th & Hedding	45 - 50 min
Local Route 66	Kaiser San Jose Medical Center to Dixon Landing Road (Milpitas)	15 min
Local Route 68	Gilroy Transit Center to San Jose Diridon Station	15-20 min
Local Route 72	Senter & Monterey to Downtown San Jose	15 min
Local Route 73	Snell/Capitol to Downtown San Jose	15 min
Local Route 81	San Jose State University-Moffett Field/Ames Cord	25-30 min
Local Route 82	Westgate to Downtown San Jose	30 min
Express Route 168	Gilroy Transit Center to San Jose Diridon Station	30 min
Express Route 181	Fremont BART Station to San Jose Diridon Station	15 min
Limited Stop Route 304	Santa Teresa LRT Station to Sunnyvale Transit Center	30 min
Limited Stop Route 323	Downtown San Jose to De Anza College	15 min
Rapid 522	Palo Alto Transit Center to Eastridge Transit Center	15 min
Hwy 17 Express (Route 970)	Downtown Santa Cruz / Scotts Valley to Downtown San Jose	10 - 30 min

Notes:
/a/ Approximate headways during peak commute periods.

Caltrain Service

Commuter rail service between San Francisco and Gilroy is provided by Caltrain, which currently operates 92 weekday trains that carry approximately 47,000 riders on an average weekday. The project site is located less than ¾ mile from the San Jose Diridon Station. The Diridon Station provides 581 parking spaces, as well as 18 bike racks and 48 bike lockers. Trains stop frequently at the Diridon station between 4:30 AM and 10:30 PM in the northbound direction, and between 6:28 AM and 1:34 AM in the southbound direction. Caltrain provides passenger train service seven days a week, and provides extended service to Morgan Hill and Gilroy during weekday commute hours.

Altamont Commuter Express Service

ACE provides commuter rail service between Stockton, Tracy, Pleasanton, and San Jose during commute hours, Monday through Friday. Service is limited to four westbound trips in the morning and four eastbound trips in the afternoon/ evening with headways averaging 60 minutes. ACE trains stop at the Diridon Station between 6:32 AM and 9:17 AM in the westbound direction, and between 3:35 PM and 6:38 PM in the eastbound direction.

Amtrak Service

Amtrak provides daily commuter passenger train service along the 170-mile Capitol Corridor between the Sacramento region and the Bay Area, with stops in San Jose, Santa Clara, Fremont, Hayward, Oakland, Emeryville, Berkeley, Richmond, Martinez, Suisun City, Davis, Sacramento, Roseville, Rocklin, and Auburn. The Capitol Corridor trains stop at the San Jose Diridon Station eight times during the weekdays between approximately 7:38 AM and 11:55 PM in the westbound direction. In the eastbound direction, Amtrak stops at the Diridon Station seven times during the weekdays between 6:40 AM and 7:15 PM.

The Coast Starlight trains provide daily passenger train service between Los Angeles and Seattle. The southbound Coast Starlight train stops at the San Jose Diridon Station at 9:55 AM and departs at 10:07 AM. The northbound Coast Starlight train stops at the Diridon Station at 8:11 PM and departs at 8:23 PM.

Project Trip Generation

Through empirical research, data have been collected that quantify the amount of traffic produced by common land uses. Thus, for the most common land uses there are standard trip generation rates that can be applied to help predict the future traffic increases that would result from a new development. The magnitude of traffic added to the roadway system by a particular development is estimated by multiplying the applicable trip generation rates by the size of the development. The trip generation rates contained in the San Jose TIA Handbook, August 2009 were used for this study. Trip reductions associated with the project site's proximity to transit and the mixed-use components of the project were applied and are described below.

Trip Reductions

Since the project site is located within 2,000 feet of an LRT station (three total stations within 2,000 feet, including the San Fernando, Convention Center, and Santa Clara Stations), the total number of trips generated by the residential component of the project can be reduced by up to 9 percent, per VTA guidelines.

A mixed-use development with complementary land uses such as residential and retail will result in a reduction of external site trips. Thus, the number of vehicle trips generated for each use may be reduced, since a portion of the trips would not require entering or exiting the site. Therefore, based on VTA's recommended mixed-use reduction, a 15 percent trip reduction was applied to the proposed project. The reduction is applied to the smaller of the two complimentary trip generators (retail use), and the same number of trips is then subtracted from the larger trip generator (residential use).

In addition, trip generation for retail uses is typically adjusted to account for pass-by-trips. Pass-by-trips are trips that would already be on the adjacent roadways (and are therefore already counted in the existing traffic) but would turn into the site while passing by. Justification for applying the pass-by-trip reduction is founded on the observation that such retail traffic is not actually generated by the retail development, but is already part of the ambient traffic levels. Pass-by-trips are therefore excluded from the traffic projections (although pass-by traffic is accounted for at the site entrances). A typical pass-by trip reduction of 25% for retail development within Santa Clara County was applied to the retail component of the proposed project.

Net Project Trips

After applying the appropriate trip generation rates and trip reductions, the project is projected to generate 443 new trips during the AM peak hour and 461 new trips during the PM peak hour. Using the recommended inbound/outbound splits, the project would produce 162 inbound and 281 outbound trips during the AM peak, and 295 inbound and 166 outbound trips during the PM peak. The trip generation estimates are summarized in Table 2.

It should be noted that the project site was formerly occupied by the Greyhound Bus Station, which generated traffic throughout the day. Although traffic was previously accessing the project site, as a conservative approach, no trip credit was taken for the fomer use on site.

The project site also is located within the Downtown Growth Area. The Downtown Growth Area land use designation is characterized by mixed land uses and high rise buildings that create opportunities for multi-modal travel and strong transit demand. In addition, the availability of bicycle lanes and sidewalks throughout downtown and the project's close proximity to major transit services will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the use of single-occupant automobile travel. Therefore, the estimates of trips to be generated by the proposed project as presented and evaluated within this study may represent an over-estimation of traffic and impacts associated with the proposed project. It is expected that the auto trips ultimately generated by the project would be less and the identified operational and parking issues reduced with the use of the multi-modal transportation system within the Downtown area.

Table 2
Project Trip Generation Estimates

					AM Peak Hour						PM Peak Hour					
					Pk-Hr	Splits		Trips			Pk-Hr	Splits		Trips		
Land Use	Size		Daily Trip Rate	Daily Trips	Factor	In	Out	In	Out	Total	Factor	In	Out	In	Out	Total
Proposed Land Uses																
Residential																
Apartments	781	units	6.0	4,686	10%	35%	65%	164	305	469	10%	65%	35%	305	164	469
Internalization Reduction (15%)[a]								-1	-3	-4				-6	-5	-11
Housing near LRT or Caltrain Station (9%)[b]				-422				-15	-27	-42				-27	-15	-42
Sub-Total Residential				4,264				148	275	423				272	144	416
Retail																
Retail	20,000	s.f.	40.0	800	3%	70%	30%	17	7	24	9%	50%	50%	36	36	72
Internalization Reduction (15%)[a]				-120				-3	-1	-4				-5	-6	-11
Pass-By Trips (25%)[c]				--				--	--	--				-8	-8	-16
Sub-Total Retail				680				14	6	20				23	22	45
Total Gross Project Trips				**4,944**				**162**	**281**	**443**				**295**	**166**	**461**

Notes:
Source: Based on "Apartments" and "Specialty Retail/Strip Commercial" rates contained in the San Jose TIA Handbook, August 2009.
[a]As prescribed by the Transportation Impact Analysis Guidelines from VTA (October 2014), the maximum trip reduction for mixed-use development project with housing and retail is equal to 15% off the retail component.
[b]As prescribed by the Transportation Impact Analysis Guidelines from VTA (October 2014), the maximum trip reduction for housing located within a 2,000-foot walk of a transit facility is equal to 9% off the residential component. (The project will be located within 2,000-foot walk of the Santa Clara LRT Station and San Fernando LRT Station.)
[c]A pass-by trip reduction of 25% was applied to the retail component of the project for the PM peak hour. The reduction was applied to the net retail project trips after applying the internalization reduction.

Project Trip Distribution and Trip Assignment

The trip distribution pattern for the project was based on previous traffic studies prepared for similar projects in Downtown San Jose. The project trips were assigned to the roadway network based on the proposed project driveway locations, existing travel patterns in the area, freeway access, and the relative locations of complementary land uses. The project trip distribution patterns are presented in Figure 1. The project trip assignment for the proposed driveway locations are shown on Figure 4.

Vehicular Site Access and Circulation

A review of the proposed site plan and site access was conducted to identify operational deficiencies with the site access points and parking layout. This review is completed to ensure adequate driveway and drive aisle widths are provided for vehicles to safely and efficiently access the site and maneuver throughout the parking areas. The site access and circulation evaluation is based on the April 14, 2017 site plan prepared by C2K Architecture, Inc. The ground level site plan is shown on Figure 5.

Proposed Site Access

The project proposes one full-access driveway on Almaden Avenue and one full-access driveway on S. San Pedro Street for passenger vehicles. In addition, one driveway serving two loading docks will be located on S. San Pedro Street. The City has requested that the location of the loading docks and electrical generator room be switched to allow for the separation of the truck dock and parking garage driveways. The separation of the driveways will provide a safe zone for pedestrians between the two driveways. The existing driveway along Post Street will be eliminated with the development of the proposed project. Parking for the proposed project would be provided within a five-level parking garage that includes three below-grade parking levels and a total of 610 parking spaces. Based on the site plan, access to the parking garage would be gated at the proposed driveways. Figure 4 indicates the project-generated trips at the two proposed project driveways on Almaden Avenue and S. San Pedro Street.

The City of San Jose Municipal Code Section 20.90.100 requires a minimum width of 26 feet for driveways and drive aisles with 90-degree parking that serve two-way traffic. Based on the site plan provided, the proposed full access driveway along Almaden Avenue is proposed to be approximately 26 feet in width. The

Figure 4
Project Trips at Project Driveways

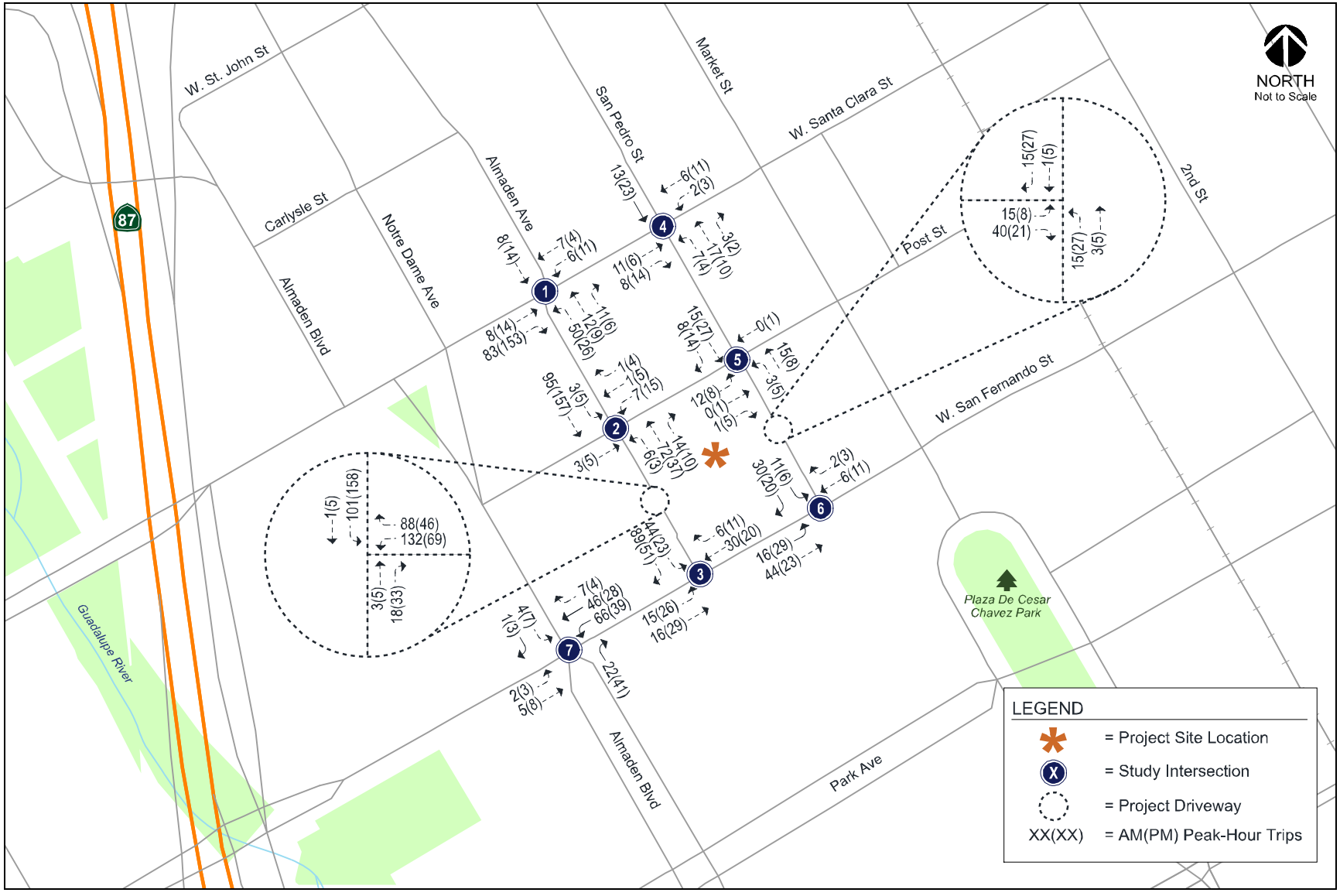
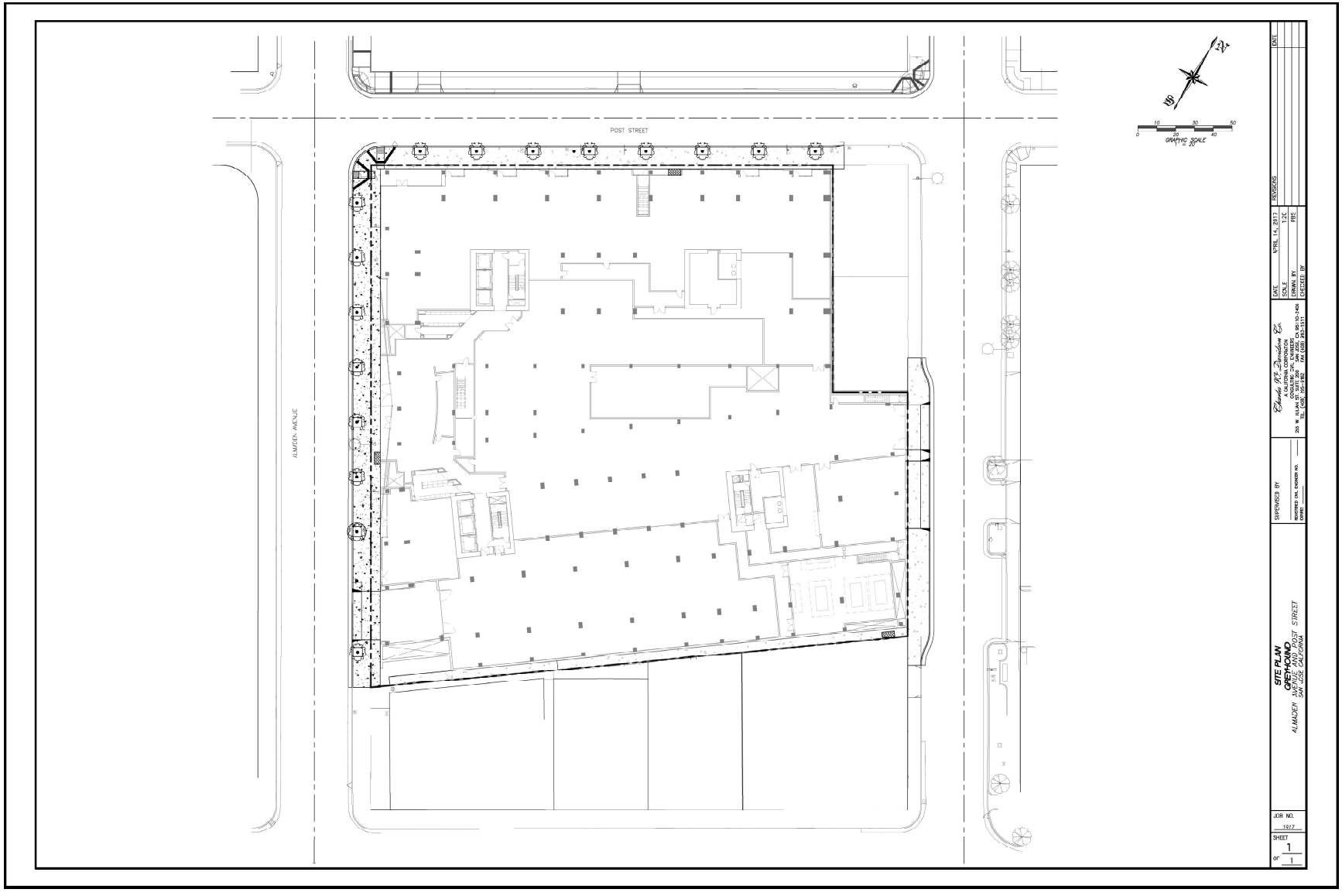


Figure 5
Ground Level Site Plan



full access driveway along S. San Pedro Street is shown to be approximately 24 feet in width which is less than the City's requirement of 26 feet. The project driveway along San Pedro Street will be required to be a minimum of 26 feet.

In addition, the City typically requires parking garage entrances to be located at least 50 feet from the face of the curb to provide adequate stacking space for at least two inbound vehicles. This requirement, however, may not always be achievable in the downtown area due to the zero setback requirements for buildings located in downtown. It is recommended that the proposed garage entrance gates be located a minimum of one car length back from the sidewalks (within the parking garage) to be able to accommodate one entering vehicle at the garage entrance gates without blocking the sidewalk.

The proposed residential component of the project is projected to generate approximately 148 inbound and 275 outbound trips during the AM peak hour and 272 inbound and 144 outbound trips during the PM peak hour. Assuming those trips would use the two proposed garage entrances equally, a maximum of 136 trips would access each of the project driveways during the PM peak hour (only approximately 74 trips during the AM peak hour), representing 2-3 vehicles per minute at each project driveway. The number of vehicles that can be served by the garage gates will depend on their service rate. However, an automated entrance gate should have the ability to serve two vehicles per minute. Therefore, it is not anticipated that vehicle queues at the project garage entrances would become an issue, since traffic volumes along San Pedro Street and Almaden Avenue are relatively low.

Sight Distance at the Driveways Serving the Project

The driveways serving the project should be free and clear of obstructions, thereby ensuring that all exiting vehicles can see pedestrians on the sidewalk and vehicles travelling on S. San Pedro Street and Almaden Avenue. Adequate sight distance (sight distance triangles) should be provided at each of the driveways in accordance with Caltrans standards. Sight distance triangles should be measured approximately 10 feet back from the travelled way. Appropriate visible and/or audible warning signals should be provided at the project driveways to alert pedestrians and bicyclists of vehicles exiting the parking garages.

Providing appropriate sight distance reduces the likelihood of a collision at a driveway or intersection and provides drivers with the ability to exit a driveway or locate sufficient gaps in traffic. Sight distance generally should be provided in accordance with Caltrans standards. The minimum acceptable sight distance is often considered the Caltrans stopping sight distance. Sight distance requirements vary depending on the roadway speeds. For the project driveways on S. San Pedro Street and Almaden Avenue, which have a speed limit of 25 miles per hour (mph), the Caltrans stopping sight distance is 150 feet. Thus, a driver must be able to see 150 feet down S. San Pedro Street and Almaden Avenue when turning into and out of the project driveways to avoid a collision.

The proposed project will have two full access driveways, one located on S. San Pedro Street approximately 180 feet north of the S. San Pedro Street/San Fernando Street intersection, and the other along Almaden Avenue approximately 80 feet north of the Almaden Avenue/San Fernando Street intersection. Two loading docks served by a single driveway also will be located along S. San Pedro Street approximately 160 feet north of the San Pedro Street/San Fernando Street intersection.

Based on the proposed driveway location on S. San Pedro Street, the minimum required sight distance to the south (towards the S. San Pedro Street/San Fernando Street intersection) will be met if the posted speed limit of 25 mph is in compliance. Additionally, the four-way stop control at the S. San Pedro Street/San Fernando Street intersection should provide adequate gaps in traffic flow along northbound S. San Pedro Street for vehicles at the project driveway to exit the project site. The available sight distance from the project driveway to the S. San Pedro Street/Post Street intersection, 125 feet, would not meet the Caltrans sight distance requirements for streets with 25 mph speed limits. However, vehicle speeds are much lower when completing turn-movements through an intersection. Therefore, vehicles turning onto southbound S. San Pedro Street from Post Street would be traveling at speeds that allow them to slow down or stop if necessary at the sight of vehicles exiting the project driveway.

Based on the proposed Almaden Avenue driveway location, the minimum required sight distance to the south (towards the Almaden Avenue/San Fernando Street intersection) will not be met. However, vehicle speeds are much lower when completing turn-movements through an intersection. Therefore, vehicles

turning onto northbound Almaden Avenue from San Fernando Street would be traveling at speeds that allow them to slow down or stop if necessary at the sight of vehicles exiting the project driveway. The minimum sight distance from the project driveway to the north (towards the Almaden Avenue/Post Street intersection) would be met if the posted speed limit of 25 mph is in compliance.

There are three existing driveways that serve parking garages along the east side of San Pedro Street directly opposite the project site frontage. The project driveway along S. San Pedro Street should be aligned as close as possible with the opposing driveways serving the Market Post Tower building (55 South Market Street) and adjacent underground parking structure. The alignment of the proposed and existing opposing driveways would provide for a clear line of sight for drivers exiting and entering each driveway as well as reduce conflicting movements between the driveways. As proposed, the project and opposing driveways will be closely aligned and will allow drivers at each driveway with a clear line of sight of turn movements to and from the opposing driveway. Figure 6 indicates the project and opposing driveway locations along San Pedro Street.

Vehicular On-Site Circulation

The City's standard width for two-way drive aisles is 26 feet wide where 90-degree parking is provided. This allows sufficient room for vehicles to back out of parking spaces. According to the site plan, the drive aisles on each level of the parking garage range from approximately 24 feet to 27.5 feet wide. The City requires drive aisles to measure a minimum of 26 feet wide. All drive aisles within the garage should be a minimum of 26 feet in width.

On-site vehicle circulation was reviewed for the project in accordance with generally accepted traffic engineering standards. As proposed, vehicles would enter the parking garage via the driveway on Almaden Avenue or driveway on S. San Pedro Street. The driveways provide access to separate parking areas: the S. San Pedro Street driveway will provide access to only the street-level and the one above ground-level parking while the Almaden Avenue driveway would provide access to the three below ground parking levels. With different access driveways, the above ground-level and below ground-level parking levels are not connected to each other and become two separate parking garages.

Circulation through each level of parking in the garage will not be continuous due to the presence of dead end aisles on each parking level. Drivers circulating through the parking levels will be unable to complete a simple turn around when confronting the dead-ends. In addition, vehicles will need to back down drive aisles when existing parking stalls located adjacent to garage walls and at the end of each of the dead-end aisles on each of the parking levels. It is preferable that drivers do not have to make three-point turns or reverse to change directions within the garage. However, the dead-end drive aisles should not be problematic if the use of the parking garage is restricted to residents only and assigned parking implemented given that residents will be familiar with the parking garage and will not circulate the garage in search of available parking. In addition, convex mirrors should be installed at appropriate locations on each level of the garage to remove blind spots.

Truck Access and Circulation

Proposed Truck Access

Based on the City of San Jose off-street loading standard for developments in the Downtown Area, the project is required to provide three off-street loading spaces for the residential component and one off-street loading space for the retail component. The project, as shown in the provided site plan, has two planned side by side off-street loading docks with access via one driveway on S. San Pedro Street. The project requires two additional loading spaces to meet the City requirements. As per section 20.70.450 of the Downtown Zoning Regulations, the Planning Director may authorize the reduction of two on-site loading spaces to one on-site loading space in connection with the issuance of a development permit if the Director finds that sufficient on-street loading space exists to accommodate circulation and manipulation of freight. It is recommended that the project pursue this reduction in off-street loading spaces by providing at least two on-street loading spaces. It is recommended that at least one of these loading spaces be designated for the residential component and be located near the lobby on Almaden Avenue. The project should work with City

Staff to ensure that all loading spaces provided meet City standards for height and width, and do not interfere with vehicular traffic on the street.

Truck turning paths for a smaller single-unit truck (SU-30) and larger WB-40 truck was reviewed at the project loading docks on S. San Pedro Street. The review of truck turning paths indicates that the approximately 30-foot width of S. San Pedro Street will be adequate for SU-30 trucks to perform turn movements at the project loading docks. The WB-40 may not be applicable to the project site given that it will not fit within the provided dock space. There is sufficient roadway width on S. San Pedro Street for SU-30 and WB-40 trucks to complete turn maneuvers without the removal of landscape islands located on the east side of S. San Pedro Street. However, the review indicates that WB-40 trucks would not be able to complete turn maneuvers into the northern most dock on S. San Pedro Street because the trucks would need to mount the curb flares at the loading dock driveway. To accommodate WB-40 trucks, the 36-foot width of the loading dock driveway would need to be widened to at least 38 feet. Widening of the loading dock driveway would require combining the loading dock driveway with the 24-foot width of the adjacent full access driveway resulting in a single 60-foot wide driveway. However, driveway widths greater than 36 feet do not meet City standards and are not conducive to pedestrian travel along sidewalks. Therefore, it is recommended that the use of the loading docks by WB-40 trucks be restricted to only the southern-most dock. Figures 6 and 7 present the truck turning paths along S. San Pedro Street at the project loading docks, as located on the site plan.

The site plan indicates that a trash enclosure will be located on street level within the loading dock area on San Pedro Street. Garbage trucks will not enter the building, therefore trash bins will need to be wheeled out to S. San Pedro Street though the loading/delivery area for garbage truck pickup. It is recommended that the use of the loading/delivery area be restricted during scheduled garbage pick-up times to ensure that access by garbage trucks is not inhibited.

Pedestrian and Bicycle Circulation and Transit Access

Pedestrian Access and Bicycle Circulation

Sidewalks are provided along each of the streets that bound the project site. Crosswalks are available at the adjacent unsignalized intersections of S. San Pedro Street/Post Street, S. San Pedro Street/San Fernando Street, and Almaden Avenue/San Fernando Street. Crosswalks at both San Fernando Street intersections consist of high visibility (typical continental crosswalk markings) crosswalks and include reflective signage along San Fernando Street. Field observations revealed that these pedestrian crossings along San Fernando Street are well respected by motorists and bicyclists travelling east and west along San Fernando Street and provide good pedestrian visibility and enhanced safety. Pedestrian crosswalks and signage do not exist across any legs of the Almaden Avenue/Post Street intersection. The City will perform a stop warrant analysis at the Almaden Avenue/Post Street intersection to determine whether all-way stop control at the intersection is warranted. If warranted, the project will be required to implement stop control and crosswalks with appropriate signage on all approaches of the intersection.

The project is proposing pedestrian improvements as part of its development. These improvements include Americans with Disabilities Act- (ADA) compliant accessible ramps at the southeast corner of the Almaden Avenue/Post Street intersection, and at the southwest corner of the S. San Pedro Street/Post Street intersection. The project also is proposing to widen the sidewalk along all three project frontages, including a 15-foot sidewalk along Almaden Avenue and approximately 12-foot sidewalks along Post Street and S. San Pedro Street. With the proposed project, the existing driveway along Post Street would be removed. These improvements to the pedestrian network, in addition to the above recommended improvement, would enhance the existing pedestrian network and increase pedestrian safety and comfort in the immediate vicinity to the site. Overall, the existing pedestrian facilities have good connectivity and provide adequate pedestrian access to surrounding areas and services, and would improve with the implementation of the proposed project improvements.

With the proposed project access driveway locations, project traffic accessing the parking garages would do so via S. San Pedro Street and Almaden Avenue. Pedestrians along the project frontage on S. San Pedro Street would be forced to cross two closely-spaced project driveways, which includes the 36-foot wide loading dock driveway. The City has recommended that the loading dock driveway be swapped with the

Figure 6
Truck Turning Paths (SU-30 Truck)

Figure 7
Truck Turning Paths (WB-40 Truck)

electric generator room on S. San Pedro Street to provide a safe zone for pedestrians between the loading dock driveway and vehicular driveway.

The Downtown Streetscape Master Plan (DSMP) provides design guidelines for existing and future development for the purpose of enhancing the pedestrian experience in the Greater Downtown area. Per the DSMP, both Almaden Avenue and San Pedro Street are designated Downtown Pedestrian Network Street (DPNS) which are intended to support a high level of pedestrian activity as well as retail and transit connections. The streets provide a seamless network throughout the downtown that is safe and comfortable for pedestrians and connects all major downtown destinations. Design features of a DPNS create an attractive and safe pedestrian environment to promote walking as the primary travel mode. The DSMP policies state that vehicles crossing the sidewalk are often a safety hazard for pedestrians and measures should be taken within the design for any new project to minimize the number of curb cuts and driveways. Providing project access along two of the project frontages as recommended by the City would reduce the amount of pedestrian and vehicle conflicts along the west side of S. San Pedro Street as encouraged by the DSMP policies.

The project site is well served by various existing bicycle facilities including Class II bicycle lanes along San Fernando Street south of the project site. Additionally, the Guadalupe River Park Trail, a Class I pedestrian and bicycle trail, is accessible via San Fernando Street and Santa Clara Street, less than a quarter mile from the project site. According to the San Jose Bike Plan 2020 Bikeway Network map, no additional bicycle facilities are planned in the study area.

Transit Facilities

The project is in close proximity to major transit services located along the surrounding roadways and would provide the opportunity for multi-modal travel to and from the project site. The nearby bicycle facilities along San Fernando Street provide access to major transit stations and provide for a balanced transportation system as outlined in the Envision 2040 General Plan goals and policies.

Parking

Projects in the downtown area are located in close proximity to offices, recreation, and retail services, allowing individuals to satisfy their daily needs for work or shop near their place of residence. The availability of bicycle lanes and sidewalks throughout the downtown and the project's close proximity to major transit services will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the demand for on-site parking as described below.

Bicycle Parking

Per the City of San Jose Parking Standards, the project is required to provide one bicycle parking space for every 4 residential units. Based on this requirement this project will be required to provide a minimum of 196 bicycle parking spaces. Based on the project's downtown location, it is likely that residents of the proposed residential units will be able to work in close proximity to the site, or will be able to quickly access transit to reach their place of work. The project must meet the required bicycle parking set forth by the City. However, it is recommended that bicycle parking that exceeds the City's requirements be provided on-site to encourage the use of non-auto modes of travel.

Vehicle Parking

According to the City's Downtown Zoning Regulations (Section 20.70 of San Jose Code of Ordinances), residential projects are required to provide one off-street parking space per residential unit. The project is not required to provide any parking for the retail use. The City's Parking and Loading regulations (Section 20.90.220 of San Jose Code of Ordinances) allows up to a 20% reduction with the implementation of a Transportation Demand Management (TDM) plan. Per the City's standard parking requirements and implementation of a TDM plan, the project is required to provide up to 625 off-street parking spaces.

The City desires metered parking along project frontages whenever possible. There are a total of 17 existing metered parking spaces along the frontages of the proposed project site on Almaden Avenue, Post Street,

and S. San Pedro Street. Metered parking along Post Street should be implemented at the location of the existing driveway that is anticipated to be removed by the project.

Transportation Demand Management

To meet the Downtown parking requirements, the project will be required to develop and implement a Transportation Demand Management (TDM) plan. Based on City Code 20.90.220, the project may receive up to a 20 percent reduction in the number of spaces required. To receive this 20 percent reduction the project must:

1. Have developed a TDM program that provides evidence that a TDM program will reduce parking demand and identifies the percentage of parking demand that will be reduced through the TDM program. The TDM program will incorporate one or more elements of TDM including, but not limited to, measures such as Ecopass, parking cash-out, alternate work schedules, ride sharing, transit, carpool/vanpools, shared parking, or any other reasonable measures; and
2. Demonstrate that it can maintain the TDM program for the life of the project and is reasonably certain that the parking shall continue to be provided and maintained at the same location for the services of the building or use for which such parking is required, during the life of the building or use.

A TDM plan, developed as part of this project, that will achieve at least a 20 percent reduction in parking is required to meet Downtown parking requirements.

Vehicular Queuing Analysis

Vehicle queues were estimated using TRAFFIX, which is based on the Highway Capacity Manual (HCM) 2000 methodology. The basis of the analysis is as follows: the estimated maximum queue length obtained from TRAFFIX is compared to the existing or planned available storage capacity for the movement. This analysis thus provides a basis for estimating future storage requirements at intersections. The results of the queue analysis are summarized in Table 3.

The queuing analysis shows that the southbound left-turn and westbound left-turn movements at one the intersection of Almaden Boulevard and San Fernando Street currently experience vehicular queue lengths that exceed the available storage capacity under existing conditions and would continue to do so under background conditions. The proposed project is projected to increase the queue for the southbound left-turn movement by no more than one vehicle and the westbound left-turn movement by 2-4 vehicles during the peak hours.

The southbound left-turn pocket at the intersection of Almaden Boulevard and San Fernando Street could be extended an additional 125 feet. However, extending the existing southbound left-turn pocket would require partial removal of the landscaped center median. Currently, the westbound left-turn queue at the intersection of Almaden Boulevard and San Fernando Street is estimated to be 6 and 16 vehicles during the AM and PM peak hours, respectively. The westbound approach consists of a left-turn and a shared right-and-through lane (plus bike lane). The left-turn pocket is approximately 175 feet long, providing queue storage for approximately 7 vehicles. A 50-foot two-way left-turn (TWLT) lane connects the westbound left-turn lane with the eastbound left-turn lane at the upstream intersection of Almaden Avenue and San Fernando Street. It was observed that the westbound left-turn queue at Almaden Boulevard/San Fernando Street often extends out of the left-turn pocket blocking westbound through traffic along San Fernando Street or, on occasions, extends into the TWLT lane back to Almaden Avenue/San Fernando Street. Providing additional queue storage capacity for this movement is not feasible due to right-of-way constraints.

The extension of turn-pockets to accommodate the projected queues at the above described intersections would require street widening along with narrowing of sidewalks and/or removal of bike lanes. The removal and/or alteration of improvements intended to encourage the use of multi-modal travel to accommodate vehicular demand is not consistent with General Plan goals. Therefore, the extension of turn-pockets at the intersections is not recommended. The projects close proximity to major transit services and pedestrian and bicycle facilities along San Fernando Street would provide for and encourage the use of multi-modal travel options and reduce the use of single-occupant automobile travel. It is expected that the auto trips ultimately

Table 3
Queuing Analysis Summary

		Projected Queue Length (Vehicles)																	
		Almaden Ave/Santa Clara St			Alamden Ave/Post St			Almaden Ave/San Fernando St		San Pedro St/Santa Clara St			San Pedro St/Post St			San Pedro St/San Fernando St		Alamden Blvd/San Fernando St	
Scenario	Peak Hour	NB	SB	WBL	NB	SB	WB	SB	EBL	NB	SB	WBL	NB	SB	EB	SBL	EBL	SBL	WBL
Existing	AM	5	3	0	0	0	0	0	0	6	2	2	0	0	0	0	0	**9**	6
	PM	6	8	0	0	0	0	1	0	5	7	2	0	0	0	1	0	**8**	**16**
Existing + Project	AM	8	3	0	0	0	0	1	0	7	2	2	0	0	0	1	0	**10**	**10**
	PM	9	9	1	0	0	1	2	0	6	8	2	0	0	0	2	0	**9**	**18**
Background	AM	5	4	0	0	0	0	0	0	6	2	2	0	0	0	0	0	**9**	6
	PM	6	10	0	0	0	0	1	0	6	7	2	0	0	0	1	0	**9**	**17**
Background + Project	AM	8	3	0	0	0	0	1	0	7	2	2	0	0	0	1	0	**10**	**10**
	PM	8	11	1	0	0	1	2	0	7	8	2	0	0	0	2	0	**10**	**19**
Available Storage																			
Existing & Background Storage (feet)		275	350	50	325	275	275	325	125	275	250	50	325	275	250	325	125	125	175
Existing & Background Storage (Vehicle)[1]		11	14	2	13	11	11	13	5	11	10	2	13	11	10	13	5	5	7

[1]Assumed 25 feet per vehicle.
Red numbers indicate movements for which projected queue lengths exceed available storage capacity.

generated by the project would be less than those estimated within this study and the identified operational deficiencies (queues at intersections) reduced as development and the planned enhancement of the multi-modal transportation system progresses within the downtown area.

Conclusions

The project as proposed would consist of up to 781 apartment units and 20,000 s.f. of retail space. Parking for the proposed project would be provided within a five-level parking garage. The project proposes that access to the parking garage be provided via one driveway along S. San Pedro Street (the project's eastern site boundary) and one driveway along Almaden Avenue. Each driveway would have a gated entrance into the parking garage. The project also is proposing one additional driveway providing access to two off-street truck loading areas along S. San Pedro Street. The City has requested that the location of the loading docks and electrical generator room be switched to allow for the separation of the truck dock and parking garage driveways. The separation of the driveways will provide a safe zone for pedestrians between the two driveways.

Since the project site is located in the Downtown Core area boundary, it is covered by the San Jose Downtown Strategy 2000 EIR. Accordingly, City staff has already concluded that the project is in conformance with the City of San Jose Transportation Level of Service Policy (Council Policy 5-3) and will not require preparation of a comprehensive Transportation Impact Analysis (TIA).

The project site was formerly occupied by the Greyhound Bus Station, which generated traffic throughout the day. Although traffic was previously accessing the project site, as a conservative approach, no trip credit was taken for the existing use on site. The project site also is located within the Downtown Growth Area which is characterized by mixed land uses and high-rise buildings that create opportunities for multi-modal travel and strong transit demand. In addition, the availability of bicycle lanes and sidewalks throughout downtown and the project's close proximity to major transit services will provide for and encourage the use of multi-modal travel options (bicycling and walking) and reduce the use of single-occupant automobile travel. Therefore, the estimates of trips to be generated by the proposed project as presented and evaluated within this study may represent an over-estimation of traffic and impacts associated with the proposed project. It is expected that the auto trips ultimately generated by the project would be less and the identified operational and parking issues reduced with the use of the multi-modal transportation system within the Downtown area.

A summary of the site access and circulation review along with recommended adjustments is provided below.

Recommendations

- The project driveway along S. San Pedro Street should be aligned as close as possible with the opposing driveways serving the Market Post Tower building (55 South Market Street) and adjacent underground parking structure. The alignment of the proposed and existing opposing driveways would provide for a clear line of sight for drivers exiting and entering each driveway as well as reduce conflicting movements between the driveways. As proposed, the project and opposing driveways will be closely aligned and will allow drivers at each driveway with a clear line of sight of turn movements to and from the opposing driveway.
- The project driveway along San Pedro Street will be required to be a minimum of 26 feet per City requirements.
- There is sufficient roadway width on S. San Pedro Street for SU-30 and WB-40 trucks to complete turn maneuvers without the removal of landscape islands located on the east side of S. San Pedro Street. However, the review indicates that WB-40 trucks would not be able to complete turn maneuvers into the northern most dock on S. San Pedro Street because the trucks would need to mount the curb flares at the loading dock driveway. It is recommended that the use of the loading docks by WB-40 trucks be restricted to only the southern-most dock.
- The City will perform a stop warrant analysis at the Almaden Avenue/Post Street intersection to determine whether all-way stop control at the intersection is warranted. If warranted, the project will

be required to implement stop control and crosswalks with appropriate signage on all approaches of the intersection.

- Construct handicap ramp at the Post Street/Almaden Avenue and Post Street/San Pedro Street intersections at the project frontage.
- The proposed garage entrance gates should be located a minimum of one car length back from the sidewalk (within the parking garage due to the zero setback requirements in the Downtown area) to be able to accommodate one entering vehicle at the garage entrance gates without blocking the sidewalk.
- Install appropriate visible and/or audible warning signs at the project driveways to alert pedestrians and bicyclists of vehicles exiting the garage.
- Per the City of San Jose Parking Standards, the project is required to provide a minimum of 196 bicycle parking spaces. However, it is recommended that bicycle parking that exceeds the City's requirements be provided on-site to encourage the use of non-auto modes of travel.
- Per the City's standard parking requirements and implementation of a TDM plan, the project is required to provide up to 625 off-street parking spaces.
- The project will be required to implement the following a TDM program to reduce parking demand. The TDM program will incorporate one or more elements of TDM including, but not limited to, measures such as Ecopass, parking cash-out, alternate work schedules, ride sharing, transit, carpool/vanpools, shared parking, or any other reasonable measures.
- Metered parking along Post Street should be implemented at the location of the existing driveway that is anticipated to be removed by the project.
- Circulation through each level of parking in the garage will not be continuous due to the presence of dead end aisles on each parking level. Therefore, the use of the parking garage should be restricted to residents only and assigned parking implemented. In addition, convex mirrors should be installed at appropriate locations on each level of the garage to remove blind spots.

Greyhound Residential Project
Water Supply Assessment

December 2016

San Jose
Water
Company

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Appendix

A City of San Jose Water Supply Assessment Request

San Jose Water Company (SJWC) is one of the largest privately owned water systems in the United States, providing high-quality, low-cost water and exceptional customer service to more than one million residents of Santa Clara County since established in 1866.

Background & Purpose

The Greyhound Residential Project (Project) is a 1.63-acre proposed development. The proposed Project would allow the construction of 781 residential units with 20,000 square feet of ground floor retail in two high rise towers with 23 to 24 stories including four levels of below-grade parking. The project is located on the southeast corner of Post Street and South Almaden Avenue, at 70 South Almaden Avenue in San Jose.

Source: www.bizjournals.com

This Water Supply Assessment (WSA) describes the relationship between existing and future water supplies and presents SJWC's strong ability to provide a diverse water supply to match build-out water demands under both normal and dry years. Based on Santa Clara Valley Water District's (SCVWD's) 2015 Urban Water Management Plan and conservation methods currently employed, SJWC is able to meet the needs of the service area through at least 2035 for average and single-dry years without a call for water use reductions. This assumes reserves are at healthy levels at the beginning of the year and that projects and programs identified in SCVWD's Water Supply Infrastructure Master Plan (WSIMP) are implemented. If reserves are low at the beginning of a single-dry year, SCVWD might call for water use reductions in combination with using reserves.

SCVWD has determined that water shortages would occur in the event of a multiple-dry year scenario and are evaluating supply projects and programs to minimize the need to call for water use reductions greater than 10 percent. Projects and programs may include additional long-term water conservation savings, water recycling, recharge capacity, storm water capture, reuse, banking, and storage. SCVWD's WSIMP implementation will be staged to minimize the risk of stranded investments or under investment should demands not increase as projected.

This WSA is written in response to California Senate Bill 610 (SB 610) and Senate Bill 221 (SB 221); legislation which requires water retailers to demonstrate whether their water supplies are sufficient for certain proposed subdivisions and large development projects subject to the California Environmental Quality Act. SB 610 includes the requirements for detailed water supply assessments, and SB 221 includes the requirement for written verification of sufficient water supply based on substantial evidence. SB 610 requires that a WSA be prepared by the local water retailer and submitted within 90 days to the requesting agency.

Service Area & Population

SJWC's service area spans 139 square miles, including most of the cities of San Jose and Cupertino, the entire cities of Campbell, Monte Sereno, Saratoga, the Town of Los Gatos, and parts of unincorporated Santa Clara County.

The population of SJWC's service area, including growth associated with this Plan Area, is shown in the following table. These projections are based on the Association of Bay Area Governments' population projections and were included in SJWC's 2015 Urban Water Management Plan.

Table 1: Current and Projected SJWC Service Area Population

2015	2020	2025	2030	2035	2040
982,750	1,034,396	1,087,273	1,142,484	1,201,289	1,262,356

Climate

The San Jose area experiences a low-humidity moderate climate with an annual average rainfall total of about 14 inches. Maximum monthly average temperatures range from the mid 60's to the low 80's (°F) in spring and summer and from the high 50's to low 60's (°F) in the winter.[1] Most precipitation in the area occurs between November and March with January and February typically being the wettest months as shown in Table 2. According to SCVWD's 2015 UWMP, the annual average evapotranspiration rate for the San Jose area is about 50 inches per year. Evapotranspiration measures the loss of water to the atmosphere by evaporation from soil and plant surfaces and transpiration from plants. Evapotranspiration serves as an indicator of how much water plants need for healthy growth.

Table 2: Climate Data

	Jan	Feb	Mar	Apr	May	Jun
Average High Temperature (°F)	58	62	66	69	74	79
Average Low Temperature (°F)	42	45	47	49	52	56
Average Precipitation (in)	2.8	2.6	2.3	1.1	0.4	0.1
Evapotranspiration (in)	1.5	1.9	3.5	5.0	6.0	6.8

	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Average High Temperature (°F)	82	82	80	74	64	58	70.7
Average Low Temperature (°F)	58	58	57	53	46	42	50.4
Average Precipitation (in)	0.0	0.0	0.2	0.7	1.5	2.5	14.3
Evapotranspiration (in)	7.0	6.3	4.8	3.5	1.9	1.4	49.6

[1] Monthly temperature totals from www.weather.com

Past, Current and Future Water Use

The majority of connections to SJWC's distribution system are either residential or commercial. SJWC also provides water to industrial, institutional and governmental connections. SJWC's customer database does not differentiate between single-family and multi-family residential accounts, but estimates 15 percent of all residential accounts are multi-family. The resale category represents the small mutual water companies, in which SJWC provides a master water service and where the mutual water company is responsible for distributing the water.

SJWC has developed demand projections from 2015 to 2040 based on population and per capita usage projections. The Association of Bay Area Governments (ABAG) census tract population projections were used to estimate population growth. It was assumed that population growth after 2010 would be within new, high water efficiency developments with a demand of 100 gpcd. It is expected that on average the per capita usage for the existing 2010 population will experience an annual decline of 0.2 percent until 2040.

Table 3: SJWC Water Use by Customer Type (AF/yr)

Customer Type	2015	2020	2025	2030	2035	2040
Single Family	47,789	63,443	65,536	67,752	70,155	72,677
Multi Family	8,433	11,195	11,567	11,956	12,380	12,825
Commercial	36,434	48,369	49,965	51,652	53,485	55,409
Industrial	700	930	961	991	1,028	1,065
Institutional / Governmental	4,984	6,617	6,834	7,065	7,316	7,580
Sales / Transfers / Exchanges	408	543	559	580	598	620
Other	150	199	206	212	221	230
Total	98,898	131,296	135,626	140,208	145,183	150,406

SJWC's total demand is not limited to metered usage. Non-revenue water is the sum of (a) water losses, (b) unbilled metered consumption, and (c) unbilled unmetered consumption.

(a) Water losses are separated into two categories: apparent losses and real losses. Apparent losses include all types of inaccuracies associated with customer metering, theft, as well as data handling errors. Real losses are physical water losses from the pressurized system and the utility's storage tanks, up to the customer meter. For example, this might include lost water through leaks, breaks and overflows.
(b) Unbilled metered consumption might include metered consumption by the utility.
(c) Unbilled unmetered consumption is any kind of authorized consumption which is neither billed nor metered. This typically includes items such as firefighting, flushing mains, and draining water storage facilities.

Over the last five years (2011 – 2015) SJWC has averaged 6.5 percent non-revenue water based on the American Water Works Association's (AWWA) Water Audit Software. This consistently low

level of non-revenue water indicates SJWC has an efficient, well-maintained water system. SJWC is committed to continuing to reduce its non-revenue water loss percentages through investments in acoustic leak correlation and logging equipment, advanced metering infrastructure, as well as a prudent water main replacement program that ranks pipelines for replacement primarily based upon their propensity to leak.

Table 4: SJWC Total System Demand (AF/yr)

	2015	2020	2025	2030	2035	2040
Customer Metered Demand	98,898	131,296	135,626	140,208	145,183	150,406
Non-Revenue Water	7,553	9,139	9,440	9,759	10,106	10,471
Total System Demand	106,451	140,435	145,066	149,967	155,289	160,877

Water Use Associated with the Greyhound Residential Project

Total water usage for this Project is estimated at 317,400 gallons per day (gpd), which is equivalent, to an annual usage of approximately 355.5 acre-feet of water. However, the site being developed as part of this Project has existing water usage, which will be eliminated. Water usage at the existing site is on average 11,750 gpd or 13.2 acre-feet per year. Therefore, the annual net demand increase in water usage associated with this Project is really about 342 acre-feet, which represents a 0.23% increase over the system wide 2013 water production of 146,776 acre-feet. The projected water demand for this Project is within normal growth projections for water demand in SJWC's system.

Table 5: Total Water Demand Estimated for Project

Existing Demand (gpd)[1]	Residential Units	Retail Space (SF)	Water Demand Factor		Net Total Demand (gpd)	Net Demand (AF/yr)
			Residential (gpd/unit)	Retail (gpd/SF)		
11,750	781	20,000	400	0.25	305,650	342

[1]Existing Daily Demand based on 2013 Average Usage

System Supplies

This section describes and quantifies the current and projected sources of water available to SJWC. A description and quantification of recycled water supplies is also included.

Imported Treated Surface Water – In 1981, SJWC entered into a 70-year master contract with SCVWD for the purchase of treated water. The contract provides for rolling three-year purchase schedules establishing fixed quantities of treated water to be purchased during each period. Water is treated at one of three SCVWD-operated treatment plants (Rinconada, Penitencia and Santa Teresa). SJWC and SCVWD currently have a three-year treated water contract for fiscal years 2014/2015 – 2016/2017, with contract supply ranging from 69,050 AF/yr in 2014/2015 to 70,584 AF/yr in 2016/2017.

Groundwater – SJWC draws water from the Santa Clara Subbasin (basin) in the north part of Santa Clara County. The basin is 22 miles long and 15 miles wide, with a surface area of 225 square miles and an operational storage capacity estimated to be 350,000 acre-feet.

The following chart shows groundwater elevation in the basin since the mid 1930's using the well surface elevation as the datum. In 2012, the groundwater basin level was high and well prepared for the effects of a multi-year drought. The high groundwater levels were a result of less pumping, an increased use of imported water, and recharge of water into the aquifer by SCVWD. Due to the current drought, the amount of imported surface water available has decreased dramatically. Water from the Federal Water Project in 2014 was available at 50 percent of normal, but water from the State Water Project has had an allocation of only five percent. As a result, SJWC has been relying more heavily on groundwater which has caused the groundwater elevation to decline. Should the drought continue, total groundwater storage is projected to drop to 200,000-250,000 acre-feet. It is, however, unlikelely that this historic drought will persist. Therefore, it is expected that the groundwater elevation will rebound and that the groundwater basin will be replenished.

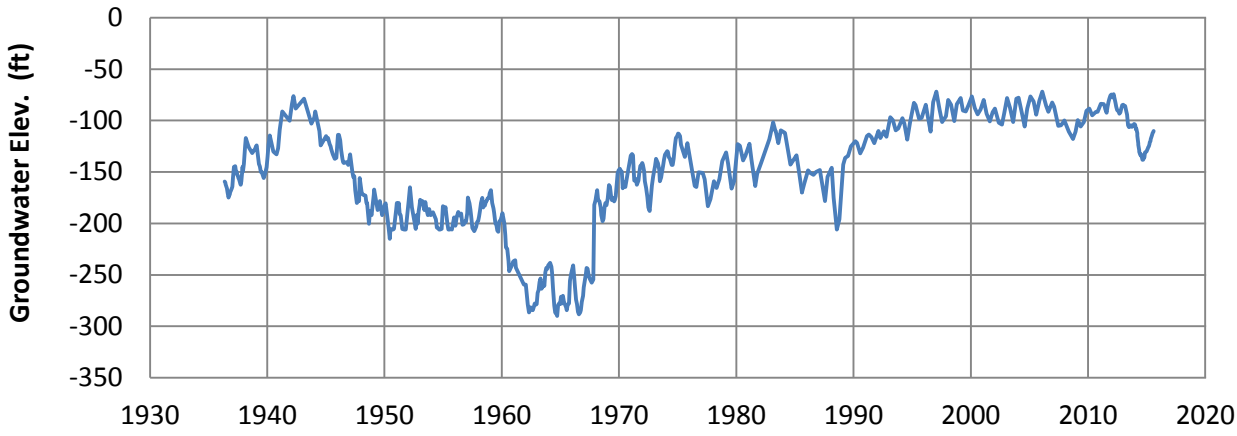


Figure 1: Groundwater Elevation in Santa Clara Subbasin (Well ID: 07S01W25L001)

Groundwater from the basin is a substantial source of water for SJWC and in 2014 groundwater accounted for about 57% of SJWC's total potable supply. The following table shows the groundwater SJWC pumped from the basin from 2011 to 2015.

Table 6: Amount of Groundwater Pumped by SJWC (AF/yr)

Basin Name	Metered or Unmetered	2011	2012	2013	2014	2015
Santa Clara Valley Subbasin	Volumetric meter data	38,500	39,696	57,707	74,552	37,888
Groundwater as a percent of total potable water supply		28.3%	28.2%	39.3%	56.8%	35.8%

Surface Water – SJWC has "pre-1914 surface water rights" to raw water in Los Gatos Creek and local watersheds in the Santa Cruz Mountains. Prior to 1872, appropriative water rights could be acquired by simply taking and beneficially using water. In 1914, the Water Code was adopted and it

grandfathered in all existing water entitlements to license holders. SJWC filed for a license in 1947 and was granted license number 10933 in 1976 by the State Water Resources Control Board to draw 6,240 AF/yr from Los Gatos Creek. SJWC has upgraded the collection and treatment system that draws water from this watershed which has increased the capacity of this entitlement to approximately 11,200 AF/yr for an average rain year.

Montevina Surface Water Treatment Plant (Plant) is the primary supply source for Town of Los Gatos, and the surrounding communities. The Plant was commissioned in 1970 and can treat up to 30 million gallons per day through direct filtration and chlorination. State and federal water quality requirements have become more stringent since 1970, and limitations in the existing treatment process often result in the loss of water supply. Microfiltration membrane technology was chosen to replace the current technology after evaluating water quality data, assessing regulatory drivers, and pilot testing available technologies. The $62 million project is underway and the upgraded Plant is scheduled to be brought online in early 2017.

Recycled Water – South Bay Water Recycling (SBWR) has been serving Silicon Valley communities since 1993 with a sustainable, high-quality water supply. SBWR was created to reduce the environmental impact of freshwater effluent discharge into the salt marshes located at the south end of the San Francisco Bay, and to help protect the California clapper rail and the salt marsh harvest mouse.

In 1997, SJWC entered into a Wholesaler-Retailer Agreement with the City of San Jose to provide recycled water to SJWC's existing and new customers nearby SBWR recycled water distribution facilities; whereas, the City of San Jose is the wholesaler and SJWC is the retailer. At the time, the involvement of SJWC was largely to assist the City in meeting its wastewater regulatory obligations. In accordance with the terms of this agreement, SJWC allowed SBWR to construct recycled water pipelines in its service area, SJWC would only own the recycled water meters, while SBWR would own, operate, and maintain the recycled water distribution system.

In 2010, this Wholesaler-Retailer Agreement was amended to allow SJWC to construct recycled water infrastructure that would be owned, operated, and maintained by SJWC. Then in 2012, this Wholesaler-Retailer Agreement was again amended to allow SJWC to construct additional recycled water infrastructure.

Summary of Existing and Planned Sources of Water – SJWC and SCVWD have worked to develop a variety of local and imported water supplies to meet demands. As demands increase with the region's growth, and imported water supplies potentially become more restricted, these planned supplies will increase in importance. In particular, groundwater, which has historically been a vital source of supply for SJWC, has recently become all the more critical for SJWC due to ongoing drought conditions. When weather conditions return to average historical conditions, groundwater and imported supplies are assumed to return to historical averages.

The following table shows the actual amount of water supplied to SJWC's distribution system from each source in 2015 as well as the projected amounts until 2040.

Table 7: Current and Projected Water Supplies[1] (AF/yr)

	2015	2020	2025	2030	2035	2040
SCVWD Treated Water	63,796	76,670	79,383	82,255	85,376	88,651
SJWC Groundwater	37,888	54,160	56,078	58,106	60,307	62,621
SJWC Surface Water	4,766	9,606	9,606	9,606	9,606	9,606
Recycled Water	1,964	4,072	6,853	8,350	8,369	8,369
Total System Demand	108,415	144,508	151,919	158,318	163,658	169,246

[1]Projected potable water supply volumes based on a 10-year average (2006-2015) of usage by type and holding surface water constant @ 10-year average.

Water Supply Vulnerability

SJWC has identified multiple sources of water for the Project which would provide a high quality, diverse and redundant source of supply. For added backup, SJWC incorporates diesel fueled generators into its facilities system which will operate wells and pumps in the event of power outages. Since SCVWD influences over 90% of SJWC's annual water supply, SJWC will continue to work with SCVWD to ensure water supply for this Project is reliable, while the impact to the existing Santa Clara Valley subbasin is minimal.

SCVWD recommends in their 2003 IWRP that water supply sources be maintained at 95% reliability during significant water shortages that occur during multiyear droughts. To accomplish this, SJWC can use less groundwater in certain areas or zones to achieve the overall balance which best meets SCVWD's and SJWC's operational goals.

Transfer and Exchange Opportunities

SJWC's distribution system has interties with the following retailers in the San Jose area: City of Santa Clara, City of San Jose Municipal Water, City of Milpitas, and Great Oaks Water. SJWC currently has no plans to use these interties for normal system operation as they are exclusively used for potential emergency sources.

Water Supply Reliability

To assess water supply reliability it is critical to first identify constraints on water sources and compare total projected water use with expected water supply.

Constraints on Water Sources – SJWC has three sources of potable water supply: groundwater, imported treated surface water and local surface water. These three sources of supply are constrained in one or more ways, driven by legal, environmental, water quality, climatic, and mechanical conditions. Additionally, there is a potential for interruption of supply caused by catastrophic events.

Table 8: Factors Resulting in Supply Inconsistency

Supply	Legal	Environmental	Water Quality	Climatic	Mechanical
Local Surface		x	x	x	x
Ground Water		x	x	x	x
SCVWD Treated Water	x	x	x	x	x

Legal - SCVWD is responsible for managing water resources in Santa Clara County, including the long-range planning for additional supplies and/or conservation needed to meet future water demands. SJWC and other retailers work closely with SCVWD to coordinate the purchase of treated imported water and the extraction of groundwater from retailer-owned wells. This activity is important to the operation of the countywide water supply and distribution system and the retailers are dependent on SCVWD's long-range resource planning.

In determining the long-range availability of water, considerations must also be given to decisions at the state or federal level that are out of the SCVWD's control. SCVWD has contracts for water deliveries with both the State Water Project (SWP) and the Federal Central Valley Project (CVP). Due to flow restrictions for the protection of water quality and the habitat of fish and wildlife in the Delta, water deliveries may be reduced from previous levels. During critical dry periods the SCVWD can expect additional reductions in water deliveries. Long-range planning success depends on the SCVWD's ability to obtain adequate imported water supplies and on proper management of the local groundwater basin.

Environmental & Climatic - SCVWD contracts with the State of California to receive raw water from the California Central Valley through the State Water Project (SWP). Water supplied through this aqueduct (which originates from the Sacramento-San Joaquin Delta) may be limited because of subsidence problems which are beginning to occur in that area and due to pumping restrictions associated with the protection of endangered species. SCVWD has also contracted with the Federal Central Valley Project (CVP) to supply raw water from the San Joaquin Valley via the Santa Clara Conduit. The reliance of water from inland sources through the SWP or the CVP is very critical; the loss of any or all of these sources due to pipe failure, levee failure, earthquake, or human intervention can have an extreme effect on SJWC's water supply. Given the above factors which could result in an inconsistent water supply, it is crucial that SJWC have sufficient backup wells and pumping capacity to supply customers for as long as several months solely from groundwater sources. SJWC believes it has this capacity in an emergency if mandatory conservation is enacted.

Water Quality - The quality of groundwater in the basins, surface water from the Santa Cruz Mountains, or the raw water supply to SCVWD's treatment plants could decrease or be contaminated such that existing treatment facilities are not adequate to meet current drinking water standards. Contamination could cause a source of supply to become unusable until further treatment techniques are utilized, or the contamination is no longer a threat to the source of supply.

Mechanical Failures - All sources of water require mechanical equipment to bring water to the public. Mechanical failures may cause water service shutdowns until repairs are made. To reduce the occurrence of failures, SJWC routinely inspects above-grade facilities at all stations. In addition, SJWC has created and implemented infrastructure replacement programs for all wells, pumps, and pipelines. To reduce the impact of mechanical failures, SJWC's maintenance department is staffed 24-hours, seven-days a week to respond to and repair any water related emergency.

Groundwater Supply Reliability – Groundwater supplies are often a reliable supply during normal and short-term drought conditions because they are local and their large storage retains available supply when surface flows become limited. However, groundwater supply availability does become threatened when overdraft occurs and when recharge and inflow decrease.
Some threats to groundwater supply reliability include:

- *Overdraft* – Under extended supply pressures, groundwater basins can enter overdraft conditions, which can have a series of consequences including subsidence.
- *Climate Change* – Climate change could increase the potential for overdraft by increasing demand, reducing other sources of supply, and reducing natural recharge and inflows from surface water and precipitation. Climate change is having a profound impact on California water resources, as evidenced by changes in snowpack, sea level, and river flows. These changes are expected to continue in the future and more precipitation will likely fall as rain instead of snow. This potential change in weather patterns will exacerbate flood risks and add additional challenges for water supply reliability.
- *Regional Growth* – Population growth could increase demands on groundwater supplies, potentially creating risk of overdraft. Regional growth could also increase the amount of contaminants entering groundwater basins as a result of increased urban runoff or industrial or other activities. Growth can also impact recharge areas by expanding impervious surfaces into areas that would otherwise represent entry points for surface water recharging local aquifers.

The Santa Clara Subbasin is able to store the largest amount of local reserves and SCVWD, as the groundwater management agency for Santa Clara County, is tasked with maintaining adequate storage in this basin to optimize reliability during extended dry periods. As groundwater is pumped by SJWC and other retailers and municipalities in Santa Clara County, SCVWD influences groundwater pumping reductions and thus reliability through financial and management practices to protect groundwater storage and minimize the risk of land subsidence.

Imported Treated Surface Water Supply Reliability – SCVWD was founded in 1929 and is the primary wholesale water supplier for Santa Clara County. Some of their core responsibilities are to provide safe, clean water for a healthy life, environment and economy. SCVWD's water originates from several sources including local reservoirs, the State Water Project and the federally funded Central Valley Project San Felipe Division. Water is piped into SJWC's system at various turnouts after it is treated at one of three SCVWD water treatment plants.

SCVWD's current water supply reserves are insufficient to meet SJWC needs throughout an extended drought. In addition, there are increasing concerns about the reliability of imported treated surface water during average years, driven by risks associated with climate change, reductions in imported water supplies, revenue requirements, and threats to infrastructure.

- *Climate Change* – In Santa Clara County, climate change is anticipated to decrease the frequency of precipitation events, but the intensity of precipitation events may increase. Climate change is expected to decrease imported water supplies as a result of reduced snow pack. Potential effects of climate change on Delta-conveyed imported water supply availability have been incorporated into SCVWD's water supply projections. However, potential climate change effects on local supplies and demands were not incorporated into their current 2012 Water Supply and Infrastructure Master Plan (WSIMP) but were included in their 2015 UWMP.
- *Reductions in Imported Water Supplies* – Over the last 15 years, major changes to state and federal water project operations have resulted from regulations to protect Delta water quality and help the recovery of endangered and threatened fish species. These regulations result in a reduction of Delta exports at certain times of the year. There is a possibility that Delta exports will be further impacted by future regulations.
- *Revenue Requirements* – Increased funding will be required for SCVWD to implement a program of activities to ensure water supplies are diversified and reliable to meet current and future demands and that treated water quality standards are met.
- *Threats to Infrastructure* – SCVWD's imported supply infrastructure must travel large distances to reach turnouts. As California is a seismically active state, infrastructure could be damaged and the result would be a disruption to water supply availability. California's water supply infrastructure is also potentially a target for acts of terrorism.

SCVWD's WSIMP is scheduled for an update in 2017 and SJWC will actively work with SCVWD to ensure the following principles are considered:

- Promote additional sources of local water supply, such as indirect potable reuse, direct potable reuse, desalination, additional conservation, and an expanded recycled water distribution system
- Coordinate operations with all retailers and municipalities to make as much surplus water as possible available for use in dry years
- Continue to pursue innovative transfer and banking programs to secure more imported water for use in dry years
- Increase public awareness about water supply issues

SCVWD's previous call for a 30 percent reduction and current call for a 20 percent reduction in water usage during this drought highlights that more investments in local water sources are necessary to ensure a reliable source of supply during multiple-dry water years.

Supply Reliability by Type of Water Year – SCVWD's Urban Water Management Plan identified average, single-dry, and multiple-dry years for water supply reliability planning. According to SCVWD, these years correspond to:

- Average Year (1922 – 2015): average supply over the hydrologic sequence of 1922 through 2015.
- Single-Dry Year (1977): Within the historic record, this was the year with the estimated lowest amount of total supply
- Multiple-Dry Years (2013 – 2015): this is a multiple dry year period that puts the most strain on the county's water supplies

Water supplies presented below are based on SCVWD's water evaluation and planning system model. According to SCVWD, this model simulates their water supply system comprised of facilities to recharge the county's groundwater basins, local water systems including the operation of reservoirs and creeks, treatment and distribution facilities, and raw water conveyance systems. The model also accounts for non-SCVWD sources and distribution of water in Santa Clara County such as imported water from San Francisco Public Utilities Commission, recycled water, and local water developed by other agencies.

Table 9: Basis of Water Year Data

Year Type	Base Year	% of Average Supply
Average Year	1922-2015	100%
Single-Dry Year	1977	100%
Multiple-Dry Years 1st Year	2013	95%
Multiple-Dry Years 2nd Year	2014	85%
Multiple-Dry Years 3rd Year	2015	66%

Average Water Year – According to SCVWD, the average water year represents average supply over the hydrologic sequence of 1922 through 2015. SJWC anticipates adequate supplies for years 2020 to 2040 to meet system demand under average year conditions

Table 10: Supply and Demand Comparison – Average Water Year (AF/yr) [1]

	2020	2025	2030	2035	2040
Supply	140,435	145,066	149,967	155,289	160,877
Demand	140,435	145,066	149,967	155,289	160,877
Difference	0	0	0	0	0

[1]Does not include recycled water or raw water

Single-Dry Water Year – The single-dry year was the year with the estimated lowest amount of total supply. Table 11 shows that supplies, with the use of reserves are sufficient to meet demands during a single-dry year through 2035. This assumes reserves are at healthy levels at the beginning of the year and that projects and programs identified in SCVWD's 2012 WSIMP are implemented.

If reserves are low at the beginning of a single-dry year, SCVWD might call for water use reductions in combination with using reserves.

Table 11: Supply and Demand Comparison – Single-Dry Water Year (AF/yr) [1]

	2020	2025	2030	2035	2040
Supply	140,435	145,066	149,967	155,289	151,308
Demand	140,435	145,066	149,967	155,289	160,877
Difference	0	0	0	0	(9,569)

[1]Does not include recycled water or raw water

Multiple-Dry Water Years – The multiple-dry year period used in this analysis assumes a repetition of the hydrology that occurred in 2013 through 2015, which is the multiple-dry year period that puts the most strain on the county's water supplies. During multiple-dry year droughts, voluntary and mandatory conservation will be needed. SCVWD will continue to work on reducing multiple-dry year deficits by securing more reliable or diverse water supplies.

Table 12: Supply and Demand Comparison – Multiple-Dry Water Years (AF/yr) [1]

		2020	2025	2030	2035	2040
First Year	**Supply**	140,435	145,066	149,967	155,289	160,877
	Demand	140,435	145,066	149,967	155,289	160,877
	Difference	0	0	0	0	0
Second Year	**Supply**	125,373	144,471	138,815	132,742	131,428
	Demand	140,435	145,066	149,967	155,289	160,877
	Difference	(15,062)	(595)	(11,152)	(22,547)	(29,449)
Third Year	**Supply**	97,550	122,945	112,926	100,779	95,089
	Demand	140,435	145,066	149,967	155,289	160,877
	Difference	(42,885)	(22,121)	(37,041)	(54,510)	(65,788)

[1]Does not include recycled water or raw water

Regional Supply Reliability – SCVWD's Ensure Sustainability water supply strategy has three key elements:

1. Secure existing supplies and facilities
2. Optimize the use of existing supplies and facilities
3. Expand water use efficiency efforts

As part of this strategy, SCVWD's 2012 WSIMP estimates water conservation and recycling, combined, will increase from about 15 percent of the county's water supply mix to about 26 percent by 2035. Developing these local sources and managing demands reduces reliance on imported water supplies. In addition, SCVWD is also working with multiple water agencies to investigate regional opportunities for collaboration to enhance water supply reliability, leverage existing infrastructure investments, facilitate water transfers during critical shortages, and improve climate change resiliency. Projects to be considered will include interagency interties and pipelines; treatment plant

improvements and expansion; groundwater management and recharge; potable reuse; desalination; and water transfers. This program may result in the addition of future supplies for SCVWD.

Water Demand Management Measures

SJWC is a signatory of the California Urban Water Conservation Council (CUWCC) and signed the CUWCC Memorandum of Understanding (MOU) in February 2006. The CUWCC is a partnership of water suppliers, environmental groups, and others interested in California water supply who have come together to agree on a set of Best Management Practices (BMPs) for water conservation in the state. Additionally, SJWC has its own water-waste provisions that come into effect when there is a water shortage. The California Public Utilities Commission (CPUC) has set forth the rules regarding water waste and water shortages governing investor owned utilities such as SJWC. The CPUC rule relating to this is Rule 14.1. This rule states that when there is a low level water shortage that prompts a call for voluntary conservation by customers, a list of water-waste provisions goes into effect. Rule 14.1 also has provisions for high level water shortages when mandatory conservation measures are deemed necessary.

SJWC provides a full range of water conservation services to both residential and commercial customers. The cornerstone of SJWC's conservation programs is the water audit program. The audit program is an excellent method for customers to learn about ways to reduce their consumption, as well as identify and fix any leaks they may have. The audits are performed at a customer request, typically in response to a high water bill concern and/or in response to marketing efforts. Audits are performed for both residential and commercial customers.

SCVWD offers conservation programs, such as rebates for high efficiency toilets and washing machines. SJWC takes advantage of all regional rebate programs and all of SCVWD's rebate programs are offered to SJWC customers. Typically customers are recommended to specific rebate programs during the course of a water audit based on a customer's need. Customers can also access rebates directly from retail outlets when purchasing equipment such as high efficiency washing machines. SJWC collaborates with SCVWD on public outreach and education including such items as customer bill inserts and conservation campaign advertising.

SJWC has also increased the outreach and educational programs on outdoor water use. SJWC constructed a water-smart demonstration garden that is open to the public (see photo to the right). Customers can visit the garden in person or take a virtual tour on SJWC's website. SJWC also developed a dedicated water wise landscaping website where customers can access a plant information database that includes hundreds of low water use plants as well as a photographic database of water wise gardens in the San Jose-Santa Clara County area. The landscaping website and the demonstration garden tour can be accessed from the SJWC home web page.

In addition to these programs, SJWC engages in other activities that contribute to the overall goal of reducing water waste, but are not specifically designated as conservation or water management programs. These include SJWC's meter calibration and replacement program, corrosion control program, valve exercising program and metering all service connections.

Summary

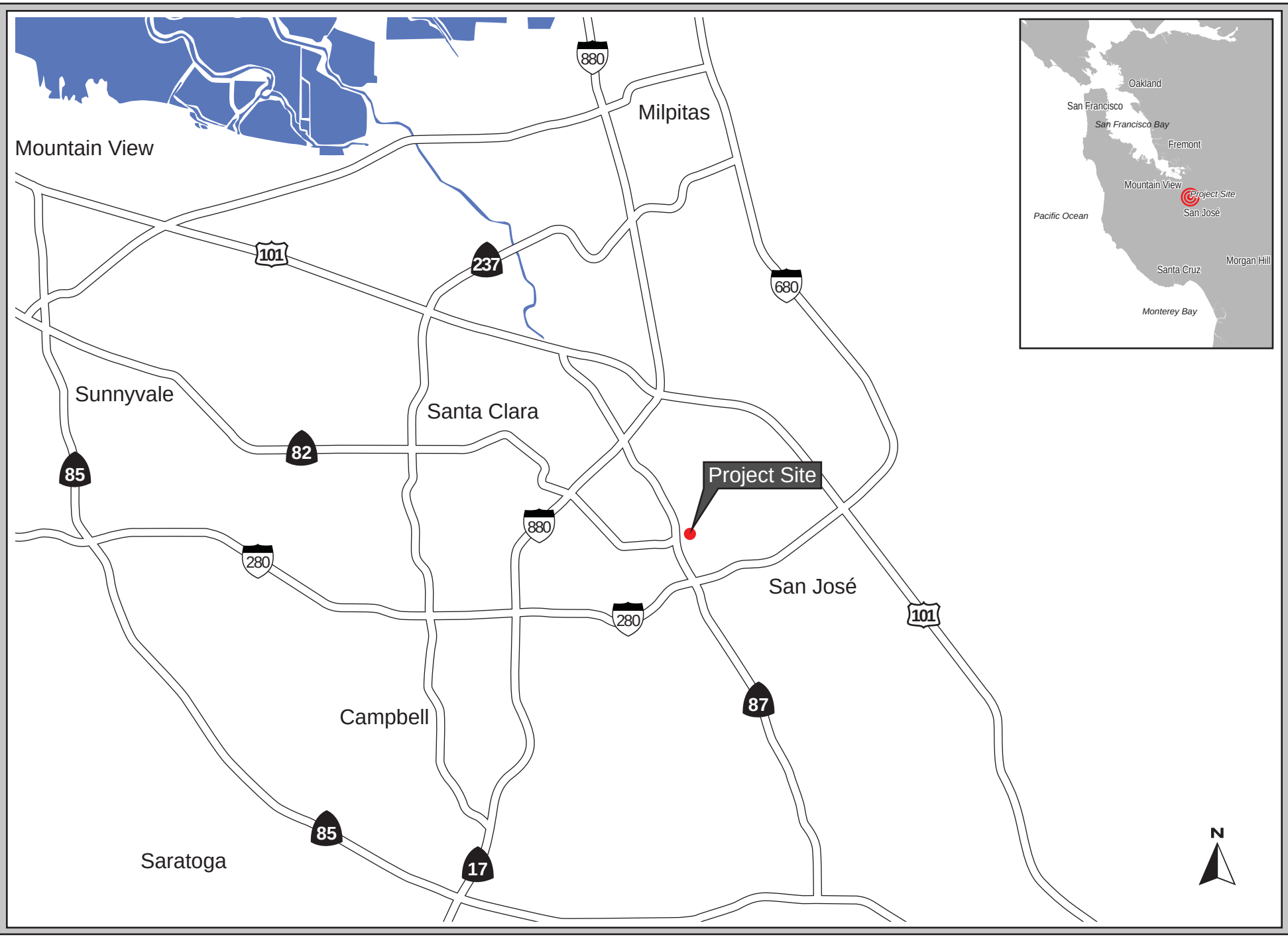
This Water Supply Assessment represents a comprehensive water supply plan for the Greyhound Residential Project. In summary:

(1) Total water usage for this Project is estimated at 355.5 acre-feet per year. However, the existing development, which is being replaced, uses an average of 13.2 acre-feet per year. Therefore, the estimated net system increase in water demand for the Project is about 342 acre-feet per year or a 0.23% increase when compared to SJWC's 2013 potable water production.

(2) SJWC currently has contracts or owns rights to receive water from the following sources:
1. Groundwater – from the Santa Clara Valley Subbasin
2. Imported surface water – from the Santa Clara Valley Water District
3. Local surface water – from Los Gatos Creek and Local Watersheds
4. Recycled water – from South Bay Water Recycling

(3) Based on San Jose Water Company's and Santa Clara Valley Water District's Urban Water Management Plans and conservation methods currently employed, there is sufficient water available to supply the Project. Also, the projected water demand for this development is within normal growth projections for water demand in SJWC's system.

SJWC works closely with SCVWD to manage its demands and imported water needs. After evaluating demands estimated for the Project and information summarized in this Water Supply Assessment, San Jose Water Company concludes that sufficient water supply exists to serve the Greyhound Residential Project.



REGIONAL MAP

FIGURE 1

VICINITY MAP

FIGURE 2

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building and Code Enforcement
HARRY FREITAS, DIRECTOR

October 17, 2016

RECEIVED SJW

OCT 17 2016

ENGINEERING

Bill Tuttle, P.E.
Director of Engineering
San Jose Water Company
1265 S. Bascom Ave.
San Jose, CA 95128

RE: WATER SUPPLY ASSESSMENT FOR DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE "GREYHOUND RESIDENTIAL PROJECT" IN SAN JOSÉ (FILE NO. SP16-021 & T16-017)

Dear Mr. Tuttle,

As the Lead Agency, the City of San José is preparing a Supplemental Environmental Impact Report to the Downtown Strategy 2000 Final Impact Report for the *Greyhound Residential Project*, located in San Jose. The proposed project is a Special Use Permit to allow the construction of 781 residential units with 20,000 square feet of ground floor retail in two (2) high rise towers with 23 to 24 stories including four (4) levels of below-grade parking on a 1.63 gross acre. And a Vesting Condominium Tentative Map to consolidate the existing four (4) lots into one (1) lot, to allow for the creation of the residential and commercial development at the project site.

The project is located on the southeast corner of Post Street and South Almaden Avenue, at 70 South Almaden Avenue in San Jose (Assessor's Parcel Numbers: 290-40-012, -013, -014, -015, and -016).

A description of the proposed project and location maps are included in the Notice of Preparation, attached. In accordance with the requirements of State law (SB 610) and the California Environmental Quality Act (CEQA) Guidelines, the City of San José requests that you provide an analysis of whether the San Jose Water Company has adequate water supply to serve this project.

Please advise the City whether this proposed development was included under the latest Urban Water Management Plan (UWMP). If the proposed development was not accounted for in the UWMP, please provide the City with a water supply assessment (WSA) identifying if the projected water supply for the next 20 years, based on normal, single year, and multiple dry years, and including existing and planned future water users, is adequate to meet the demand projected for the proposed development. In conformance with California's Water Code Section 10910(d)(1), the WSA shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system. In addition, the following information shall be provided in the WSA:

a) Written contracts or other proof of entitlement to an identified water supply;
b) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system;
c) Federal, State, and local permits for construction of necessary infrastructure associated with delivering the water supply; and
d) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

If the water supply for this project will also include groundwater, please also provide the following additional information in your WSA analysis:

e) A review of any information contained in the UWMP relevant to the identified water supply for the proposed project;
f) A description of any groundwater basin or basins from which the proposed project will be supplied;
g) A detailed description and analysis of the amount and location of groundwater pumped by the public water system; and
h) An analysis of the sufficiency of the groundwater from the basin or basins from which the project will be supplied to meet the projected water demand associated with the proposed project.

According to California Water Code Section 10910(g)(1), the deadline for your response is 90 days after receipt of this request; however, we would appreciate an earlier response, if possible. Please identify a contact person, and send your response to:

Attn: Krinjal Mathur
City of San José
Department of Planning, Building, and Code Enforcement
200 East Santa Clara Street, 3rd Floor Tower
San José, CA 95113-1905

Thank you for your assistance in this matter. Please do not hesitate to contact Krinjal Mathur environmental project manager, at 408-535-7874or via email at krinjal.mathur@sanjoseca.gov if you have any questions regarding this request or the proposed project.

Harry Freitas, Director
Department of Planning, Building, and Code Enforcement

FOR HARRY FREITAS

10/17/16
Date

Attachment: Notice of Preparation for the Greyhound Residential Project (File No. SP16-021 & T16-017)

CB&I
180 Promenade Circle, Suite 320
Sacramento, California 95834
Phone: 916.928.3300
Fax: 916.565.4356

January 30, 2017

CB&I Project No. 631215948

Mr. Aaron Costa
Santa Clara County Department of Environmental Health
Hazardous Materials Compliance Division
1555 Berger Drive, Suite 300
San Jose, California 95112-2716

Subject: November 2016 Quarterly Groundwater Monitoring and Remedial Progress Report
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Dear Mr. Costa:

Please find enclosed, the November 2016 Quarterly Groundwater Monitoring and Remedial Progress Report for the above-referenced Pacific Bell Telephone Company facility. This report summarizes the fourth quarter 2016 sampling results and provides an update on remedial progress through the end of fourth quarter 2016.

During groundwater sampling activities, free product was encountered in three of the sixteen monitoring wells and as a result, samples were not collected from these wells during this sampling event. Groundwater samples were collected for laboratory analysis from the remaining thirteen monitoring wells. Groundwater elevations, flow directions, and analytical results were consistent with previous sampling events.

As part of the remedial activities at the site, in March 2015 oxygenation of the aquifer was initiated using in-situ Submerged Oxygen Curtain (iSOC®) technology, with a biological enzyme (OSE II) injected into the vadose and phreatic zones in May 2015 to further promote remediation of the residual free phase diesel fuel. A summary of remedial activities through December 2016 is included in this report.

If you have any questions regarding the information presented in this report, please contact either Greg Rainwater with AT&T at (469) 365-1125 or Rob Delnagro with CB&I at (916) 565-4343.

Please direct any written correspondence to:

Mr. Greg Rainwater
Apex Titan for AT&T Services, Inc.
12100 Ford Road, Suite 401
Dallas, Texas 75234

Thank you for your support on this project.

Sincerely,
CB&I Environmental & Infrastructure, Inc.

Rob Delnagro, P.G.
Program Manager

cc: Mr. Greg Rainwater – Apex Titan for AT&T Services, Inc.

Perjury Statement
I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

1/30/17

Mr. Greg Rainwater
Apex Titan for AT&T Services, Inc.

Date

NOVEMBER 2016 QUARTERLY GROUNDWATER MONITORING AND REMEDIAL PROGRESS REPORT

PACIFIC BELL TELEPHONE COMPANY FACILITY
95 SOUTH ALMADEN AVENUE
SAN JOSE, CALIFORNIA

Prepared for:

AT&T Services, Inc.
308 South Akard Street, Room 1700
Dallas, Texas 75202

Prepared by:

CB&I Environmental & Infrastructure, Inc.
180 Promenade Circle, Suite 320
Sacramento, California 95834

CB&I Project No. 631215948

January 2017

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1.0 Introduction

This report documents the Fourth Quarter 2016 quarterly groundwater monitoring event and the status of remedial activities conducted at the Pacific Bell Telephone Company (Pacific Bell) facility located at 95 South Almaden Avenue (Site) in San Jose, California (Figure 1). Groundwater monitoring and sampling were performed by CB&I Environmental & Infrastructure, Inc. (CB&I) on behalf of AT&T Services, Inc., in order to comply with a request from the Santa Clara County Department of Environmental Health (SCCDEH). In a letter dated August 6, 2009, the SCCDEH requested sampling be conducted semi-annually, with sampling to be performed in the first and third quarter of each year. The SCCDEH amended this request to quarterly sampling in a letter dated October 16, 2014.

The Pacific Bell facility is located in downtown San Jose, Santa Clara County, California, and occupies an entire city block (Figure 1). The surrounding area is primarily commercial-office properties. Guadalupe Creek lies approximately 1,000 feet west of the Pacific Bell property and flows to the north. Current and former diesel fuel underground storage tank (UST) systems occupy the southwestern margin and western corner of the city-block (Figure 2).

The Pacific Bell facility contains an active switching station for telephone services to portions of the southern San Francisco Bay. The above-grade structures on the property consist of a five-story building that contains offices and telephone switching equipment and a one-story building for maintenance personnel. The facility's in-use UST complex consists of three diesel 20,000-gallon USTs piped into the main building to support backup power generation for the site's critical communication infrastructure. Most of the subject property is paved and used for parking of company-owned and private vehicles.

The site is monitored by 16 groundwater monitoring wells (Figure 2). The well depths range from 27 to 35 feet, with the oldest wells installed in 1992 and the most recent wells installed in 2015. In addition, eleven injection wells were installed at the site in 2015 to the west of the UST complex. A Site Background is provided in Appendix A.

2.0 Quarterly Groundwater Sampling Activities

The monitoring well purging and sampling methods were performed in general accordance with Regional Water Quality Control Board (RWQCB) and SCCDEH guidelines. The field sampling activities discussed in the following sections were completed by CB&I on November 14, 2016. Prior to quarterly sampling, all wells are gauged for depth-to-water and depth-to-product measurements.

2.1 Water Level Measurements

All monitoring wells were opened and allowed to equilibrate prior to collecting depth-to-water measurements. Depth-to-water measurements were then collected using an interface probe referenced to designated measuring points at the top of each well casing.

2.2 Product Monitoring

Passive skimmers were installed within monitoring wells MW-1 and MW-6, with collected product removed on a quarterly basis. If product is observed within either of the skimmers, the amount of product is gauged and recorded and placed into the purge water drum for disposal. After the wells are allowed to equilibrate and depth-to-water measurements are collected (Section 2.1), the passive skimmers are placed back into the wells. During sampling events, depth-to-water and depth-to-product measurements are collected.

2.3 Monitoring Well Sampling

Thirteen of the sixteen monitoring wells were sampled on November 14, 2016. Due to the presence of free product in three (3) wells (MW-1, MW-6, and MW-7), no samples were collected from these wells.

A peristaltic pump was used to purge the wells using low-flow purging methods prior to sampling. The groundwater quality parameters pH, specific conductivity, dissolved oxygen (DO), oxidation/reduction potential (ORP), and temperature were measured periodically during the purging process. For wells that did not have measurable free product, samples were collected once the groundwater quality parameters were shown to have stabilized. Copies of the field data sheets are included in Appendix B.

Groundwater samples were collected using new single-use Teflon™ bailers. Following collection, the sample containers were labeled, placed in an ice-packed cooler, and sent via overnight courier to the laboratory under chain-of-custody protocol. Copies of the chain-of-custody documents are included in Appendix C.

2.4 Groundwater Sample Analysis

The groundwater samples were submitted to Pace Analytical, a State of California-certified laboratory, for analysis. The samples were analyzed for:

- Total petroleum hydrocarbons as diesel (TPH-D) via EPA Method 8015B with a silica gel clean-up,
- TPH as gasoline (TPH-G) via EPA Method 8015B,

- Benzene, toluene, ethylbenzene, and xylenes (BTEX) via EPA Method 8260B,
- Fuel oxygenates methyl-t-butyl ether (MTBE), tert-butyl alcohol (TBA), di-isopropyl ether (DIPE), tert-amyl methyl ether (TAME), and ethyl tert-butyl ether (ETBE) via EPA Method 8260B,
- Biodegradation parameters sulfate and nitrate via EPA Method 300.0,
- Phosphorous via SM 4500-P E, and
- Total Hydrocarbon Degraders.

3.0 Results of Groundwater Monitoring

3.1 Product Monitoring Results

Measurable free product has historically been reported in seven wells (MW-1, MW-6, MW-7, MW-10, MW-11, MW-12, and MW-13). During the November 2016 groundwater monitoring activities, measurable free product was encountered in three (3) monitoring wells: MW-1 (0.02 feet), MW-6 (0.01 feet), and MW-7 (0.07 feet). Measurable free product was not encountered in any of the remaining monitoring wells during the November 2016 monitoring event. Well MW-11 which had measurable free product during the August 2016 sampling event, did not have measurable free product during the November 2016 sampling event.

3.2 Field Monitoring Results

On November 14, 2016, the groundwater flow direction generally ranged from northeast to east-northeast with hydraulic gradients ranging from approximately 0.021 to 0.067 feet per foot (ft/ft). The depth to groundwater ranged from 13.05 feet bgs (69.92 feet amsl) at MW-12 and 13.72 feet bgs (70.44 feet amsl) at MW-10, located on Almaden Boulevard, to 20.71 feet bgs (63.88 feet amsl) at MW-2, located near the northeastern boundary of the Site. The average groundwater elevation during the November 2016 monitoring event (66.95 feet amsl) increased 1.29 feet from the average groundwater elevation during the August 2016 monitoring event (65.66 feet amsl).

The potentiometric surface map for the November 2016 monitoring event is provided as Figure 3, with a summary of water level measurements and groundwater elevations included in Table 1.

At the request of SCCDEH, historical groundwater level measurements were utilized to prepare “rose” diagrams and charts to represent historical groundwater gradient frequency and direction. These charts indicate historical groundwater gradients primarily to the northeast with gradients ranging from 0.0007 to 0.345 ft/ft. Rose diagrams and charts are included in Appendix D.

DO concentrations in the monitoring wells during the November monitoring event ranged from 0.41 milligrams per liter (mg/L) in MW-13 to 1.94 mg/L in MW-3. DO concentration data is included in Appendix B and summarized in Table 1.

3.3 Groundwater Analytical Results

Samples were not collected from three (3) wells due to the presence of measurable SPH in those wells. Of the 13 wells sampled, five (5) wells did not contain analyte concentrations above the laboratory reporting limits. A summary of the analytical results are provided below:

- TPH-D was detected above the laboratory reporting limits (RL) in samples collected from six (6) of the 13 wells sampled. Detected concentrations ranged from 150 micrograms per liter (µg/L) in well MW-10 to 2,000 µg/L in well MW-11.
- TPH-G was detected above the RL in eight (8) of the 13 wells sampled: Detected concentrations ranged from 88.3 µg/L in well MW-14 to 4,280 µg/L in well MW-12.
- Benzene was detected above the RL in two (2) of the 13 wells sampled: MW-16 at 2.7 µg/L and MW-12 at 28.6 µg/L.
- Toluene, ethylbenzene, and xylenes were each reported in well MW-12 at concentrations of 9.8 ug/L, 5.0 µg/L, and 18.7 µg/L. These analytes were not detected above RLs in any other wells during this sampling event.
- No fuel oxygenates (MTBE, DIPE, TAME, ETBE, and TBA) were detected above RLs.

Analytical results are summarized in Table 2 and depicted on Figure 4. The samples were additionally analyzed for the biodegradation parameters sulfate, phosphorous, nitrate, and total hydrocarbon degraders; these results are summarized in Section 5.0 – Remedial Progress. A copy of the laboratory analytical report is provided in Appendix C.

4.0 Disposal of Purge Water

Approximately 35 gallons of purge and decontamination water were generated during the November 2016 groundwater sampling event. The water was transported to CB&I's Sacramento office and placed into a temporary holding tank pending off-site disposal.

5.0 Remedial Progress

The performance of the OSE II/iSOC® pilot test is based on the evaluation of observed LNAPL in the monitoring wells and concentrations of selected constituents of concern (COCs) and

electron acceptors in the groundwater. The field parameters temperature, pH, conductivity, DO and ORP and the depth to groundwater are generally measured on a monthly basis in the onsite monitoring wells and iSOC® injection wells. Monthly system monitoring logs for fourth quarter 2016 are included in Appendix D.

The minimum historical depth to water measured at the site was 12.77 feet bgs in well MW-1 in 1998. Groundwater levels continue to be below average across the Site due to the ongoing drought. However, over the past four quarters, groundwater elevations have been increasing.

- Between March 2016 and June 2016, the average groundwater elevation increased 1.2 feet. On June 1, 2016, the depth to groundwater ranged from 18.15 to 22.54 feet bgs, with an average depth of 20.16 feet bgs.

- Between June 2016 and August 2016, the average groundwater elevation increased 2.24 feet. On August 22, 2016, the depth to groundwater ranged from 15.03 to 21.76 feet bgs, with an average depth of 17.90 feet bgs.

- Between August 2016 and November 2016, the average groundwater elevation increased 1.29 feet. On November 14, 2016, the depth to groundwater ranged from 13.05 to 20.71 feet bgs, with an average depth of 16.61 feet bgs.

The mass of the residual TPH was identified between 15 to 23 feet bgs. Based on the current trend in the groundwater levels, most of the identified impacted interval resides within the current saturated interval. This condition may influence the mobilization of remaining residual diesel fuel in the soil.

The iSOC® injection wells are screened from 13 to 28 feet bgs. The greater the saturation of the well screen, the better the performance of the iSOC® systems in distributing DO into the groundwater. During the November 2016 monitoring event, the average depth to water was approximately 16.61 feet. As a result, the saturation in the iSOC® wells increased on average to 11.4 feet of saturation. The increase in the average submergence depth of the iSOC® diffuser is expected to increase the effectiveness of the system.

LNAPL continues to be present at the site. During the November 2016 sampling event, LNAPL was reported in three monitoring wells, all within the pilot study area, as presented in Section 3.1.

COC concentrations in the groundwater generally demonstrate long term stable to decreasing concentration trends at the site. TPH-D and TPH-G continue to be the primary COCs detected in the groundwater. The highest concentrations are typically found within the pilot test area and in the wells located hydraulically upgradient of the pilot test area.

DO continues to be the limiting factor in stimulating diesel-consuming bacteria beneath the Site. Most of the upper saturated zone is composed of low permeability materials that limit the migration of DO away from the injection wells. DO concentrations in the groundwater in the monitoring wells remain low, typically less than 2 mg/L. This is attributed to the low hydraulic conductivity of the formation and high potential biological oxygen demand from bacteria degrading the LNAPL and dissolved phase diesel in the groundwater. The following summarizes the geochemical parameter sampling results:

- Following purging, DO concentrations within the monitoring wells ranged from 0.19 milligrams per liter (mg/L) in well MW-10 to 0.49 mg/L in well MW-1. The low DO concentrations (less than 1.0 mg/L) indicate that groundwater at the Site is oxygen-depleted, consistent with anaerobic conditions. During the November iSOC monitoring which was concurrent with the sampling event, DO concentrations in the injection wells ranged from 0.17 in IW-5 to 33.56 mg/L in IW-7 with an average of 15.27 mg/L. During this monitoring event, five (5) injection wells had DO concentrations below 10 mg/L. Efforts are being made to increase oxygenation in these wells.
- Post-purge pH ranged from 6.86 to 7.73, which is in the optimal range (6 to 8) for biological activity.
- Nitrate concentrations were below the RL (RL range of 0.10 mg/L to 2.5 mg/L) in all but one (1) of the samples. Well MW-16 reported a nitrate concentration of 0.15 mg/L.
- Sulfate was reported in seven (7) wells at concentrations ranging from 0.56 mg/L (MW-14) to 487 mg/L (MW-8). The highest concentration was reported in well MW-8 which is located downgradient of the pilot test area. In general, sulfate concentrations within the pilot study area were lower than those downgradient to cross gradient of the pilot study area.
- Phosphorous was reported in all of the wells sampled at concentrations ranging from 0.14 mg/L (MW-8) to 1.6 mg/L (MW-5). The highest concentrations were reported in upgradient wells MW-10 and MW-12 and cross-gradient well MW-5.
- Aerobic hydrocarbon degrading bacteria densities ranged from 12 colony forming units per milliliter (CFU/ml) at wells MW-14 and MW-16 to 14,000 CFU/ml at well MW-11. No detectable concentrations were reported in well MW-13. The lab reported an elevated level of bacteria in only one well (MW-11). The remaining wells had very low to moderate densities of aerobic hydrocarbon-degrading bacteria.

Biodegradation parameters, ORP data and oxygen cylinder pressure data are presented in Tables 3, 4 and 5, respectively.

6.0 Summary and Conclusions

Groundwater flow direction and gradient were consistent with previous sampling events. Groundwater elevations during the November 2016 sampling event increased an average of 1.29 feet from the August 2016 sampling event, ranged from 70.44 feet msl (MW-10) to 63.88 feet msl (MW-2) and were consistent with previous sampling events. Groundwater elevations are still low relative to historical pre-drought conditions, but have, in general, increased in recent months to their highest levels since before iSOC was initiated in March 2015.

The number of wells containing measurable free product during the November sampling event decreased from the August sampling event. Free product was measured in three wells with thicknesses ranging from 0.01 feet to 0.07 feet. Although LNAPL is still present at the site, based on an evaluation of biodegradation parameters and bacterial colony data, multiple lines of evidence suggest in-situ biodegradation of the plume is occurring by way of both aerobic and anaerobic processes.

TPH-D, TPH-G, BTEX, and oxygenate concentrations were consistent with previous sampling events. Generally, reported concentrations for TPHd and BTEX decreased from the August 2016 sampling event and concentrations remain within historical ranges. Of the 12 wells sampled during both August 2016 and November 2016, TPHg concentrations increased in seven of the wells and remained below reporting limits in the remaining five (5) wells. The highest TPHg concentrations continues to be in upgradient wells MW-10 and MW-12, suggesting a possible off-site upgradient source. Long term decreasing concentration trends are present at the site and plume appears to be stable to decreasing in size.

7.0 Reporting Requirements

An electronic copy of this report will be uploaded to the GeoTracker database, and a notification of the upload sent to:

- Mr. Aaron Costa
  Santa Clara County Department of Environmental Health
  Hazardous Materials Compliance Division
  1555 Berger Drive, Suite 300
  San Jose, California 95112-2716

8.0 Signatures

The interpretations and conclusions contained in this report represent our professional opinions. These opinions are based on currently accepted engineering practices at this time and for this specific site. No additional warranty is implied or intended.

Report prepared by:

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Program Manager
CB&I Environmental & Infrastructure, Inc.

The work described in this report was performed under the direct supervision of a State of California Professional Geologist.

Tables

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
Monitoring Wells							
MW-1	07/07/95	---	95.44	16.05	---	---	79.39
MW-1	10/30/95	---	95.44	17.15	---	---	78.29
MW-1	01/15/96	---	95.44	---	---	---	---
MW-1	10/18/96	---	95.44	16.70	---	---	78.74
MW-1	01/30/97	---	95.44	14.14	---	---	81.30
MW-1	04/30/97	---	95.44	15.81	---	---	79.63
MW-1	07/25/97	---	95.44	15.59	---	---	79.85
MW-1	10/30/97	---	95.44	---	---	---	---
MW-1	04/28/98	---	95.44	12.77	---	---	82.67
MW-1	07/10/98	---	95.44	13.71	---	---	81.73
MW-1	10/26/98	---	95.44	14.81	---	---	80.63
MW-1	01/28/99	---	95.44	15.04	---	---	80.40
MW-1	07/22/99	---	95.44	14.57	---	---	80.87
MW-1	01/20/00	---	95.44	---	---	---	---
MW-1	09/11/00	0.38	95.44	16.90	---	---	78.54
MW-1	01/29/01	0.79	95.44	16.68	---	---	78.76
MW-1	03/08/01	1.20	95.44	15.81	---	---	79.63
MW-1	06/21/01	0.85	95.44	15.65	---	---	79.79
MW-1	10/03/01	1.00	95.44	16.85	---	---	78.59
MW-1	12/21/01	1.66	95.44	17.00	---	---	78.44
MW-1	03/15/02	1.50	95.44	16.98	---	---	78.46
MW-1	04/16/02	1.05	95.44	16.96	---	---	78.48
MW-1	07/08/02	1.04	95.44	17.17	---	---	78.27
MW-1	10/08/02	0.05	95.44	17.60	---	---	77.84
MW-1	01/13/03	0.16	95.44	16.25	---	---	79.19
MW-1	04/15/03	0.10	95.44	16.21	---	---	79.23
MW-1	07/01/03	0.10	95.44	14.94	---	---	80.50
MW-1	10/14/03	0.39	95.44	16.64	---	---	78.80
MW-1	01/21/04	0.07	95.44	16.31	---	---	79.13
MW-1	04/07/04	---	95.44	15.66	---	---	79.78
MW-1	07/07/04	1.68	95.44	15.84	---	---	79.60
MW-1	10/05/04	0.09	95.44	17.10	---	---	78.34
MW-1	03/10/05	---	95.44	15.60	---	---	79.84
MW-1	06/07/05	---	95.44	15.40	---	---	80.04
MW-1	08/09/05	---	95.44	15.75	---	---	79.69
MW-1	11/09/05	---	95.44	16.10	---	---	79.34
MW-1	02/01/06	---	95.44	14.90	---	---	80.54
MW-1	05/03/06	---	95.44	13.83	---	---	81.61
MW-1	07/25/06	---	95.44	16.60	---	---	78.84
MW-1	11/06/06	---	95.44	19.42	---	---	76.02
MW-1	02/21/07	1.68	95.44	20.62	---	---	74.82
MW-1	05/14/07	---	95.44	18.85	---	---	76.59
MW-1	09/19/07	---	95.44	15.99	---	---	79.45
MW-1	12/03/07	---	95.44	17.09	---	---	78.35
MW-1	03/27/08	0.66	95.44	15.80	---	---	79.64
MW-1	06/12/08	---	95.44	17.08	---	---	78.36
MW-1	09/18/08	---	95.44	17.77	---	---	77.67
MW-1	12/31/08	---	95.44	17.99	---	---	77.45
MW-1	03/25/09	---	95.44	17.17	---	---	78.27
MW-1	06/16/09	---	95.44	17.39	---	---	78.05
MW-1	09/09/09	---	95.44	---	---	---	---
MW-1	03/05/10	3.40	95.44	15.67	---	---	79.77

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MW-1	09/17/10	---	95.44	16.21	---	---	79.23
MW-1	03/23/11	2.20	95.44	15.03	---	---	80.41
MW-1	09/27/11	3.10	95.44	15.50	---	---	79.94
MW-1	03/21/12	---	95.44	15.37	---	---	80.07
MW-1	09/28/12	4.00	95.44	16.70	---	---	78.74
MW-1	03/29/13	3.80	95.44	16.01	---	---	79.43
MW-1	09/27/13	---	95.42	16.64	---	---	78.78
MW-1	03/27/14	---	95.42	18.63	18.62	0.01	76.79
MW-1	08/11/14	0.50	95.42	19.69	NP	0.00	75.73
MW-1	03/12/15	---	95.42	19.26	19.21	0.05	76.16
MW-1	03/17/15	0.54	95.42	21.33	---	---	74.09
MW-1	03/19/15	1.30	95.42	21.35	21.34	0.01	74.07
MW-1	03/20/15	0.62	95.42	21.38	---	---	74.04
MW-1	03/23/15	2.28	95.42	20.13	---	---	75.29
MW-1	03/24/15	0.28	95.42	21.33	---	---	74.09
MW-1	03/25/15	0.56	95.42	21.39	---	---	74.03
MW-1	04/10/15	0.03	95.42	21.54	21.53	0.01	73.88
MW-1	04/17/15	0.04	95.42	21.56	21.55	0.01	73.86
MW-1	04/23/15	0.15	95.42	21.72	21.70	0.02	73.70
MW-1	05/19/15	0.73	95.42	21.76	21.75	0.01	73.66
MW-1	06/23/15	0.24	95.42	22.13	22.12	0.01	73.29
MW-1	07/13/15	0.42	95.42	22.33	---	---	73.09
MW-1	08/13/15	---	95.42	---	---	---	---
MW-1	09/01/15	0.33	82.64*	23.54	23.46	0.08	59.10
MW-1	10/22/15	0.59	82.64	22.70	22.69	0.01	59.94
MW-1	11/19/15	0.26	82.64	22.75	22.73	0.02	59.89
MW-1	12/29/15	2.43	82.64	22.35	---	---	60.29
MW-1	02/02/16	1.38	82.64	21.52	---	---	61.12
MW-1	03/21/16	1.50	82.64	20.42	20.39	0.03	62.22
MW-1	03/29/16	1.50	82.64	---	---	---	---
MW-1	04/27/16	4.74	82.64	19.70	---	---	62.94
MW-1	05/26/16	2.51	82.64	19.30	---	---	63.34
MW-1	06/01/16	0.16 [a]	82.64	19.34	19.32	0.02	63.30
MW-1	06/29/16	2.82	82.64	19.10	---	---	63.54
MW-1	07/21/16	1.75	82.64	17.60	---	---	65.04
MW-1	08/22/16	12.49	82.64	17.27	17.25	0.02	65.37
MW-1	09/22/16	3.50	82.64	17.40	17.39	0.01	65.24
MW-1	10/25/16	0.96	82.64	16.51	16.50	0.01	66.13
MW-1	11/14/16	---	82.64	15.95	15.93	0.02	66.69
MW-1	12/27/16	1.13	82.64	16.63	16.62	0.01	66.01
MW-2	07/07/95	---	97.20	18.85	---	---	78.35
MW-2	10/30/95	---	97.20	19.68	---	---	77.52
MW-2	01/15/96	---	97.20	19.90	---	---	77.30
MW-2	10/18/96	---	97.20	20.09	---	---	77.11
MW-2	01/30/97	---	97.20	18.46	---	---	78.74
MW-2	04/30/97	---	97.20	18.12	---	---	79.08
MW-2	07/25/97	---	97.20	18.64	---	---	78.56
MW-2	10/30/97	---	97.20	19.63	---	---	77.57
MW-2	04/28/98	---	97.20	16.34	---	---	80.86
MW-2	07/10/98	---	97.20	17.31	---	---	79.89
MW-2	10/26/98	---	97.20	18.58	---	---	78.62
MW-2	01/28/99	---	97.20	19.03	---	---	78.17
MW-2	07/22/99	---	97.20	18.72	---	---	78.48
MW-2	01/20/00	---	97.20	19.52	---	---	77.68

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MW-2	09/11/00	0.49	97.20	19.60	---	---	77.60
MW-2	01/29/01	0.63	97.20	20.17	---	---	77.03
MW-2	03/08/01	1.09	97.20	19.83	---	---	77.37
MW-2	06/21/01	0.60	97.20	19.80	---	---	77.40
MW-2	10/03/01	1.08	97.20	20.89	---	---	76.31
MW-2	12/21/01	1.18	97.20	21.00	---	---	76.20
MW-2	03/15/02	1.28	97.20	20.60	---	---	76.60
MW-2	04/16/02	1.03	97.20	20.50	---	---	76.70
MW-2	07/08/02	1.08	97.20	20.53	---	---	76.67
MW-2	10/08/02	0.07	97.20	20.97	---	---	76.23
MW-2	01/13/03	0.28	97.20	20.06	---	---	77.14
MW-2	04/15/03	0.39	97.20	19.57	---	---	77.63
MW-2	07/01/03	0.30	97.20	19.60	---	---	77.60
MW-2	10/14/03	0.48	97.20	20.27	---	---	76.93
MW-2	01/21/04	0.10	97.20	19.85	---	---	77.35
MW-2	04/07/04	---	97.20	19.27	---	---	77.93
MW-2	07/07/04	3.54	97.20	19.40	---	---	77.80
MW-2	10/05/04	0.08	97.20	20.49	---	---	76.71
MW-2	03/10/05	---	97.20	19.59	---	---	77.61
MW-2	06/07/05	---	97.20	19.10	---	---	78.10
MW-2	08/09/05	---	97.20	19.10	---	---	78.10
MW-2	11/09/05	---	97.20	19.89	---	---	77.31
MW-2	11/09/05	---	97.20	19.89	---	---	77.31
MW-2	02/01/06	---	97.20	18.88	---	---	78.32
MW-2	05/03/06	---	97.20	17.91	---	---	79.29
MW-2	07/25/06	---	97.20	20.03	---	---	77.17
MW-2	11/06/06	---	97.20	22.21	---	---	74.99
MW-2	02/21/07	4.60	97.20	22.24	---	---	74.96
MW-2	05/14/07	---	97.20	20.96	---	---	76.24
MW-2	09/19/07	---	97.20	20.26	---	---	76.94
MW-2	12/03/07	---	97.20	20.75	---	---	76.45
MW-2	03/27/08	0.33	97.20	20.08	---	---	77.12
MW-2	06/12/08	---	97.20	20.54	---	---	76.66
MW-2	09/18/08	---	97.20	21.49	---	---	75.71
MW-2	12/31/08	1.14	97.20	22.08	---	---	75.12
MW-2	03/25/09	1.62	97.20	21.38	---	---	75.82
MW-2	06/16/09	1.78	97.20	21.40	---	---	75.80
MW-2	09/09/09	2.40	97.20	21.70	---	---	75.50
MW-2	03/05/10	2.60	97.20	19.50	---	---	77.70
MW-2	09/17/10	1.82	97.20	19.87	---	---	77.33
MW-2	03/23/11	2.60	97.20	18.60	---	---	78.60
MW-2	09/27/11	2.80	97.20	19.05	---	---	78.15
MW-2	03/21/12	2.40	97.20	18.17	---	---	79.03
MW-2	09/28/12	2.80	97.20	18.84	---	---	78.36
MW-2	03/29/13	2.20	97.20	18.78	---	---	78.42
MW-2	09/27/13	4.30	97.20	19.97	---	---	77.23
MW-2	03/27/14	0.69	97.20	23.10	NP	0.00	74.10
MW-2	08/11/14	0.61	97.20	23.81	NP	0.00	73.39
MW-2	03/12/15	0.58	97.20	25.10	NP	0.00	72.10
MW-2	03/17/15	1.07	97.20	25.13	---	---	72.07
MW-2	03/19/15	1.29	97.20	25.13	---	---	72.07
MW-2	03/20/15	1.44	97.20	25.14	---	---	72.06
MW-2	03/23/15	0.61	97.20	25.15	---	---	72.05
MW-2	03/24/15	0.47	97.20	22.74	---	---	74.46

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MW-2	03/25/15	0.47	97.20	25.17	---	---	72.03
MW-2	04/10/15	0.05	97.20	25.22	---	---	71.98
MW-2	04/17/15	0.06	97.20	25.25	---	---	71.95
MW-2	04/23/15	0.61	97.20	25.22	NP	0.00	71.98
MW-2	05/19/15	0.61	97.20	25.30	NP	0.00	71.90
MW-2	06/23/15	0.35	97.20	25.40	NP	0.00	71.80
MW-2	07/13/15	1.30	97.20	---	---	---	---
MW-2	08/13/15	0.97	97.20	25.70	---	---	71.50
MW-2	08/19/15	0.97	97.20	25.70	---	---	71.50
MW-2	09/01/15	0.38	84.59*	25.64	NP	0.00	58.95
MW-2	10/22/15	0.72	84.59	25.74	NP	0.00	58.85
MW-2	11/19/15	0.91	84.59	25.79	NP	0.00	58.80
MW-2	12/29/15	2.58	84.59	25.40	---	---	59.19
MW-2	02/02/16	1.47	84.59	24.77	---	---	59.82
MW-2	03/21/16	5.81	84.59	23.82	NP	0.00	60.77
MW-2	03/29/16	2.52	84.59	---	---	---	---
MW-2	04/27/16	4.62	84.59	23.15	---	---	61.44
MW-2	05/26/16	2.31	84.59	22.64	---	---	61.95
MW-2	06/01/16	0.67 [a]	84.59	22.54	NP	0.00	62.05
MW-2	06/29/16	1.71	84.59	22.27	---	---	62.32
MW-2	07/21/16	14.10	84.59	22.05	---	---	62.54
MW-2	08/22/16	1.21	84.59	21.76	NP	0.00	62.83
MW-2	09/22/16	2.42	84.59	20.60	NP	0.00	63.99
MW-2	10/24/16	0.72	84.59	20.15	NP	0.00	64.44
MW-2	11/14/16	0.50	84.59	20.71	NP	0.00	63.88
MW-2	12/27/16	0.68	84.59	20.25	NP	0.00	64.34
MW-3	07/07/95	---	96.75	18.10	---	---	78.65
MW-3	10/31/95	---	96.75	19.19	---	---	77.56
MW-3	01/15/96	---	96.75	19.10	---	---	77.65
MW-3	10/18/96	---	96.75	19.22	---	---	77.53
MW-3	01/30/97	---	96.75	17.07	---	---	79.68
MW-3	04/30/97	---	96.75	17.46	---	---	79.29
MW-3	07/25/97	---	96.75	17.91	---	---	78.84
MW-3	10/30/97	---	96.75	18.19	---	---	78.56
MW-3	04/28/98	---	96.75	15.69	---	---	81.06
MW-3	07/10/98	---	96.75	16.64	---	---	80.11
MW-3	10/26/98	---	96.75	17.70	---	---	79.05
MW-3	01/28/99	---	96.75	17.87	---	---	78.88
MW-3	07/22/99	---	96.75	17.63	---	---	79.12
MW-3	01/20/00	---	96.75	19.41	---	---	77.34
MW-3	09/11/00	0.26	96.75	19.46	---	---	77.29
MW-3	01/29/01	0.29	96.75	19.45	---	---	77.30
MW-3	03/08/01	1.38	96.75	19.91	---	---	76.84
MW-3	06/21/01	0.31	96.75	18.73	---	---	78.02
MW-3	10/03/01	1.35	96.75	19.92	---	---	76.83
MW-3	12/21/01	1.21	96.75	20.03	---	---	76.72
MW-3	03/15/02	1.15	96.75	19.65	---	---	77.10
MW-3	04/16/02	1.03	96.75	19.53	---	---	77.22
MW-3	07/08/02	1.02	96.75	19.72	---	---	77.03
MW-3	10/08/02	0.06	96.75	20.15	---	---	76.60
MW-3	01/13/03	0.09	96.75	19.40	---	---	77.35
MW-3	04/15/03	0.23	96.75	18.82	---	---	77.93
MW-3	07/01/03	0.17	96.75	18.96	---	---	77.79
MW-3	10/14/03	0.39	96.75	19.65	---	---	77.10

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-3	01/21/04	0.07	96.75	19.11	---	---	77.64
MW-3	04/07/04	---	96.75	18.30	---	---	78.45
MW-3	07/07/04	1.09	96.75	18.65	---	---	78.10
MW-3	10/05/04	0.08	96.75	19.62	---	---	77.13
MW-3	03/10/05	---	96.75	18.55	---	---	78.20
MW-3	06/07/05	---	96.75	17.95	---	---	78.80
MW-3	08/09/05	---	96.75	18.21	---	---	78.54
MW-3	11/09/05	---	96.75	18.71	---	---	78.04
MW-3	02/01/06	---	96.75	17.70	---	---	79.05
MW-3	05/03/06	---	96.75	16.44	---	---	80.31
MW-3	07/25/06	---	96.75	18.93	---	---	77.82
MW-3	11/06/06	---	96.75	21.54	---	---	75.21
MW-3	02/21/07	3.27	96.75	22.17	---	---	74.58
MW-3	05/14/07	---	96.75	20.93	---	---	75.82
MW-3	09/19/07	---	96.75	19.14	---	---	77.61
MW-3	12/03/07	---	96.75	19.72	---	---	77.03
MW-3	03/27/08	0.31	96.75	18.22	---	---	78.53
MW-3	06/12/08	---	96.75	19.51	---	---	77.24
MW-3	09/18/08	---	96.75	20.41	---	---	76.34
MW-3	12/31/08	1.23	96.75	20.77	---	---	75.98
MW-3	03/25/09	3.93	96.75	19.89	---	---	76.86
MW-3	06/16/09	1.92	96.75	20.20	---	---	76.55
MW-3	09/09/09	2.80	96.75	20.80	---	---	75.95
MW-3	03/05/10	3.00	96.75	18.88	---	---	77.87
MW-3	09/17/10	1.70	96.75	19.24	---	---	77.51
MW-3	03/23/11	2.00	96.75	18.60	---	---	78.15
MW-3	09/27/11	2.20	96.75	18.47	---	---	78.28
MW-3	03/21/12	2.80	96.75	17.88	---	---	78.87
MW-3	09/28/12	2.40	96.75	18.31	---	---	78.44
MW-3	03/29/13	2.60	96.75	18.21	---	---	78.54
MW-3	09/27/13	2.71	96.75	19.40	---	---	77.35
MW-3	03/27/14	0.60	96.75	22.00	NP	0.00	74.75
MW-3	08/11/14	0.56	96.75	22.82	NP	0.00	73.93
MW-3	03/12/15	0.64	96.75	24.09	NP	0.00	72.66
MW-3	03/17/15	0.63	96.75	24.19	---	---	72.56
MW-3	03/19/15	1.20	96.75	24.20	---	---	72.55
MW-3	03/20/15	1.23	96.75	24.21	---	---	72.54
MW-3	03/23/15	0.77	96.75	24.23	---	---	72.52
MW-3	03/24/15	0.70	96.75	24.24	---	---	72.51
MW-3	03/25/15	0.64	96.75	24.26	---	---	72.49
MW-3	04/10/15	0.10	96.75	24.55	---	---	72.20
MW-3	04/17/15	0.12	96.75	24.57	---	---	72.18
MW-3	04/23/15	0.29	96.75	24.32	NP	0.00	72.43
MW-3	05/19/15	0.76	96.75	24.40	NP	0.00	72.35
MW-3	06/23/15	0.48	96.75	23.58	NP	0.00	73.17
MW-3	07/13/15	0.55	96.75	24.88	---	---	71.87
MW-3	08/13/15	1.70	96.75	24.89	---	---	71.86
MW-3	08/19/15	1.70	96.75	24.89	---	---	71.86
MW-3	09/01/15	0.38	84.16*	24.85	NP	0.00	59.31
MW-3	10/22/15	0.59	84.16	25.02	NP	0.00	59.14
MW-3	11/19/15	2.11	84.16	25.04	NP	0.00	59.12
MW-3	12/29/15	1.79	84.16	24.78	---	---	59.38
MW-3	02/02/16	1.86	84.16	24.15	---	---	60.01
MW-3	03/21/16	3.49	84.16	23.24	NP	0.00	60.92

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MW-3	03/29/16	2.18	84.16	---	---	---	---
MW-3	04/27/16	6.74	84.16	22.60	---	---	61.56
MW-3	05/26/16	3.99	84.16	22.18	---	---	61.98
MW-3	06/01/16	1.87 [a]	84.16	22.11	NP	0.00	62.05
MW-3	06/29/16	2.57	84.16	21.92	---	---	62.24
MW-3	07/21/16	1.91	84.16	21.48	---	---	62.68
MW-3	08/22/16	1.06	84.16	21.10	NP	0.00	63.06
MW-3	09/22/16	2.70	84.16	20.95	NP	0.00	63.21
MW-3	10/24/16	0.70	84.16	20.45	NP	0.00	63.71
MW-3	11/14/16	1.94	84.16	20.06	NP	0.00	64.10
MW-3	12/27/16	0.94	84.16	19.73	NP	0.00	64.43
MW-4	07/07/95	---	96.71	17.20	---	---	79.51
MW-4	10/31/95	---	96.71	18.16	---	---	78.55
MW-4	01/15/96	---	96.71	18.15	---	---	78.56
MW-4	10/18/96	---	96.71	18.28	---	---	78.43
MW-4	01/30/97	---	96.71	16.31	---	---	80.40
MW-4	04/30/97	---	96.71	16.61	---	---	80.10
MW-4	07/25/97	---	96.71	17.17	---	---	79.54
MW-4	10/30/97	---	96.71	17.65	---	---	79.06
MW-4	04/28/98	---	96.71	14.39	---	---	82.32
MW-4	07/10/98	---	96.71	15.29	---	---	81.42
MW-4	10/26/98	---	96.71	16.36	---	---	80.35
MW-4	01/28/99	---	96.71	16.76	---	---	79.95
MW-4	07/22/99	---	96.71	16.22	---	---	80.49
MW-4	01/20/00	---	96.71	17.41	---	---	79.30
MW-4	09/11/00	0.39	96.71	17.73	---	---	78.98
MW-4	01/29/01	0.48	96.71	18.00	---	---	78.71
MW-4	03/08/01	1.71	96.71	17.58	---	---	79.13
MW-4	06/21/01	0.51	96.71	17.52	---	---	79.19
MW-4	10/03/01	0.90	96.71	18.66	---	---	78.05
MW-4	12/21/01	1.08	96.71	18.97	---	---	77.74
MW-4	03/15/02	1.17	96.71	18.85	---	---	77.86
MW-4	04/16/02	1.03	96.71	18.80	---	---	77.91
MW-4	07/08/02	1.06	96.71	18.87	---	---	77.84
MW-4	10/08/02	0.07	96.71	19.11	---	---	77.60
MW-4	01/13/03	0.32	96.71	17.54	---	---	79.17
MW-4	04/15/03	0.03	96.71	17.81	---	---	78.90
MW-4	07/01/03	0.25	96.71	17.25	---	---	79.46
MW-4	10/14/03	0.31	96.71	18.29	---	---	78.42
MW-4	01/21/04	0.08	96.71	18.00	---	---	78.71
MW-4	04/07/04	---	96.71	17.45	---	---	79.26
MW-4	07/07/04	0.13	96.71	17.45	---	---	79.26
MW-4	10/05/04	0.04	96.71	18.65	---	---	78.06
MW-4	03/10/05	---	96.71	17.68	---	---	79.03
MW-4	06/07/05	---	96.71	17.15	---	---	79.56
MW-4	08/09/05	---	96.71	17.28	---	---	79.43
MW-4	11/09/05	---	96.71	18.00	---	---	78.71
MW-4	02/01/06	---	96.71	16.84	---	---	79.87
MW-4	05/03/06	---	96.71	15.53	---	---	81.18
MW-4	07/25/06	---	96.71	18.10	---	---	78.61
MW-4	11/06/06	---	96.71	20.28	---	---	76.43
MW-4	02/21/07	17.30	96.71	20.95	---	---	75.76
MW-4	05/14/07	---	96.71	19.92	---	---	76.79
MW-4	09/19/07	---	96.71	18.12	---	---	78.59

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95 South Almaden Avenue
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Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-4	12/03/07	---	96.71	18.88	---	---	77.83
MW-4	03/27/08	0.30	96.71	18.09	---	---	78.62
MW-4	06/12/08	---	96.71	18.71	---	---	78.00
MW-4	09/18/08	---	96.71	19.66	---	---	77.05
MW-4	12/31/08	1.96	96.71	20.23	---	---	76.48
MW-4	03/25/09	0.82	96.71	19.22	---	---	77.49
MW-4	06/16/09	1.36	96.71	19.44	---	---	77.27
MW-4	09/09/09	2.80	96.71	19.80	---	---	76.91
MW-4	03/05/10	3.00	96.71	17.55	---	---	79.16
MW-4	09/17/10	1.81	96.71	18.10	---	---	78.61
MW-4	03/23/11	2.60	96.71	17.00	---	---	79.71
MW-4	09/27/11	2.60	96.71	17.47	---	---	79.24
MW-4	03/21/12	2.80	96.71	16.90	---	---	79.81
MW-4	09/28/12	2.20	96.71	17.10	---	---	79.61
MW-4	03/29/13	2.30	96.71	17.45	---	---	79.26
MW-4	09/27/13	3.20	96.76	18.25	---	---	78.51
MW-4	03/27/14	0.48	96.76	20.74	NP	0.00	76.02
MW-4	08/11/14	0.49	96.76	21.41	NP	0.00	75.35
MW-4	03/12/15	0.39	96.76	22.60	NP	0.00	74.16
MW-4	03/17/15	1.35	96.76	22.65	---	---	74.11
MW-4	03/19/15	2.69	96.76	22.65	---	---	74.11
MW-4	03/20/15	1.04	96.76	22.69	---	---	74.07
MW-4	03/23/15	0.81	96.76	22.77	---	---	73.99
MW-4	03/24/15	0.58	96.76	25.17	---	---	71.59
MW-4	03/25/15	0.53	96.76	22.78	---	---	73.98
MW-4	04/10/15	0.16	96.76	22.81	---	---	73.95
MW-4	04/17/15	0.16	96.76	22.83	---	---	73.93
MW-4	04/23/15	0.13	96.76	22.89	NP	0.00	73.87
MW-4	05/19/15	0.62	96.76	23.01	NP	0.00	73.75
MW-4	06/23/15	0.24	96.76	23.20	NP	0.00	73.56
MW-4	07/13/15	0.19	96.76	23.38	---	---	73.38
MW-4	08/13/15	0.43	96.76	23.59	---	---	73.17
MW-4	08/19/15	0.43	96.76	23.59	---	---	73.17
MW-4	09/01/15	0.39	84.22*	23.56	NP	0.00	60.66
MW-4	10/22/15	0.68	84.22	23.80	NP	0.00	60.42
MW-4	11/19/15	1.03	84.22	23.82	NP	0.00	60.40
MW-4	12/29/15	2.06	84.22	23.53	---	---	60.69
MW-4	02/02/16	1.66	84.22	22.76	---	---	61.46
MW-4	03/21/16	0.99	84.22	21.67	NP	0.00	62.55
MW-4	03/29/16	0.71	84.22	---	---	---	---
MW-4	04/27/16	4.77	84.22	21.04	---	---	63.18
MW-4	05/26/16	3.81	84.22	22.67	---	---	61.55
MW-4	06/01/16	1.12 [a]	84.22	20.62	NP	0.00	63.60
MW-4	06/29/16	2.08	84.22	20.47	---	---	63.75
MW-4	07/21/16	1.43	84.22	19.54	---	---	64.68
MW-4	08/22/16	0.85	84.22	18.95	NP	0.00	65.27
MW-4	09/22/16	1.92	84.22	19.37	NP	0.00	64.85
MW-4	10/24/16	0.70	84.22	18.62	NP	0.00	65.60
MW-4	11/14/16	0.88	84.22	18.15	NP	0.00	66.07
MW-4	12/27/16	1.26	84.22	18.48	NP	0.00	65.74
MW-5	07/07/95	---	96.01	16.20	---	---	79.81
MW-5	10/30/95	---	96.01	17.30	---	---	78.71
MW-5	01/15/96	---	96.01	17.25	---	---	78.76
MW-5	10/18/96	---	96.01	17.28	---	---	78.73

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95 South Almaden Avenue
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Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-5	01/30/97	---	96.01	14.93	---	---	81.08
MW-5	04/30/97	---	96.01	15.78	---	---	80.23
MW-5	07/25/97	---	96.01	16.20	---	---	79.81
MW-5	10/30/97	---	96.01	16.59	---	---	79.42
MW-5	04/28/98	---	96.01	13.39	---	---	82.62
MW-5	07/10/98	---	96.01	14.32	---	---	81.69
MW-5	10/26/98	---	96.01	16.11	---	---	79.90
MW-5	01/28/99	---	96.01	15.69	---	---	80.32
MW-5	07/22/99	---	96.01	15.45	---	---	80.56
MW-5	01/20/00	---	96.01	16.85	---	---	79.16
MW-5	09/11/00	0.40	96.01	17.21	---	---	78.80
MW-5	01/29/01	0.42	96.01	17.16	---	---	78.85
MW-5	03/08/01	1.35	96.01	16.46	---	---	79.55
MW-5	06/21/01	0.41	96.01	16.35	---	---	79.66
MW-5	10/03/01	0.90	96.01	18.66	---	---	77.35
MW-5	12/21/01	1.01	96.01	17.82	---	---	78.19
MW-5	03/15/02	1.10	96.01	17.68	---	---	78.33
MW-5	04/16/02	1.01	96.01	17.63	---	---	78.38
MW-5	07/08/02	1.03	96.01	17.82	---	---	78.19
MW-5	10/08/02	0.05	96.01	18.00	---	---	78.01
MW-5	01/13/03	0.21	96.01	16.67	---	---	79.34
MW-5	04/15/03	0.09	96.01	16.79	---	---	79.22
MW-5	07/01/03	0.13	96.01	15.55	---	---	80.46
MW-5	10/14/03	0.51	96.01	17.30	---	---	78.71
MW-5	01/21/04	0.35	96.01	16.90	---	---	79.11
MW-5	04/07/04	---	96.01	16.30	---	---	79.71
MW-5	07/07/04	0.76	96.01	16.37	---	---	79.64
MW-5	10/05/04	0.05	96.01	17.50	---	---	78.51
MW-5	03/10/05	---	96.01	16.38	---	---	79.63
MW-5	06/07/05	---	96.01	15.97	---	---	80.04
MW-5	08/09/05	---	96.01	16.24	---	---	79.77
MW-5	11/09/05	---	96.01	16.65	---	---	79.36
MW-5	02/01/06	---	96.01	15.42	---	---	80.59
MW-5	05/03/06	---	96.01	14.25	---	---	81.76
MW-5	07/25/06	---	96.01	17.00	---	---	79.01
MW-5	11/06/06	---	96.01	---	---	---	---
MW-5	02/21/07	18.50	96.01	20.40	---	---	75.61
MW-5	05/14/07	---	96.01	19.24	---	---	76.77
MW-5	09/19/07	---	96.01	16.55	---	---	79.46
MW-5	12/03/07	---	96.01	17.68	---	---	78.33
MW-5	03/27/08	0.25	96.01	16.52	---	---	79.49
MW-5	06/12/08	---	96.01	17.48	---	---	78.53
MW-5	09/18/08	---	96.01	18.41	---	---	77.60
MW-5	12/31/08	2.09	96.01	18.85	---	---	77.16
MW-5	03/25/09	1.34	96.01	17.90	---	---	78.11
MW-5	06/16/09	1.04	96.01	18.24	---	---	77.77
MW-5	09/09/09	2.80	96.01	18.65	---	---	77.36
MW-5	03/05/10	2.90	96.01	16.20	---	---	79.81
MW-5	09/17/10	1.47	96.01	16.99	---	---	79.02
MW-5	03/23/11	2.50	96.01	15.95	---	---	80.06
MW-5	09/27/11	2.80	96.01	16.40	---	---	79.61
MW-5	03/21/12	2.40	96.01	16.10	---	---	79.91
MW-5	09/28/12	2.60	96.01	15.95	---	---	80.06
MW-5	03/29/13	2.20	96.01	16.45	---	---	79.56

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-5	09/27/13	2.21	96.07	17.30	---	---	78.77
MW-5	03/27/14	0.57	96.07	19.90	NP	0.00	76.17
MW-5	08/11/14	0.53	96.07	20.65	NP	0.00	75.42
MW-5	03/12/15	0.51	96.07	21.90	NP	0.00	74.17
MW-5	03/17/15	0.84	96.07	21.94	---	---	74.13
MW-5	03/19/15	1.47	96.07	21.92	---	---	74.15
MW-5	03/20/15	0.96	96.07	21.95	---	---	74.12
MW-5	03/23/15	1.01	96.07	21.97	---	---	74.10
MW-5	03/24/15	1.20	96.07	22.03	---	---	74.04
MW-5	03/25/15	1.37	96.07	22.09	---	---	73.98
MW-5	04/10/15	0.25	96.07	22.11	---	---	73.96
MW-5	04/17/15	0.22	96.07	22.14	---	---	73.93
MW-5	04/23/15	---	96.07	22.18	NP	0.00	73.89
MW-5	05/19/15	---	96.07	DRY	---	---	DRY
MW-5	06/23/15	---	96.07	DRY	---	---	DRY
MW-5	07/13/15	---	96.07	DRY	---	---	DRY
MW-5	08/13/15	---	96.07	DRY	---	---	DRY
MW-5	09/01/15	---	83.37*	DRY	---	---	DRY
MW-5	10/22/15	---	83.37	DRY	---	---	DRY
MW-5	11/19/15	---	83.37	DRY	---	---	DRY
MW-5	12/29/15	---	83.37	DRY	---	---	DRY
MW-5	02/02/16	---	83.37	DRY	---	---	DRY
MW-5	03/21/16	---	83.37	DRY	---	---	DRY
MW-5	03/29/16	---	83.37	DRY	---	---	DRY
MW-5	04/27/16	---	83.37	DRY	---	---	DRY
MW-5	05/26/16	---	83.37	DRY	---	---	DRY
MW-5	06/01/16	---	83.37	DRY	---	---	DRY
MW-5	06/29/16	---	83.37	DRY	---	---	DRY
MW-5	07/21/16	---	83.37	DRY	---	---	DRY
MW-5	08/22/16	1.74	83.37	17.27	NP	0.00	66.10
MW-5	09/22/16	---	83.37	DRY	---	---	DRY
MW-5	11/14/16	1.14	83.37	16.46	NP	0.00	66.91
MW-6	07/07/95	---	95.83	15.90	---	---	79.93
MW-6	10/30/95	---	95.83	17.05	---	---	78.78
MW-6	01/15/96	---	95.83	16.75	---	---	79.08
MW-6	10/18/96	---	95.83	16.88	---	---	78.95
MW-6	01/30/97	---	95.83	14.52	---	---	81.31
MW-6	04/30/97	---	95.83	15.43	---	---	80.40
MW-6	07/25/97	---	95.83	15.91	---	---	79.92
MW-6	10/30/97	---	95.83	---	---	---	---
MW-6	04/28/98	---	95.83	13.42	---	---	82.41
MW-6	07/10/98	---	95.83	14.12	---	---	81.71
MW-6	10/26/98	---	95.83	15.23	---	---	80.60
MW-6	01/29/99	---	95.83	15.42	---	---	80.41
MW-6	07/22/99	---	95.83	15.09	---	---	80.74
MW-6	01/20/00	---	95.83	---	---	---	---
MW-6	09/11/00	0.37	95.83	17.10	---	---	78.73
MW-6	01/29/01	0.39	95.83	17.08	---	---	78.75
MW-6	03/08/01	1.51	95.83	16.31	---	---	79.52
MW-6	06/21/01	0.29	95.83	15.84	---	---	79.99
MW-6	10/03/01	0.98	95.83	17.15	---	---	78.68
MW-6	12/21/01	0.97	95.83	17.38	---	---	78.45
MW-6	03/15/02	1.05	95.83	17.30	---	---	78.53
MW-6	04/16/02	1.03	95.83	17.30	---	---	78.53

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-6	07/08/02	1.20	95.83	17.45	---	---	78.38
MW-6	10/08/02	0.01	95.83	17.69	---	---	78.14
MW-6	01/13/03	0.21	95.83	16.43	---	---	79.40
MW-6	04/15/03	0.04	95.83	16.48	---	---	79.35
MW-6	07/01/03	0.14	95.83	15.58	---	---	80.25
MW-6	10/14/03	0.54	95.83	16.95	---	---	78.88
MW-6	01/21/04	0.12	95.83	16.53	---	---	79.30
MW-6	04/07/04	---	95.83	15.89	---	---	79.94
MW-6	07/07/04	1.45	95.83	16.04	---	---	79.79
MW-6	10/05/04	0.12	95.83	17.26	---	---	78.57
MW-6	03/10/05	---	95.83	15.92	---	---	79.91
MW-6	06/07/05	---	95.83	15.69	---	---	80.14
MW-6	08/09/05	---	95.83	15.96	---	---	79.87
MW-6	11/09/05	---	95.83	16.22	---	---	79.61
MW-6	02/01/06	---	95.83	15.12	---	---	80.71
MW-6	05/03/06	---	95.83	14.10	---	---	81.73
MW-6	07/25/06	---	95.83	16.98	---	---	78.85
MW-6	11/06/06	---	95.83	19.41	---	---	76.42
MW-6	02/21/07	18.20	95.83	20.48	---	---	75.35
MW-6	05/14/07	---	95.83	19.11	---	---	76.72
MW-6	09/19/07	---	95.83	16.11	---	---	79.72
MW-6	12/03/07	---	95.83	17.47	---	---	78.36
MW-6	03/27/08	0.33	95.83	16.25	---	---	79.58
MW-6	06/12/08	---	95.83	17.14	---	---	78.69
MW-6	09/18/08	---	95.83	18.06	---	---	77.77
MW-6	12/31/08	---	95.83	18.35	---	---	77.48
MW-6	03/25/09	---	95.83	17.51	---	---	78.32
MW-6	06/16/09	---	95.83	17.90	---	---	77.93
MW-6	09/09/09	---	95.83	---	---	---	---
MW-6	03/05/10	3.60	95.83	16.31	---	---	79.52
MW-6	09/17/10	---	95.83	16.56	---	---	79.27
MW-6	03/23/11	2.80	95.83	15.60	---	---	80.23
MW-6	09/27/11	3.20	95.83	16.05	---	---	79.78
MW-6	03/21/12	---	95.83	15.86	---	---	79.97
MW-6	09/28/12	3.80	95.83	16.10	---	---	79.73
MW-6	03/29/13	3.60	95.83	16.19	---	---	79.64
MW-6	09/27/13	---	95.86	17.03	---	---	78.83
MW-6	03/27/14	---	95.86	19.36	19.35	0.01	76.50
MW-6	08/11/14	0.47	95.86	20.25	NP	0.00	75.61
MW-6	03/12/15	---	95.86	21.72	21.65	0.07	74.14
MW-6	03/17/15	0.52	95.86	21.23	---	---	74.63
MW-6	03/19/15	0.52	95.86	21.73	21.72	0.01	74.13
MW-6	03/20/15	0.38	95.86	21.79	---	---	74.07
MW-6	03/23/15	0.49	95.86	21.74	---	---	74.12
MW-6	03/24/15	0.63	95.86	21.78	---	---	74.08
MW-6	03/25/15	0.20	95.86	21.71	---	---	74.15
MW-6	04/10/15	0.00	95.86	22.00	21.99	0.01	73.86
MW-6	04/17/15	0.60	95.86	22.02	22.01	0.01	73.84
MW-6	04/23/15	0.36	95.86	22.13	22.11	0.02	73.73
MW-6	05/19/15	0.94	95.86	22.14	22.13	0.01	73.72
MW-6	06/23/15	0.25	95.86	22.53	22.51	0.02	73.33
MW-6	07/13/15	0.43	95.86	22.80	---	---	73.06
MW-6	08/13/15	---	95.86	---	---	---	---
MW-6	09/01/15	0.31	83.32*	23.00	22.92	0.08	60.32

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95 South Almaden Avenue
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Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-6	10/22/15	0.61	83.32	23.28	23.26	0.02	60.04
MW-6	11/19/15	0.11	83.32	23.28	23.16	0.12	60.04
MW-6	12/29/15	2.88	83.32	22.92	---	---	60.40
MW-6	02/02/16	2.34	83.32	15.25	---	---	68.07
MW-6	03/21/16	2.26	83.32	20.97	20.96	0.01	62.35
MW-6	03/29/16	1.00	83.32	---	---	---	---
MW-6	04/27/16	3.54	83.32	20.18	---	---	63.14
MW-6	05/26/16	3.19	83.32	19.83	---	---	63.49
MW-6	06/01/16	0.58 [a]	83.32	19.82	19.80	0.02	63.50
MW-6	06/29/16	2.21	83.32	19.52	---	---	63.80
MW-6	07/21/16	1.55	83.32	18.40	---	---	64.92
MW-6	08/22/16	0.97	83.32	17.50	17.48	0.02	65.82
MW-6	09/23/16	0.31	83.32	17.63	17.62	0.01	65.69
MW-6	10/24/16	0.53	83.32	16.70	16.69	0.01	66.62
MW-6	11/14/16	---	83.32	16.12	16.11	0.01	67.20
MW-6	12/27/16	0.41	83.32	16.95	16.94	0.01	66.37
MW-7	03/27/08	0.28	96.21	16.53	---	---	79.68
MW-7	06/12/08	---	96.21	17.97	---	---	78.24
MW-7	09/18/08	---	96.21	18.51	---	---	77.70
MW-7	12/31/08	2.05	96.21	18.88	---	---	77.33
MW-7	03/25/09	0.60	96.21	17.88	---	---	78.33
MW-7	06/16/09	1.27	96.21	18.40	---	---	77.81
MW-7	09/09/09	3.20	96.21	18.86	---	---	77.35
MW-7	03/05/10	3.40	96.21	16.78	---	---	79.43
MW-7	09/17/10	1.80	96.21	17.19	---	---	79.02
MW-7	03/23/11	3.20	96.21	16.10	---	---	80.11
MW-7	09/27/11	2.20	96.21	16.45	---	---	79.76
MW-7	03/21/12	2.80	96.21	16.15	---	---	80.06
MW-7	09/28/12	2.10	96.21	16.34	---	---	79.87
MW-7	03/29/13	2.80	96.21	16.70	---	---	79.51
MW-7	09/27/13	2.82	96.18	17.63	---	---	78.55
MW-7	03/27/14	---	96.18	19.85	19.82	0.03	76.33
MW-7	08/11/14	0.50	96.18	21.01	20.97	0.00	75.17
MW-7	03/12/15	---	96.18	22.65	22.28	0.37	73.53
MW-7	03/17/15	0.70	96.18	22.22	---	---	73.96
MW-7	03/19/15	1.05	96.18	22.23	---	---	73.95
MW-7	03/20/15	0.51	96.18	22.25	---	---	73.93
MW-7	03/23/15	0.56	96.18	22.30	---	---	73.88
MW-7	03/24/15	0.51	96.18	22.31	---	---	73.87
MW-7	03/25/15	0.61	96.18	22.30	---	---	73.88
MW-7	04/10/15	0.00	96.18	22.52	22.50	0.02	73.66
MW-7	04/17/15	0.00	96.18	22.54	22.52	0.02	73.64
MW-7	04/23/15	0.15	96.18	22.62	22.58	0.04	73.56
MW-7	05/19/15	0.83	96.18	22.77	22.75	0.02	73.41
MW-7	06/23/15	0.26	96.18	23.14	23.12	0.02	73.04
MW-7	07/13/15	0.40	96.18	23.34	---	---	72.84
MW-7	08/13/15	---	96.18	---	---	---	---
MW-7	09/01/15	0.54	83.48*	22.53	22.49	0.04	60.95
MW-7	10/22/15	0.59	83.48	23.84	23.60	0.24	59.64
MW-7	11/19/15	0.25	83.48	23.90	23.74	0.16	59.58
MW-7	12/29/15	2.71	83.48	23.47	---	---	60.01
MW-7	02/02/16	4.03	83.48	22.80	---	---	60.68
MW-7	03/21/16	0.98	83.48	21.74	21.55	0.19	61.74
MW-7	03/29/16	0.62	83.48	---	---	---	---

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95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-7	04/27/16	5.04	83.48	19.70	---	---	63.78
MW-7	05/26/16	3.46	83.48	20.40	---	---	63.08
MW-7	06/01/16	0.19 [a]	83.48	20.44	20.42	0.02	63.04
MW-7	06/29/16	1.81	83.48	20.18	---	---	63.30
MW-7	07/21/16	1.57	83.48	19.28	---	---	64.20
MW-7	08/22/16	1.61	83.48	18.61	18.59	0.02	64.87
MW-7	09/22/16	1.82	83.48	18.45	NP	0.00	65.03
MW-7	10/25/16	0.78	83.48	17.60	NP	0.00	65.88
MW-7	11/14/16	---	83.48	17.19	17.12	0.07	66.29
MW-7	12/27/16	0.86	83.48	17.53	NP	0.00	65.95
MW-8	03/27/08	0.20	95.20	17.36	---	---	77.84
MW-8	06/12/08	---	95.20	17.85	---	---	77.35
MW-8	09/18/08	---	95.20	18.72	---	---	76.48
MW-8	12/31/08	1.71	95.20	19.13	---	---	76.07
MW-8	03/25/09	0.72	95.20	18.16	---	---	77.04
MW-8	06/16/09	0.76	95.20	18.59	---	---	76.61
MW-8	09/09/09	2.60	95.20	19.13	---	---	76.07
MW-8	03/05/10	3.20	95.20	16.95	---	---	78.25
MW-8	09/17/10	1.32	95.20	17.49	---	---	77.71
MW-8	03/23/11	2.80	95.20	16.70	---	---	78.50
MW-8	09/27/11	2.10	95.20	16.82	---	---	78.38
MW-8	03/21/12	2.80	95.20	16.35	---	---	78.85
MW-8	09/28/12	2.40	95.20	16.43	---	---	78.77
MW-8	03/29/13	2.40	95.20	16.77	---	---	78.43
MW-8	09/27/13	1.70	96.20	17.74	---	---	78.46
MW-8	03/27/14	0.53	96.20	20.23	NP	0.00	75.97
MW-8	08/11/14	0.60	96.20	20.23	NP	0.00	75.97
MW-8	03/12/15	0.26	96.20	21.00	NP	0.00	75.20
MW-8	03/17/15	0.18	96.20	22.55	---	---	73.65
MW-8	03/19/15	1.28	96.20	22.52	---	---	73.68
MW-8	03/20/15	0.98	96.20	22.53	---	---	73.67
MW-8	03/23/15	0.60	96.20	22.59	---	---	73.61
MW-8	03/24/15	0.65	96.20	22.58	---	---	73.62
MW-8	03/25/15	0.47	96.20	22.60	---	---	73.60
MW-8	04/10/15	0.12	96.20	22.68	---	---	73.52
MW-8	04/17/15	0.10	96.20	22.69	---	---	73.51
MW-8	04/23/15	0.15	96.20	22.40	NP	0.00	73.80
MW-8	05/19/15	0.66	96.20	22.70	NP	0.00	73.50
MW-8	06/23/15	0.29	96.20	22.84	NP	0.00	73.36
MW-8	07/13/15	1.53	96.20	23.11	---	---	73.09
MW-8	08/13/15	---	96.20	---	---	---	---
MW-8	09/01/15	0.97	83.43*	23.49	NP	0.00	59.94
MW-8	10/22/15	0.63	83.43	23.65	NP	0.00	59.78
MW-8	11/19/15	0.83	83.43	23.66	NP	0.00	59.77
MW-8	12/29/15	2.11	83.43	23.30	---	---	60.13
MW-8	02/02/16	2.05	83.43	22.67	---	---	60.76
MW-8	03/21/16	1.53	83.43	21.42	NP	0.00	62.01
MW-8	03/29/16	1.02	83.43	---	---	---	---
MW-8	04/27/16	6.02	83.43	20.78	---	---	62.65
MW-8	05/26/16	3.42	83.43	20.35	---	---	63.08
MW-8	06/01/16	0.29 [a]	83.43	20.30	NP	0.00	63.13
MW-8	06/29/16	1.40	83.43	20.23	---	---	63.20
MW-8	07/21/16	1.94	83.43	18.78	---	---	64.65
MW-8	08/22/16	0.87	83.43	18.20	NP	0.00	65.23

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95 South Almaden Avenue
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Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
MW-8	09/22/16	1.57	83.43	18.75	NP	0.00	64.68
MW-8	10/24/16	1.22	83.43	18.06	NP	0.00	65.37
MW-8	11/14/16	0.80	83.43	17.60	NP	0.00	65.83
MW-8	12/27/16	1.03	83.43	17.85	NP	0.00	65.58
MW-9	03/27/08	0.17	96.67	17.83	---	---	78.84
MW-9	06/12/08	---	96.67	18.56	---	---	78.11
MW-9	09/18/08	---	96.67	19.54	---	---	77.13
MW-9	12/31/08	2.34	96.67	20.07	---	---	76.60
MW-9	03/25/09	2.80	96.67	19.04	---	---	77.63
MW-9	06/16/09	1.21	96.67	19.28	---	---	77.39
MW-9	09/09/09	2.40	96.67	19.65	---	---	77.02
MW-9	03/05/10	3.10	96.67	17.45	---	---	79.22
MW-9	09/17/10	1.26	96.67	17.96	---	---	78.71
MW-9	03/23/11	3.20	96.67	16.70	---	---	79.97
MW-9	09/27/11	2.40	96.67	17.35	---	---	79.32
MW-9	03/21/12	2.60	96.67	16.80	---	---	79.87
MW-9	09/28/12	2.30	96.67	17.00	---	---	79.67
MW-9	03/29/13	2.20	96.67	17.40	---	---	79.27
MW-9	09/27/13	2.54	96.67	18.22	---	---	78.45
MW-9	03/27/14	0.56	96.67	20.69	NP	0.00	75.98
MW-9	08/11/14	0.63	96.67	21.35	NP	0.00	75.32
MW-9	03/12/15	0.29	96.67	22.54	NP	0.00	74.13
MW-9	03/17/15	0.95	96.67	22.61	---	---	74.06
MW-9	03/19/15	1.39	96.67	22.62	---	---	74.05
MW-9	03/20/15	0.71	96.67	22.63	---	---	74.04
MW-9	03/23/15	0.65	96.67	22.65	---	---	74.02
MW-9	03/24/15	0.75	96.67	22.76	---	---	73.91
MW-9	03/25/15	0.58	96.67	22.67	---	---	74.00
MW-9	04/10/15	0.17	96.67	22.76	---	---	73.91
MW-9	04/17/15	0.13	96.67	22.79	---	---	73.88
MW-9	04/23/15	0.28	96.67	22.83	NP	0.00	73.84
MW-9	05/19/15	0.61	96.67	23.01	NP	0.00	73.66
MW-9	06/23/15	0.33	96.67	23.18	NP	0.00	73.49
MW-9	07/13/15	0.38	96.67	23.33	---	---	73.34
MW-9	08/13/15	0.83	96.67	23.55	---	---	73.12
MW-9	08/19/15	0.83	96.67	23.55	---	---	73.12
MW-9	09/01/15	0.99	83.80*	23.55	NP	0.00	60.25
MW-9	10/22/15	0.67	83.80	23.74	NP	0.00	60.06
MW-9	11/19/15	3.05	83.80	23.78	NP	0.00	60.02
MW-9	12/29/15	2.54	83.80	23.48	---	---	60.32
MW-9	02/02/16	1.52	83.80	22.66	---	---	61.14
MW-9	03/21/16	1.74	83.80	21.55	NP	0.00	62.25
MW-9	03/29/16	0.64	83.80	---	---	---	---
MW-9	04/27/16	6.37	83.80	20.95	---	---	62.85
MW-9	05/26/16	5.12	83.80	20.55	---	---	63.25
MW-9	06/01/16	0.29[a]	83.80	20.54	NP	0.00	63.26
MW-9	06/29/16	2.25	83.80	20.37	---	---	63.43
MW-9	07/21/16	16.20	83.80	19.18	---	---	64.62
MW-9	08/22/16	0.73	83.80	18.56	NP	0.00	65.24
MW-9	09/22/16	2.06	83.80	19.15	NP	0.00	64.65
MW-9	10/24/16	1.44	83.80	18.43	NP	0.00	65.37
MW-9	11/14/16	0.74	83.80	17.92	NP	0.00	65.88
MW-9	12/27/16	1.79	83.80	18.33	NP	0.00	65.47

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MW-10	09/27/13	1.30	96.88	17.00	---	---	79.88
MW-10	03/27/14	0.44	96.88	19.46	NP	0.00	77.42
MW-10	08/11/14	0.58	96.88	19.99	NP	0.00	76.89
MW-10	03/12/15	0.40	96.88	21.46	NP	0.00	75.42
MW-10	03/17/15	0.71	96.88	21.51	---	---	75.37
MW-10	03/19/15	1.32	96.88	21.52	---	---	75.36
MW-10	03/20/15	0.73	96.88	21.62	---	---	75.26
MW-10	03/23/15	0.82	96.88	21.74	---	---	75.14
MW-10	03/24/15	0.73	96.88	21.75	---	---	75.13
MW-10	03/25/15	0.47	96.88	21.71	---	---	75.17
MW-10	04/10/15	0.17	96.88	21.85	---	---	75.03
MW-10	04/17/15	0.12	96.88	21.87	---	---	75.01
MW-10	04/23/15	0.08	96.88	22.04	NP	0.00	74.84
MW-10	05/19/15	0.81	96.88	22.35	NP	0.00	74.53
MW-10	06/23/15	0.30	96.88	22.79	22.78	0.01	74.09
MW-10	07/13/15	0.54	96.88	22.90	---	---	73.98
MW-10	08/13/15	---	96.88	---	---	---	---
MW-10	09/01/15	0.25	84.16*	23.21	23.19	0.02	60.95
MW-10	10/22/15	0.60	84.16	23.96	NP	0.00	60.20
MW-10	11/19/15	0.20	84.16	23.72	NP	0.00	60.44
MW-10	12/29/15	1.92	84.16	23.48	---	---	60.68
MW-10	02/02/16	2.35	84.16	22.55	---	---	61.61
MW-10	03/21/16	0.29	84.16	21.12	NP	0.00	63.04
MW-10	03/29/16	0.17	84.16	---	---	---	---
MW-10	04/27/16	6.08	84.16	20.22	---	---	63.94
MW-10	05/27/16	2.35	84.16	19.83	---	---	64.33
MW-10	06/01/16	0.18 [a]	84.16	19.89	19.88	0.01	64.27
MW-10	06/30/16	0.98	84.16	19.65	---	---	64.51
MW-10	07/21/16	1.77	84.16	18.20	---	---	65.96
MW-10	08/22/16	0.88	84.16	16.02	NP	0.00	68.14
MW-10	09/23/16	0.11	84.16	15.24	NP	0.00	68.92
MW-10	10/25/16	0.65	84.16	14.30	NP	0.00	69.86
MW-10	11/14/16	0.60	84.16	13.72	NP	0.00	70.44
MW-10	12/28/16	1.05	84.16	16.35	NP	0.00	67.81
MW-11	09/27/13	1.54	96.00	16.16	---	---	79.84
MW-11	03/27/14	0.47	96.00	19.12	NP	0.00	76.88
MW-11	08/11/14	0.43	96.00	19.94	NP	0.00	76.06
MW-11	03/12/15	0.29	96.00	21.48	NP	0.00	74.52
MW-11	03/17/15	0.63	96.00	21.60	---	---	74.40
MW-11	03/19/15	1.06	96.00	21.62	---	---	74.38
MW-11	03/20/15	0.68	96.00	21.65	---	---	74.35
MW-11	03/23/15	0.73	96.00	21.77	---	---	74.23
MW-11	03/24/15	0.47	96.00	21.78	---	---	74.22
MW-11	03/25/15	0.37	96.00	21.80	---	---	74.20
MW-11	04/10/15	0.06	96.00	21.88	---	---	74.12
MW-11	04/17/15	0.21	96.00	21.89	---	---	74.11
MW-11	04/23/15	0.15	96.00	22.22	NP	0.00	73.78
MW-11	05/19/15	0.84	96.00	22.20	NP	0.00	73.80
MW-11	06/23/15	0.50	96.00	22.78	NP	0.00	73.22
MW-11	07/13/15	1.42	96.00	22.85	---	---	73.15
MW-11	08/13/15	---	96.00	---	---	---	---
MW-11	09/01/15	0.56	83.71*	23.29	NP	0.00	60.42
MW-11	10/22/15	0.53	83.71	24.78	24.77	0.01	58.93
MW-11	11/19/15	0.18	83.71	23.50	23.48	0.02	60.21

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MW-11	12/29/15	2.93	83.71	23.35	---	---	60.36
MW-11	02/02/16	1.96	83.71	22.42	---	---	61.29
MW-11	03/21/16	1.28	83.71	21.61	21.23	0.38	62.10
MW-11	03/29/16	0.81	83.71	---	---	---	---
MW-11	04/27/16	4.24	83.71	20.47	---	---	63.24
MW-11	05/27/16	1.27	83.71	20.10	---	---	63.61
MW-11	06/01/16	0.55 [a]	83.71	20.27	20.19	0.08	63.44
MW-11	06/30/16	2.72	83.71	19.85	---	---	63.86
MW-11	07/21/16	1.55	83.71	19.01	---	---	64.70
MW-11	08/22/16	0.71	83.71	17.87	17.85	0.02	65.84
MW-11	09/23/16	0.08	83.71	17.52	NP	0.00	66.19
MW-11	10/25/16	0.53	83.71	16.60	NP	0.00	67.11
MW-11	11/14/16	1.11	83.71	16.06	NP	0.00	67.65
MW-11	12/28/16	2.10	83.71	16.85	NP	0.00	66.86
MW-12	09/27/13	2.08	95.37	15.57	---	---	79.80
MW-12	03/27/14	0.40	95.37	18.03	NP	0.00	77.34
MW-12	08/11/14	0.40	95.37	18.36	NP	0.00	77.01
MW-12	03/12/15	0.31	95.37	20.60	NP	0.00	74.77
MW-12	04/23/15	0.08	95.37	21.05	NP	0.00	74.32
MW-12	05/19/15	0.69	95.37	21.10	NP	0.00	74.27
MW-12	06/23/15	0.50	95.37	21.62	21.48	0.14	73.75
MW-12	07/13/15	---	95.37	---	---	---	---
MW-12	08/13/15	---	95.37	---	---	---	---
MW-12	09/01/15	0.13	82.97*	22.10	21.93	0.17	60.87
MW-12	11/19/15	0.22	82.97	22.41	22.28	0.12	60.56
MW-12	03/21/16	0.43	82.97	19.88	NP	0.00	63.09
MW-12	03/29/16	0.23	82.97	---	---	---	---
MW-12	05/26/16	---	82.97	---	---	---	---
MW-12	06/01/16	0.11 [a]	82.97	18.64	18.62	0.02	64.33
MW-12	06/29/16	---	82.97	---	---	---	---
MW-12	08/22/16	0.79	82.97	15.09	NP	0.00	67.88
MW-12	11/14/16	0.87	82.97	13.05	NP	0.00	69.92
MW-13	09/27/13	2.56	95.46	15.61	---	---	79.85
MW-13	03/27/14	0.31	95.46	18.21	NP	0.00	77.25
MW-13	08/11/14	0.48	95.46	18.55	NP	0.00	76.91
MW-13	03/12/15	0.52	95.46	20.12	NP	0.00	75.34
MW-13	04/23/15	0.18	95.46	20.64	NP	0.00	74.82
MW-13	05/19/15	0.80	95.46	20.82	NP	0.00	74.64
MW-13	06/23/15	0.43	95.46	21.22	NP	0.00	74.24
MW-13	07/13/15	---	95.46	---	---	---	---
MW-13	08/13/15	---	95.46	---	---	---	---
MW-13	09/01/15	0.38	83.25*	21.67	21.65	0.02	61.58
MW-13	11/19/15	1.55	83.25	22.01	NP	0.00	61.24
MW-13	03/21/16	2.00	83.25	19.45	NP	0.00	63.80
MW-13	03/29/16	0.33	83.25	---	---	---	---
MW-13	05/26/16	---	83.25	---	---	---	---
MW-13	06/01/16	0.14 [a]	83.25	18.15	NP	0.00	65.10
MW-13	06/29/16	---	83.25	---	---	---	---
MW-13	08/22/16	1.06	83.25	15.03	NP	0.00	68.22
MW-13	11/14/16	0.41	83.25	13.31	NP	0.00	69.94
MW-14	02/15/15	---	83.02	21.63	---	---	61.39
MW-14	03/12/15	0.46	83.02	21.91	NP	0.00	61.11
MW-14	03/17/15	0.37	83.02	21.79	---	---	61.23

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MW-14	03/19/15	1.88	83.02	21.77	---	---	61.25
MW-14	03/20/15	0.70	83.02	21.77	---	---	61.25
MW-14	03/23/15	0.72	83.02	21.81	---	---	61.21
MW-14	03/24/15	0.78	83.02	21.84	---	---	61.18
MW-14	03/25/15	0.38	83.02	21.92	---	---	61.10
MW-14	04/10/15	0.11	83.02	21.95	---	---	61.07
MW-14	04/17/15	0.07	83.02	21.98	---	---	61.04
MW-14	04/23/15	0.14	83.02	22.08	NP	0.00	60.94
MW-14	05/19/15	0.77	83.02	22.16	NP	0.00	60.86
MW-14	06/23/15	0.28	83.02	22.48	NP	0.00	60.54
MW-14	07/13/15	0.15	83.02	22.60	---	---	60.42
MW-14	09/01/15	0.60	83.02	22.89	NP	0.00	60.13
MW-14	10/22/15	0.59	83.02	23.08	NP	0.00	59.94
MW-14	11/19/15	0.18	83.02	23.03	NP	0.00	59.99
MW-14	12/29/15	2.10	83.02	22.68	---	---	60.34
MW-14	02/02/16	1.96	83.02	21.92	---	---	61.10
MW-14	03/21/16	2.27	83.02	20.86	NP	0.00	62.16
MW-14	03/29/16	0.58	83.02	---	---	---	---
MW-14	04/27/16	4.48	83.02	20.10	---	---	62.92
MW-14	05/26/16	1.97	83.02	19.68	---	---	63.34
MW-14	06/01/16	0.26 [a]	83.02	19.91	NP	0.00	63.11
MW-14	06/29/16	1.38	83.02	19.53	---	---	63.49
MW-14	07/21/16	1.50	83.02	18.20	---	---	64.82
MW-14	08/22/16	1.21	83.02	17.49	NP	0.00	65.53
MW-14	09/22/16	2.55	83.02	17.93	NP	0.00	65.09
MW-14	10/24/16	1.01	83.02	17.16	NP	0.00	65.86
MW-14	11/14/16	0.66	83.02	16.65	NP	0.00	66.37
MW-14	12/27/16	0.95	83.02	17.08	NP	0.00	65.94
MW-15	02/15/15	---	83.18	21.53	---	---	61.65
MW-15	03/12/15	0.33	83.18	21.69	NP	0.00	61.49
MW-15	03/17/15	0.64	83.18	21.70	---	---	61.48
MW-15	03/19/15	1.12	83.18	21.70	---	---	61.48
MW-15	03/20/15	0.60	83.18	21.72	---	---	61.46
MW-15	03/23/15	0.55	83.18	21.79	---	---	61.39
MW-15	03/24/15	0.69	83.18	21.84	---	---	61.34
MW-15	03/25/15	0.37	83.18	21.75	---	---	61.43
MW-15	04/10/15	0.09	83.18	21.90	---	---	61.28
MW-15	04/17/15	0.07	83.18	21.93	---	---	61.25
MW-15	04/23/15	0.13	83.18	21.95	NP	0.00	61.23
MW-15	05/19/15	0.94	83.18	22.09	NP	0.00	61.09
MW-15	06/23/15	0.56	83.18	22.56	NP	0.00	60.62
MW-15	07/13/15	0.75	83.18	22.60	---	---	60.58
MW-15	09/01/15	0.44	83.18	22.90	NP	0.00	60.28
MW-15	10/22/15	0.60	83.18	23.11	NP	0.00	60.07
MW-15	11/19/15	0.31	83.18	23.30	---	---	59.88
MW-15	12/29/15	1.93	83.18	23.00	---	---	60.18
MW-15	02/02/16	3.98	83.18	22.07	---	---	61.11
MW-15	03/21/16	1.60	83.18	21.10	NP	0.00	62.08
MW-15	03/29/16	1.00	83.18	---	---	---	---
MW-15	04/27/16	4.74	83.18	20.15	---	---	63.03
MW-15	05/26/16	2.66	83.18	19.74	---	---	63.44
MW-15	06/01/16	0.18 [a]	83.18	19.73	NP	0.00	63.45
MW-15	06/29/16	2.42	83.18	19.52	---	---	63.66
MW-15	07/21/16	1.36	83.18	18.55	---	---	64.63

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MW-15	08/22/16	0.74	83.18	17.59	NP	0.00	65.59
MW-15	09/22/16	2.37	83.18	17.74	NP	0.00	65.44
MW-15	10/24/16	0.97	83.18	16.95	NP	0.00	66.23
MW-15	11/14/16	0.70	83.18	16.30	NP	0.00	66.88
MW-15	12/27/16	0.89	83.18	16.91	NP	0.00	66.27
MW-16	02/15/15	---	83.68	22.08	---	---	61.60
MW-16	03/12/15	0.48	83.68	21.98	NP	0.00	61.70
MW-16	03/17/15	0.70	83.68	21.99	---	---	61.69
MW-16	03/19/15	1.15	83.68	22.00	---	---	61.68
MW-16	03/20/15	0.69	83.68	22.01	---	---	61.67
MW-16	03/23/15	0.55	83.68	22.06	---	---	61.62
MW-16	03/24/15	0.65	83.68	22.15	---	---	61.53
MW-16	03/25/15	0.54	83.68	22.19	---	---	61.49
MW-16	04/10/15	0.07	83.68	22.21	---	---	61.47
MW-16	04/17/15	0.06	83.68	22.23	---	---	61.45
MW-16	04/23/15	0.38	83.68	22.40	NP	0.00	61.28
MW-16	05/19/15	0.83	83.68	22.48	NP	0.00	61.20
MW-16	06/23/15	0.33	83.68	22.84	NP	0.00	60.84
MW-16	07/13/15	0.96	83.68	23.04	---	---	60.64
MW-16	09/01/15	0.52	83.68	23.33	NP	0.00	60.35
MW-16	10/22/15	0.58	83.68	23.55	NP	0.00	60.13
MW-16	11/19/15	0.14	83.68	23.53	NP	0.00	60.15
MW-16	12/29/15	1.76	83.68	23.35	---	---	60.33
MW-16	02/02/16	4.01	83.68	22.62	---	---	61.06
MW-16	03/21/16	3.77	83.68	21.43	NP	0.00	62.25
MW-16	03/29/16	3.27	83.68	---	---	---	---
MW-16	04/27/16	6.41	83.68	20.55	---	---	63.13
MW-16	05/26/16	1.80	83.68	20.18	---	---	63.50
MW-16	06/01/16	0.27 [a]	83.68	20.06	NP	0.00	63.62
MW-16	06/30/16	2.97	83.68	19.92	---	---	63.76
MW-16	07/21/16	1.52	83.68	19.02	---	---	64.66
MW-16	08/22/16	1.51	83.68	18.10	NP	0.00	65.58
MW-16	09/22/16	3.26	83.68	17.90	NP	0.00	65.78
MW-16	10/24/16	0.55	83.68	17.05	NP	0.00	66.63
MW-16	11/14/16	---	83.68	16.58	NP	0.00	67.10
MW-16	12/27/16	0.31	83.68	17.18	NP	0.00	66.50
Injection Wells							
IW-1	05/01/15	0.21	83.66	22.55	---	---	61.11
IW-1	07/13/15	28.00	83.66	23.60	---	---	60.06
IW-1	10/22/15	31.81	83.66	25.49	---	---	58.17
IW-1	12/29/15	15.51	83.66	23.75	---	---	59.91
IW-1	02/02/16	19.60	83.66	23.18	---	---	60.48
IW-1	03/29/16	23.79	83.66	23.15	---	---	60.51
IW-1	04/27/16	8.52	83.66	22.97	---	---	60.69
IW-1	05/26/16	15.81	83.66	22.95	---	---	60.71
IW-1	06/29/16	25.38	83.66	22.93	---	---	60.73
IW-1	07/21/16	2.52	83.66	19.80	---	---	63.86
IW-1	08/23/16	17.13	83.66	19.46	18.33	1.13	64.20
IW-1	09/22/16	31.94	83.66	18.55	---	---	65.11
IW-1	10/25/16	35.48	83.66	17.58	---	---	66.08
IW-1	11/15/16	30.34	83.66	16.90	---	---	66.76
IW-1	12/27/16	1.64	83.66	17.44	---	---	66.22
IW-2	05/01/15	0.52	83.51	22.30	---	---	61.21

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
IW-2	07/13/15	28.56	83.51	22.80	---	---	60.71
IW-2	08/19/15	6.73	83.51	23.20	---	---	60.31
IW-2	10/22/15	30.61	83.51	22.96	---	---	60.55
IW-2	12/29/15	20.92	83.51	23.10	---	---	60.41
IW-2	02/02/16	8.45	83.51	22.35	---	---	61.16
IW-2	03/29/16	6.32	83.51	21.02	---	---	62.49
IW-2	05/26/16	10.15	83.51	19.95	---	---	63.56
IW-2	06/29/16	12.37	83.51	19.75	---	---	63.76
IW-2	07/21/16	10.43	83.51	18.68	---	---	64.83
IW-2	08/23/16	12.36	83.51	17.98	NP	0.00	65.53
IW-2	09/22/16	23.03	83.51	18.04	---	---	65.47
IW-2	10/25/16	0.85	83.51	17.12	---	---	66.39
IW-2	11/15/16	1.03	83.51	16.53	---	---	66.98
IW-2	12/27/16	1.28	83.51	17.18	---	---	66.33
IW-3	05/01/15	0.70	82.81	21.83	---	---	60.98
IW-3	07/13/15	32.61	82.81	22.32	---	---	60.49
IW-3	08/19/15	6.17	82.81	22.65	---	---	60.16
IW-3	10/22/15	24.38	82.81	22.82	---	---	59.99
IW-3	12/29/15	22.10	82.81	22.50	---	---	60.31
IW-3	02/02/16	17.43	82.81	21.74	---	---	61.07
IW-3	03/29/16	21.49	82.81	20.40	---	---	62.41
IW-3	05/26/16	11.38	82.81	19.42	---	---	63.39
IW-3	06/29/16	23.55	82.81	19.24	---	---	63.57
IW-3	07/21/16	18.33	82.81	18.03	---	---	64.78
IW-3	08/23/16	26.21	82.81	17.35	NP	0.00	65.46
IW-3	09/22/16	30.74	82.81	17.40	---	---	65.41
IW-3	10/25/16	33.72	82.81	16.58	---	---	66.23
IW-3	11/15/16	13.77	82.81	15.95	---	---	66.86
IW-3	12/27/16	10.53	82.81	16.64	---	---	66.17
IW-4	05/01/15	0.94	82.83	21.75	---	---	61.08
IW-4	07/13/15	33.45	82.83	22.40	---	---	60.43
IW-4	08/19/15	5.53	82.83	22.71	---	---	60.12
IW-4	10/22/15	27.40	82.83	23.04	---	---	59.79
IW-4	12/29/15	22.81	82.83	22.30	---	---	60.53
IW-4	02/02/16	26.24	82.83	21.52	---	---	61.31
IW-4	03/29/16	4.98	82.83	20.20	---	---	62.63
IW-4	04/27/16	24.29	82.83	19.68	---	---	63.15
IW-4	05/26/16	9.49	82.83	19.30	---	---	63.53
IW-4	06/29/16	13.20	82.83	19.12	---	---	63.71
IW-4	07/21/16	19.55	82.83	17.70	---	---	65.13
IW-4	08/23/16	18.15	82.83	17.11	NP	0.00	65.72
IW-4	09/22/16	24.34	82.83	17.36	---	---	65.47
IW-4	10/25/16	32.52	82.83	16.53	---	---	66.30
IW-4	11/15/16	29.10	82.83	15.89	---	---	66.94
IW-4	12/27/16	41.06	82.83	16.63	---	---	66.20
IW-5	05/01/15	1.31	83.64	22.52	---	---	61.12
IW-5	07/13/15	29.25	83.64	23.10	---	---	60.54
IW-5	10/22/15	32.41	83.64	23.21	---	---	60.43
IW-5	12/29/15	1.85	83.64	23.35	---	---	60.29
IW-5	02/02/16	4.89	83.64	22.63	---	---	61.01
IW-5	03/29/16	3.72	83.64	21.20	---	---	62.44
IW-5	04/27/16	6.57	83.64	20.60	---	---	63.04
IW-5	05/26/16	3.21	83.64	20.22	---	---	63.42

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
IW-5	06/29/16	2.81	83.64	20.03	---	---	63.61
IW-5	07/21/16	1.56	83.64	19.07	---	---	64.57
IW-5	08/23/16	13.09	83.64	18.27	NP	0.00	65.37
IW-5	09/23/16	2.42	83.64	18.08	---	---	65.56
IW-5	10/25/16	0.65	83.64	17.20	---	---	66.44
IW-5	11/15/16	0.17	83.64	16.65	---	---	66.99
IW-5	12/27/16	1.02	83.64	17.25	---	---	66.39
IW-6	05/01/15	1.32	83.40	22.45	---	---	60.95
IW-6	07/13/15	27.25	83.40	23.05	---	---	60.35
IW-6	10/22/15	21.74	83.40	23.47	---	---	59.93
IW-6	12/29/15	13.31	83.40	23.45	---	---	59.95
IW-6	02/02/16	20.20	83.40	22.60	---	---	60.80
IW-6	03/29/16	3.71	83.40	21.15	---	---	62.25
IW-6	04/27/16	7.08	83.40	20.57	---	---	62.83
IW-6	05/26/16	3.49	83.40	20.12	---	---	63.28
IW-6	06/29/16	2.06	83.40	19.03	---	---	64.37
IW-6	07/21/16	1.37	83.40	18.82	---	---	64.58
IW-6	08/23/16	0.93	83.40	18.35	NP	0.00	65.05
IW-6	09/23/16	0.93	83.40	17.98	---	---	65.42
IW-6	10/25/16	0.78	83.40	17.05	---	---	66.35
IW-6	11/15/16	1.17	83.40	16.47	---	---	66.93
IW-6	12/27/16	1.37	83.40	17.23	---	---	66.17
IW-7	05/01/15	1.25	83.71	22.45	---	---	61.26
IW-7	07/13/15	28.13	83.71	23.10	---	---	60.61
IW-7	10/22/15	20.61	83.71	23.76	---	---	59.95
IW-7	12/29/15	19.00	83.71	23.44	---	---	60.27
IW-7	02/02/16	27.41	83.71	22.73	---	---	60.98
IW-7	05/27/16	23.11	83.71	20.22	---	---	63.49
IW-7	06/30/16	25.75	83.71	19.95	---	---	63.76
IW-7	07/21/16	24.35	83.71	19.10	---	---	64.61
IW-7	08/23/16	32.92	83.71	18.19	NP	0.00	65.52
IW-7	09/23/16	36.50	83.71	17.82	---	---	65.89
IW-7	10/25/16	35.63	83.71	16.93	---	---	66.78
IW-7	11/15/16	33.56	83.71	16.33	---	---	67.38
IW-7	12/28/16	39.80	83.71	17.02	---	---	66.69
IW-8	05/01/15	1.14	83.75	22.53	---	---	61.22
IW-8	07/13/15	24.50	83.75	23.05	---	---	60.70
IW-8	10/22/15	24.21	83.75	23.70	---	---	60.05
IW-8	12/29/15	15.76	83.75	23.40	---	---	60.35
IW-8	02/02/16	13.38	83.75	22.62	---	---	61.13
IW-8	05/27/16	1.69	83.75	20.48	---	---	63.27
IW-8	06/30/16	3.51	83.75	19.93	---	---	63.82
IW-8	07/21/16	17.77	83.75	18.98	---	---	64.77
IW-8	08/23/16	25.84	83.75	18.09	NP	0.00	65.66
IW-8	09/23/16	0.38	83.75	17.89	---	---	65.86
IW-8	10/25/16	17.53	83.75	16.95	---	---	66.80
IW-8	11/15/16	5.20	83.75	16.35	---	---	67.40
IW-8	12/28/16	2.37	83.75	17.28	---	---	66.47
IW-9	05/01/15	1.01	83.77	22.45	---	---	61.32
IW-9	07/13/15	0.24	83.77	22.98	---	---	60.79
IW-9	10/22/15	19.74	83.77	23.74	---	---	60.03
IW-9	12/29/15	1.87	83.77	23.45	---	---	60.32
IW-9	02/02/16	3.82	83.77	22.80	---	---	60.97

Table 1
Summary of Groundwater Measurements
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number	Date Measured	Dissolved Oxygen (mg/L)	Well Casing Elevation (feet above msl)	Depth to Groundwater (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet above msl)
IW-9	03/29/16	---	83.77	20.45	---	---	63.32
IW-9	05/27/16	2.18	83.77	20.08	---	---	63.69
IW-9	06/30/16	1.62	83.77	19.81	---	---	63.96
IW-9	07/21/16	1.72	83.77	18.77	---	---	65.00
IW-9	08/23/16	1.40	83.77	17.80	NP	0.00	65.97
IW-9	09/23/16	0.10	83.77	17.75	---	---	66.02
IW-9	10/25/16	0.87	83.77	16.80	---	---	66.97
IW-9	11/15/16	1.10	83.77	16.22	---	---	67.55
IW-9	12/28/16	1.05	83.77	17.20	---	---	66.57
IW-10	05/01/15	1.28	83.51	22.30	---	---	61.21
IW-10	07/13/15	32.02	83.51	22.85	---	---	60.66
IW-10	10/22/15	23.68	83.51	23.47	---	---	60.04
IW-10	12/29/15	21.16	83.51	23.15	---	---	60.36
IW-10	02/02/16	0.51	83.51	22.28	---	---	61.23
IW-10	03/29/16	5.88	83.51	20.85	---	---	62.66
IW-10	04/27/16	21.52	83.51	20.28	---	---	63.23
IW-10	05/27/16	23.46	83.51	19.88	---	---	63.63
IW-10	06/30/16	1.92	83.51	19.60	---	---	63.91
IW-10	07/21/16	1.24	83.51	18.38	---	---	65.13
IW-10	08/23/16	16.03	83.51	17.45	NP	0.00	66.06
IW-10	09/23/16	0.16	83.51	17.28	---	---	66.23
IW-10	10/25/16	27.70	83.51	16.27	---	---	67.24
IW-10	11/15/16	29.22	83.51	15.67	---	---	67.84
IW-10	12/28/16	38.55	83.51	16.95	---	---	66.56
IW-11	05/01/15	0.55	83.56	22.13	---	---	61.43
IW-11	07/13/15	19.34	83.56	22.68	---	---	60.88
IW-11	10/22/15	32.37	83.56	23.62	---	---	59.94
IW-11	12/29/15	19.84	83.56	22.98	---	---	60.58
IW-11	02/02/16	8.22	83.56	22.02	---	---	61.54
IW-11	03/29/16	2.52	83.56	20.65	---	---	62.91
IW-11	04/27/16	20.40	83.56	20.10	---	---	63.46
IW-11	05/27/16	19.95	83.56	19.65	---	---	63.91
IW-11	06/30/16	20.25	83.56	19.38	---	---	64.18
IW-11	07/21/16	21.15	83.56	18.02	---	---	65.54
IW-11	08/23/16	24.64	83.56	16.96	NP	0.00	66.60
IW-11	09/23/16	0.09	83.56	17.19	---	---	66.37
IW-11	10/25/16	32.45	83.56	16.10	---	---	67.46
IW-11	11/15/16	23.34	83.56	15.43	---	---	68.13
IW-11	12/28/16	38.29	83.56	16.88	---	---	66.68

Notes:
iSOC initiated March 2015
During sampling events, dissolved oxygen concentrations are pre-purge unless otherwise noted.
msl - mean sea level
NP = no measurable product
--- = not measured or not available
* - wells surveyed to NAVD 88 datum
[a] - post-purge

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-1	07/07/95	**7,300**	NA	ND	ND	**46**	**42**	NA	NA
MW-1	10/30/95	**1,400,000**	NA	ND	**7.7**	**41**	**55**	NA	NA
MW-1	01/15/96	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	10/18/96	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	01/30/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	04/30/97	**36,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	07/25/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	10/30/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	04/28/98	**19,000**	NA	ND	**23**	ND	**21**	NA	NA
MW-1	07/10/98	ND	NA	ND	ND	**4.3**	**7.3**	NA	NA
MW-1	10/26/98	**12,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	01/28/99	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	07/22/99	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	01/20/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/11/00	ND	NA	ND	ND	ND	ND	NS	NA
MW-1	01/29/01	**1,900,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	03/08/01	**96,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	06/21/01	**120,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	10/03/01	**18,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	12/21/01	**35,000**	NA	ND	ND	ND	ND	NA	NA
MW-1	03/15/02	**4,000**	NA	ND	ND	ND	**0.7**	NA	NA
MW-1	04/16/02	**2,600**	NA	$ND_{0.5}$	$ND_{0.5}$	**0.7**	$ND_{0.5}$	ND_{1}	NA
MW-1	07/08/02	**6,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**0.52**	ND_{1}	NA
MW-1	10/08/02	**28,000**	NA	$ND_{0.5}$	$ND_{0.5}$	**1.3**	**0.82**	ND_{1}	NA
MW-1	01/13/03	**1,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	04/15/03	**4,900**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	07/01/03	**19,000**	NA	$ND_{0.5}$	**0.57**	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	10/14/03	**8,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	01/21/04	**2,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	04/07/04	**4,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	07/07/04	**4,500**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	10/05/04	**3,100**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	03/10/05	**9,500**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	06/07/05	**7,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	08/09/05	**4,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	11/09/05	**3,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	02/01/06	**5,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	05/03/06	**4,900**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	07/25/06	**11,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-1	11/06/06	**6,000**	NA	$ND_{0.5}$	**0.65**	$ND_{0.5}$	**0.73**	ND_{1}	NA

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-1	02/21/07	**96,000**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	ND_{1}	NA
MW-1	05/14/07	**16,000**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-1	09/19/07	**90,000**	NA	**0.9**	**1.6**	$ND_{0.50}$	**2.1**	$ND_{1.0}$	NA
MW-1	12/03/07	**20,000**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-1	03/27/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	06/12/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/18/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	12/31/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/25/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	06/16/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/09/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/05/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/17/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/23/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/27/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/21/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/28/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/29/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/27/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/27/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	08/12/14	**420**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50\text{-}10.0}$
MW-1	03/12/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	03/21/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	08/22/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-1	11/14/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-2	07/07/95	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	10/30/95	**75**	NA	ND	ND	ND	ND	NA	NA
MW-2	01/15/96	**85**	NA	ND	ND	ND	ND	NA	NA
MW-2	10/18/96	**68**	NA	ND	ND	ND	ND	ND	NA
MW-2	01/30/97	ND	NA	ND	ND	ND	ND	ND	NA
MW-2	04/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	07/25/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	10/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	04/28/98	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	07/10/98	**290**	NA	ND	ND	ND	ND	NA	NA
MW-2	10/26/98	ND	NA	ND	ND	ND	ND	NA	NA

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
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San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-2	01/28/99	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	07/22/99	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	01/20/00	ND	NA	ND	ND	ND	ND	ND	NA
MW-2	09/11/00	ND	NA	ND	ND	ND	ND	NS	NA
MW-2	01/29/01	**110**	NA	ND	ND	ND	ND	NA	NA
MW-2	03/08/01	**72**	NA	ND	ND	ND	ND	NA	NA
MW-2	06/21/01	ND	NA	ND	ND	ND	ND	NS	NA
MW-2	10/03/01	ND	NA	ND	ND	ND	ND	NS	NA
MW-2	12/21/01	**71**	NA	ND	ND	ND	ND	NA	NA
MW-2	03/15/02	ND	NA	ND	ND	ND	ND	NA	NA
MW-2	04/16/02	**70**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	07/08/02	ND_{240}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	10/08/02	**100**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	01/13/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	04/15/03	**110**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	07/01/03	**83**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	10/14/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	01/21/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	04/07/04	**110**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	07/07/04	**75**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	10/05/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	03/10/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	06/07/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	08/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	11/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	02/01/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	05/03/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	07/25/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	11/06/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-2	02/21/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	ND_{1}	NA
MW-2	05/14/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-2	09/19/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-2	12/03/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-2	03/27/08	ND_{50}	NA	$ND_{0.50}$	**1**	$ND_{0.50}$	**1.5**	$ND_{1.0}$	NA
MW-2	06/12/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-2	09/18/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-2	12/31/08	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-2	03/25/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-2	06/16/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-2	09/09/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$

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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-2	03/05/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-2	09/17/10	ND_{51}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5\text{-}4.0}$
MW-2	03/23/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5\text{-}4.0}$
MW-2	09/27/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**0.67**	$ND_{0.5\text{-}2.0}$
MW-2	03/21/12	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-2	09/28/12	ND_{40}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5\text{-}5.0}$
MW-2	03/29/13	**1,500**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0\text{-}5.0}$
MW-2	09/27/13	**52.1**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5\text{-}10}$
MW-2	03/27/14	43.3 J	ND_{50}	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25\text{-}5.0}$
MW-2	08/11/14	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50\text{-}10.0}$
MW-2	03/12/15	**66**	ND_{100}	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.20}$	$ND_{0.10}$	$ND_{0.10\text{-}1.0}$
MW-2	06/23/15	**70**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.5\text{-}5.0}$
MW-2	09/01/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.5\text{-}5.0}$
MW-2	11/19/15	ND_{52}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.5\text{-}5.0}$
MW-2	03/21/16	36.1 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0\text{-}10}$
MW-2	06/01/16	ND_{96}	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0\text{-}10}$
MW-2	08/22/16	**69.6**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0\text{-}20}$
MW-2	11/14/16	ND_{98}	ND_{50}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50\text{-}5.0}$
MW-3	10/31/95	**92**	NA	ND	ND	ND	ND	NA	NA
MW-3	01/15/96	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	10/18/96	ND	NA	ND	ND	ND	ND	ND	NA
MW-3	01/30/97	ND	NA	ND	ND	ND	ND	ND	NA
MW-3	04/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	07/25/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	10/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	04/28/98	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	07/10/98	**1,900**	NA	ND	ND	ND	ND	NA	NA
MW-3	10/26/98	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	01/28/99	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	07/22/99	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	01/20/00	ND	NA	ND	ND	ND	ND	ND	NA
MW-3	09/11/00	**360**	NA	ND	ND	ND	ND	ND	NA
MW-3	01/29/01	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	03/08/01	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	06/21/01	ND	NA	ND	ND	ND	**0.74**	NA	NA
MW-3	10/03/01	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	12/21/01	**72**	NA	ND	ND	ND	ND	NA	NA
MW-3	03/15/02	ND	NA	ND	ND	ND	ND	NA	NA
MW-3	04/16/02	**96**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	07/08/02	ND_{240}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA

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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-3	10/08/02	**230**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	01/13/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	04/15/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	07/01/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	10/14/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	01/21/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	04/07/04	**52**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	07/07/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	10/05/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	03/10/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	06/07/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	08/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	11/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	02/01/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	05/03/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	07/25/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	11/06/06	**89**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-3	02/21/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	ND_{1}	NA
MW-3	05/14/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	09/19/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	12/03/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	03/27/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	06/12/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	09/18/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-3	12/31/08	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	03/25/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	06/16/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	09/09/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	03/05/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	09/17/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-3	03/23/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-3	09/27/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	03/21/12	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-3	09/28/12	ND_{41}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-5.0}$
MW-3	03/29/13	**1,000**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0-5.0}$
MW-3	09/27/13	**65.6**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-3	03/27/14	**79.7**	ND_{50}	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-3	08/11/14	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-3	03/12/15	**47**	ND_{100}	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.20}$	$ND_{0.10}$	**5.1 - TBA**
MW-3	06/23/15	**82**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$

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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-3	09/01/15	ND_{49}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50\text{-}5.0}$
MW-3	11/19/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50\text{-}5.0}$
MW-3	03/21/16	88.3 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0\text{-}10}$
MW-3	06/01/16	81.1 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0\text{-}10}$
MW-3	08/22/16	**394**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0\text{-}20}$
MW-3	11/14/16	ND_{97}	ND_{50}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50\text{-}5.0}$
MW-4	07/07/95	**230**	NA	ND	ND	ND	**0.67**	NA	NA
MW-4	10/31/95	**290**	NA	**0.6**	**0.8**	**0.7**	**0.8**	NA	NA
MW-4	01/15/96	**16,000**	NA	ND	ND	ND	**1**	NA	NA
MW-4	10/18/96	**420**	NA	ND	ND	ND	ND	ND	NA
MW-4	01/30/97	**170**	NA	ND	ND	ND	ND	ND	NA
MW-4	04/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	07/25/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	10/30/97	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	04/28/98	**1,100**	NA	ND	ND	**0.7**	**0.72**	NA	NA
MW-4	07/10/98	**930**	NA	ND	ND	**0.7**	**0.72**	NA	NA
MW-4	10/26/98	**220**	NA	ND	ND	ND	ND	NA	NA
MW-4	01/28/99	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	07/22/99	**320**	NA	ND	ND	ND	ND	NA	NA
MW-4	01/20/00	**77**	NA	ND	ND	ND	ND	ND	NA
MW-4	09/11/00	**1,200**	NA	ND	ND	ND	ND	NA	NA
MW-4	01/29/01	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	03/08/01	**160**	NA	ND	ND	ND	ND	NA	NA
MW-4	06/21/01	**110**	NA	ND	ND	**2.1**	**11**	NA	NA
MW-4	10/03/01	ND	NA	ND	ND	ND	ND	NA	NA
MW-4	12/21/01	**58**	NA	ND	ND	ND	ND	NA	NA
MW-4	03/15/02	**86**	NA	ND	ND	ND	ND	NA	NA
MW-4	04/16/02	**120**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	07/08/02	ND_{240}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	10/08/02	**340**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	01/13/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	04/15/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	07/01/03	**61**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	10/14/03	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	01/21/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	04/07/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	07/07/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	10/05/04	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	03/10/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	06/07/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA

Table 2
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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-4	08/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	11/09/05	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	02/01/06	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	05/03/06	**790**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	07/25/06	**96**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	11/06/06	**120**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	02/21/07	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-4	05/14/07	ND_{50}	NA	$ND_{0.5}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-4	09/19/07	ND_{50}	NA	$ND_{0.5}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-4	12/03/07	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	**0.73**	$ND_{1.0}$	NA
MW-4	03/27/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-4	06/12/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-4	09/18/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-4	12/31/08	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	03/25/09	**77**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	06/16/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	09/09/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	03/05/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	09/17/10	**73**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-4	03/23/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-4	09/27/11	**73**	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	03/21/12	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-4	09/28/12	ND_{41}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-5.0}$
MW-4	03/29/13	**290**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0-5.0}$
MW-4	09/27/13	**74.9**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-4	03/27/14	**81.1**	ND_{50}	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-4	08/11/14	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-4	03/12/15	**250**	ND_{100}	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.20}$	$ND_{0.10}$	$ND_{0.10-1.0}$
MW-4	06/23/15	**67**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-4	09/01/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-4	11/19/15	ND_{52}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-4	03/21/16	37.1 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-4	06/01/16	ND_{94}	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-4	08/22/16	44.3 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-4	11/14/16	ND_{97}	ND_{50}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-5	07/07/95	**1,800**	NA	ND	ND	ND	ND	NA	NA
MW-5	10/30/95	**4,400**	NA	ND	ND	**4.6**	**11**	NA	NA
MW-5	01/15/96	**7,000**	NA	ND	ND	ND	**1.6**	NA	NA
MW-5	10/18/96	**3,400**	NA	ND	ND	ND	ND	ND	NA
MW-5	01/30/97	**2,900**	NA	ND	ND	ND	ND	ND	NA

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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-5	04/30/97	**1,500**	NA	ND	ND	ND	ND	NA	NA
MW-5	07/25/97	**600**	NA	ND	ND	ND	ND	NA	NA
MW-5	10/30/97	**1,100**	NA	ND	ND	ND	ND	NA	NA
MW-5	04/28/98	**700**	NA	ND	ND	ND	ND	NA	NA
MW-5	07/10/98	**700**	NA	ND	ND	ND	ND	NA	NA
MW-5	10/26/98	**590**	NA	ND	ND	ND	ND	NA	NA
MW-5	01/28/99	**540**	NA	ND	ND	ND	ND	NA	NA
MW-5	07/22/99	**680**	NA	ND	ND	ND	ND	NA	NA
MW-5	01/20/00	**1,100**	NA	ND	**1.7**	ND	ND	ND	NA
MW-5	09/11/00	**87,000**	NA	ND	**0.58**	ND	ND	NA	NA
MW-5	01/29/01	**400**	NA	ND	ND	ND	ND	NA	NA
MW-5	03/08/01	**650**	NA	ND	ND	ND	ND	NA	NA
MW-5	06/21/01	**2,700**	NA	**11**	**7.1**	**1.0**	**3.9**	NA	NA
MW-5	10/03/01	**2,700**	NA	ND	ND	ND	ND	NA	NA
MW-5	12/21/01	**1,900**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	NA	NA
MW-5	03/15/02	**2,900**	NA	ND	ND	ND	ND	NA	NA
MW-5	04/16/02	**2,800**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	07/08/02	**470**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	10/08/02	**4,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	01/13/03	**370**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	04/15/03	**3,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	07/01/03	**7,200**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	10/14/03	**1,300**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	01/21/04	**640**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	04/07/04	**560**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	07/07/04	**280**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	10/05/04	**1,200**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	03/10/05	**120**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	06/07/05	**130**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	08/09/05	**50**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	11/09/05	**220**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	02/01/06	**380**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	05/03/06	**620**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	07/25/06	**1,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-5	11/06/06	NS	NA	NS	NS	NS	NS	NS	NS
MW-5	02/21/07	**180**	NA	**5.5**	**8.2**	**1.9**	**7.5**	ND_{1}	NA
MW-5	05/14/07	**160**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-5	09/19/07	**460**	NA	**1.4**	**2.8**	**0.77**	**3**	$ND_{1.0}$	NA
MW-5	12/03/07	**480**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	ND_{1}	NA
MW-5	03/27/08	**420**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA

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		(all results reported in micrograms per liter)							
MW-5	06/12/08	**580**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-5	09/18/08	**530**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-5	12/31/08	**1,100**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	03/25/09	**1,500**	NA	$ND_{0.5}$	$ND_{0.5+G373}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	06/16/09	**1,300**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	09/09/09	**1,500**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	03/05/10	**1,200**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	09/17/10	**1,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5\text{-}4.0}$
MW-5	03/23/11	**1,900**	**460**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5\text{-}4.0}$
MW-5	09/27/11	**1,100**	**380**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	03/21/12	**630**	**190**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-5	09/28/12	**420**	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5\text{-}5.0}$
MW-5	03/29/13	**1,200**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0\text{-}5.0}$
MW-5	09/27/13	**3,320**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5\text{-}10}$
MW-5	03/27/14	**899**	**106**	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25\text{-}5.0}$
MW-5	08/12/14	**590**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50\text{-}10.0}$
MW-5	03/12/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	03/21/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-5	08/22/16	**1,490**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0\text{-}20}$
MW-5	11/14/16	**220**	**172**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50\text{-}5.0}$
MW-6	07/07/95	**13,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	10/30/95	**67,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	01/15/96	**18,000**	NA	ND	ND	ND	**6.4**	NA	NA
MW-6	10/18/96	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	01/30/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	04/30/97	**24,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	07/25/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	10/30/97	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	04/28/98	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	07/10/98	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	10/26/98	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	01/29/99	**9,200**	NA	**0.55**	ND	ND	**1.1**	NA	NA
MW-6	07/22/99	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	01/20/00	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/11/00	**13,000**	NA	ND	ND	ND	**0.55**	NS	NA
MW-6	01/29/01	**410,000**	NA	ND	ND	ND	ND	NA	NA

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		(all results reported in micrograms per liter)							
MW-6	03/08/01	**180,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	06/21/01	**50,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	10/03/01	**75,000**	NA	ND	ND	ND	ND	NA	NA
MW-6	12/21/01	**49,000**	NA	ND	ND	**0.63**	**0.52**	NA	NA
MW-6	03/15/02	**190,000**	NA	**2.9**	$ND_{2.5}$	**2.9**	$ND_{1.0}$	NA	NA
MW-6	04/16/02	**19,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	07/08/02	**40,000**	NA	$ND_{2.5}$	$ND_{2.5}$	**5.3**	**5**	ND_{1}	NA
MW-6	10/08/02	**29,000**	NA	$ND_{0.5}$	$ND_{0.5}$	**1.1**	**0.81**	ND_{1}	NA
MW-6	01/13/03	**2,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	04/15/03	**2,300**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	07/01/03	**2,200**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	10/14/03	**3,400**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	01/21/04	**4,100**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	04/07/04	**2,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	07/07/04	**14,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	10/05/04	**3,400**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	03/10/05	**1,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	06/07/05	**9,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	08/09/05	**5,200**	NA	$ND_{0.5}$	**0.7**	$ND_{0.5}$	**0.57**	ND_{1}	NA
MW-6	11/09/05	**2,600**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	02/01/06	**1,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	05/03/06	**2,900**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	07/25/06	**23,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	11/06/06	**2,400**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**0.71**	ND_{1}	NA
MW-6	02/21/07	**9,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	05/14/07	**3,800**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	ND_{1}	NA
MW-6	09/19/07	**4,700**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	NA
MW-6	12/03/07	**1,800**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-6	03/27/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	06/12/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/18/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	12/31/08	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/25/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	06/16/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/09/09	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/05/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/17/10	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/23/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/27/11	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/21/12	NS	NS	NS	NS	NS	NS	NS	NS

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-6	09/28/12	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/29/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/27/13	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/27/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	08/12/14	**18,900**	**398**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50\text{-}10.0}$
MW-6	03/12/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/21/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	08/22/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	11/14/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	03/27/08	**1,800**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-7	06/12/08	**7,800**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-7	09/18/08	**7,900**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-7	12/31/08	**47,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-7	03/25/09	**150,000**	NA	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	**5.5 - TBA**
MW-7	06/16/09	**420,000**	NA	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0\text{-}20}$
MW-7	09/09/09	**240,000**	NA	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-7	03/05/10	**25,000**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**4.6 - TBA**
MW-7	09/17/10	**86,000**	NA	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0}$	ND_{10}	$ND_{5.0}$	$ND_{5.0\text{-}40}$
MW-7	03/23/11	**130,000**	**1,000**	$ND_{5.0}$	$ND_{5.0}$	$ND_{5.0}$	ND_{10}	$ND_{5.0}$	$ND_{5.0\text{-}40}$
MW-7	09/27/11	**8,700**	**1,400**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**2.6**	$ND_{0.5}$	$ND_{0.5\text{-}2.0}$
MW-7	03/21/12	**59,000**	**840**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**2.5 - TBA**
MW-7	09/28/12	**130,000**	**650**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5\text{-}5.0}$
MW-7	03/29/13	**3,100**	**201**	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0\text{-}5.0}$
MW-7	09/27/13	**4,570**	**204**	$ND_{2.5}$	$ND_{2.5}$	$ND_{2.5}$	$ND_{7.5}$	$ND_{2.5}$	$ND_{2.5\text{-}50}$
MW-7	03/27/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	08/12/14	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	03/12/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	03/21/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	08/22/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-7	11/14/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-8	03/27/08	**65**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-8	06/12/08	ND_{100}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA

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Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-8	09/18/08	**72**	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-8	12/31/08	**150**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**5.7 - TBA**
MW-8	03/25/09	**180**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**7.2 - TBA**
MW-8	06/16/09	**130**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{5.0-20}$
MW-8	09/09/09	**160**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	4.2
MW-8	03/05/10	**130**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**4.2 - TBA**
MW-8	09/17/10	**1,200**	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-8	03/23/11	**710**	**400**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-8	09/27/11	**260**	**280**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**3.0 - TBA**
MW-8	03/21/12	ND_{50}	**130**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	**2.9 - TBA**
MW-8	09/28/12	**92**	**90**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-5.0}$
MW-8	03/29/13	**720**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0-5.0}$
MW-8	09/27/13	**873**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-8	03/27/14	**2,380**	**166**	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-8	08/12/14	**2,300**	**192**	$ND_{0.50}$	**0.78**	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-8	03/12/15	ND_{50}	**130**	**0.11**	$ND_{0.10}$	$ND_{0.10}$	$ND_{0.20}$	$ND_{0.10}$	$ND_{0.10-1.0}$
MW-8	06/23/15	**52**	**120**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-8	09/01/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-8	11/19/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-8	03/21/16	**167**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-8	06/01/16	75.5 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-8	08/22/16	ND_{47}	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-8	11/14/16	ND_{97}	ND_{50}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-9	03/27/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-9	06/12/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-9	09/18/08	ND_{50}	NA	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	NA
MW-9	12/31/08	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	03/25/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	06/16/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	09/09/09	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	03/05/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	09/17/10	ND_{50}	NA	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-9	03/23/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.0}$	$ND_{0.5}$	$ND_{0.5-4.0}$
MW-9	09/27/11	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	03/21/12	ND_{50}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5-2.0}$
MW-9	09/28/12	ND_{41}	ND_{50}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-5.0}$
MW-9	03/29/13	**860**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0-5.0}$
MW-9	09/27/13	**50.6**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-9	03/27/14	**90.4**	ND_{50}	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-9	08/12/14	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$

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Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-9	03/12/15	ND_{50}	ND_{100}	**2.3**	**1.1**	**0.43**	**0.49**	$ND_{0.10}$	$ND_{0.10-1.0}$
MW-9	06/23/15	**64**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-9	09/01/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-9	11/19/15	ND_{50}	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-9	03/21/16	36.9 J	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-9	06/01/16	ND_{98}	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-9	08/22/16	**1,680**	ND_{100}	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-9	11/14/16	ND_{97}	ND_{50}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-10	09/27/13	**552**	**374**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-10	03/27/14	**1,240**	**922**	**6.2**	**2.0**	**0.97**	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-10	08/11/14	**830**	**871**	**6.2**	**2.1**	**1.3**	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-10	03/12/15	**250**	**460**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-10	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-10	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-10	11/19/15	**130**	**200**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-10	03/21/16	**2,580**	**495**	**1.1**	0.69 J	0.40 J	0.48 J	$ND_{1.0}$	$ND_{2.0-10}$
MW-10	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-10	08/22/16	**1,680**	**503**	0.46 J	0.57 J	0.50 J	1.4 J	$ND_{1.0}$	$ND_{1.0-20}$
MW-10	11/14/16	**150**	**786**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-11	09/27/13	**1,090**	**499**	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-11	03/27/14	**1,650**	**1,350**	**0.67**	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-11	08/11/14	**1,300**	**884**	**0.6**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-11	03/12/15	**3,100**	**730**	**1.1**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-11	06/23/15	**360**	**370**	**0.64**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-11	09/01/15	**1,200**	**440**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-11	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-11	03/21/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-11	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-11	08/22/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-11	11/14/16	**2,000**	**751**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-12	09/27/13	**3,980**	**4,180**	**74.2**	**16.4**	**23.6**	**65.9**	$ND_{0.5}$	$ND_{0.5-10}$
MW-12	03/27/14	**21,600**	**7,450**	**211**	**19.5**	**45.9**	**116**	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-12	08/11/14	**3,200**	**6,150**	**233**	**18.7**	**49.9**	**130**	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-12	03/12/15	**17,200**	**10,600**	**334**	**20.6**	**29.3**	**79.8**	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-12	06/23/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	11/19/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	03/21/16	**16,800**	**4,480**	**164**	**9.6**	**16.1**	**36.8**	$ND_{5.0}$	ND_{10-50}
MW-12	06/01/16	NS	NS	NS	NS	NS	NS	NS	NS
MW-12	08/22/16	**4,320**	**2,260**	**48.3**	**13.6**	**5.9**	**24.3**	$ND_{1.0}$	$ND_{1.0-20}$

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Sample I.D.	Date Collected	TPH-D	TPH-G	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE	Four Fuel Oxygenates
		(all results reported in micrograms per liter)							
MW-12	11/14/16	**1,900**	**4,280**	**28.6**	**9.8**	**5.0**	**18.7**	$ND_{1.0}$	$ND_{1.0-10}$
MW-13	09/27/13	**1,780**	ND_{100}	$ND_{0.5}$	$ND_{0.5}$	$ND_{0.5}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.5-10}$
MW-13	03/27/14	**12,400**	**704**	$ND_{0.24}$	$ND_{0.22}$	$ND_{0.21}$	$ND_{0.75}$	$ND_{0.25}$	$ND_{0.25-5.0}$
MW-13	08/11/14	**1,600**	**558**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.50}$	$ND_{0.50-10.0}$
MW-13	03/12/15	**3,900**	**560**	**0.56**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-13	06/23/15	**790**	**320**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-13	09/01/15	NS	NS	NS	NS	NS	NS	NS	NS
MW-13	11/19/15	**800**	ND	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-13	03/21/16	**1,210**	60.3 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-13	06/01/16	**1,300**	66.2 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-13	08/22/16	**2,290**	60.9 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-13	11/14/16	**370**	**278**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-14	03/12/15	ND_{50}	**190**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-14	06/23/15	**64**	**210**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-14	09/01/15	ND_{50}	**180**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-14	11/19/15	**74**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-14	03/21/16	**728**	68.8 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-14	06/01/16	**954**	73.5 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-14	08/22/16	**2,140**	62.3 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-14	11/14/16	ND_{97}	**88.3**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-15	03/12/15	**710**	**270**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**6.4 - TBA**
MW-15	06/23/15	**140**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**5.1 - TBA**
MW-15	09/01/15	ND_{51}	**180**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	$ND_{0.50-5.0}$
MW-15	11/19/15	**69**	ND_{100}	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**5.4 - TBA**
MW-15	03/21/16	**670**	65.7 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	$ND_{2.0-10}$
MW-15	06/01/16	**854**	75.1 J	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{2.0}$	$ND_{1.0}$	4.2 J- TBA
MW-15	08/22/16	**2,160**	**101**	$ND_{1.0}$	$ND_{1.0}$	$ND_{1.0}$	$ND_{3.0}$	$ND_{1.0}$	$ND_{1.0-20}$
MW-15	11/14/16	ND_{98}	**142**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$
MW-16	03/12/15	**570**	**680**	**1.8**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**10.2 - TBA**
MW-16	06/23/15	**250**	**470**	**3.6**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**10.9 - TBA**
MW-16	09/01/15	**170**	**800**	**2.8**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**11.9 - TBA**
MW-16	11/19/15	**190**	**155**	$ND_{0.50}$	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.0}$	$ND_{0.50}$	**10.0 - TBA**
MW-16	03/21/16	**1,110**	**453**	**1.3**	0.32 J	0.25 J	1.1 J	$ND_{1.0}$	$ND_{2.0-10}$
MW-16	06/01/16	**1,520**	**409**	**1.3**	0.36 J	0.27 J	0.90 J	$ND_{1.0}$	7.2 J- TBA
MW-16	08/22/16	**2,680**	**486**	**1.8**	0.47 J	0.30 J	1.4 J	$ND_{1.0}$	$ND_{1.0-20}$
MW-16	11/14/16	**1,700**	**700**	**2.7**	$ND_{0.50}$	$ND_{0.50}$	$ND_{1.5}$	$ND_{0.5}$	$ND_{0.50-5.0}$

Table 2
Groundwater Sample Analytical Results - Petroleum Compounds
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Notes:
TPH-D - total petroleum hydrocarbons as diesel
TPH-G - total petroleum hydrocarbons as gasoline
MTBE - methyl-t-butyl ether
Four Fuel Oxygenates - ethyl tert-butyl ether (ETBE), di-isopropyl ether (DIPE), tert-amylmethyl ether (TAME), and tert-butyl alcohol (TBA)
ND_x - not detected above "x" laboratory reporting limits
J - Estimated concentration above adjusted method detection limit and below the adjusted reporting limit
NS - not sampled
NA - not analyzed

Table 3
Groundwater Sample Analytical Results - Biodegradation Parameters
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Monitoring Well Number	Date Measured	Nitrate (mg/L)	Sulfate (mg/L)	Phosphorous (mg/L)	Colony Counts	Total Hydrocarbon Degraders (CFU/ml)
MW-1	08/12/14	$ND_{0.10}$	$ND_{2.5}$	**33.9**	---	**40,000**
MW-1	03/12/15	---	---	---	---	---
MW-1	04/24/15	---	---	---	---	---
MW-1	05/19/15	---	---	---	---	---
MW-1	06/23/15	---	---	---	---	---
MW-1	09/01/15	---	---	---	---	---
MW-1	11/19/15	---	---	---	---	---
MW-1	03/21/16	---	---	---	---	---
MW-1	06/01/16	---	---	---	---	---
MW-1	08/22/16	---	---	---	---	---
MW-1	11/14/16	---	---	---	---	---
MW-2	08/11/14	$ND_{0.10}$	**47.4**	**1.6**	---	**140,000**
MW-2	03/12/15	$ND_{0.10}$	**74.7**	**0.76**	**164**	**1,600,000**
MW-2	04/24/15	$ND_{0.10}$	**42.5**	**0.60**	**68**	**6,800**
MW-2	05/19/15	**0.10**	**45.5**	**0.33**	**6**	**60**
MW-2	06/23/15	$ND_{0.10}$	**47.0**	**0.16**	**12**	**120**
MW-2	09/01/15	$ND_{0.10}$	**51.0**	**0.37**	**120**	**1,200**
MW-2	11/19/15	$ND_{0.10}$	**39.1**	**0.30**	---	**5,900**
MW-2	03/21/16	$ND_{0.10}$	**45.2**	**0.39**	---	**20**
MW-2	06/01/16	$ND_{0.10}$	**64.9**	**0.34**	---	**10**
MW-2	08/22/16	$ND_{0.10}$	**63**	$ND_{0.10}$	---	**140**
MW-2	11/14/16	$ND_{0.50}$	**96.3**	**0.22**	---	**20**
MW-3	08/11/14	$ND_{0.10}$	**62.0**	**4.3**	---	**1,100**
MW-3	03/12/15	**0.14**	**54.6**	**1.0**	**64**	**6,400**
MW-3	04/24/15	**0.11**	**51.7**	**1.0**	**28**	**28,000**
MW-3	05/19/15	$ND_{0.10}$	**54.0**	**0.54**	**112**	**1,100**
MW-3	06/23/15	$ND_{0.10}$	**51.3**	**0.34**	**54**	**540**
MW-3	09/01/15	$ND_{0.10}$	**13.2**	**0.68**	**75**	**750**
MW-3	11/19/15	$ND_{0.10}$	**9.3**	**0.29**	---	**6,400**
MW-3	03/21/16	$ND_{0.10}$	**60.7**	**0.67**	---	**400**
MW-3	06/01/16	$ND_{0.10}$	**63.8**	**0.76**	---	**200**
MW-3	08/22/16	$ND_{0.10}$	**87.5**	**0.68**	---	**10**
MW-3	11/14/16	$ND_{1.0}$	**76.4**	**0.54**	---	**70**
MW-4	08/11/14	$ND_{0.10}$	**40.1**	**0.40**	---	**100**
MW-4	03/12/15	$ND_{0.10}$	**43.7**	**0.34**	**42**	**420**
MW-4	04/24/15	$ND_{0.10}$	**70.0**	**0.34**	**132**	**13,000**
MW-4	05/19/15	$ND_{0.10}$	**66.6**	**0.26**	**16**	**160**
MW-4	06/23/15	$ND_{0.10}$	**57.9**	**0.11**	**16**	**160**
MW-4	09/01/15	$ND_{0.10}$	**73.2**	**0.28**	ND	<10
MW-4	11/19/15	$ND_{0.50}$	**68.7**	**0.066**	---	**31,000**
MW-4	03/21/16	$ND_{0.10}$	**65.8**	**0.32**	---	**200**
MW-4	06/01/16	$ND_{0.10}$	**70.0**	**0.29**	---	**200**
MW-4	08/22/16	$ND_{0.10}$	**69.4**	**0.29**	---	**30**
MW-4	11/14/16	$ND_{0.50}$	**66**	**0.22**	---	**130**

Table 3
Groundwater Sample Analytical Results - Biodegradation Parameters
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Monitoring Well Number	Date Measured	Nitrate (mg/L)	Sulfate (mg/L)	Phosphorous (mg/L)	Colony Counts	Total Hydrocarbon Degraders (CFU/ml)
MW-5	08/12/14	$ND_{0.10}$	$ND_{2.5}$	**3.0**	---	**9,000**
MW-5	03/12/15	---	---	---	---	---
MW-5	04/24/15	---	---	---	---	---
MW-5	05/19/15	---	---	---	---	---
MW-5	06/23/15	---	---	---	---	---
MW-5	11/19/15	---	---	---	---	---
MW-5	03/21/16	---	---	---	---	---
MW-5	06/01/16	---	---	---	---	---
MW-5	08/22/16	**3.9**	**891**	0.079 J	---	**1,300**
MW-5	11/14/16	$ND_{0.50}$	**50.8**	**1.6**	---	**2,000**
MW-6	08/12/14	$ND_{0.10}$	$ND_{2.5}$	**0.77**	---	**30**
MW-6	03/12/15	---	---	---	---	---
MW-6	04/24/15	---	---	---	---	---
MW-6	05/19/15	---	---	---	---	---
MW-6	06/23/15	---	---	---	---	---
MW-6	09/01/15	---	---	---	---	---
MW-6	11/19/15	---	---	---	---	---
MW-6	03/21/16	---	---	---	---	---
MW-6	06/01/16	---	---	---	---	---
MW-6	08/22/16	---	---	---	---	---
MW-6	11/14/16	---	---	---	---	---
MW-7	08/12/14	---	---	---	---	---
MW-7	03/12/15	---	---	---	---	---
MW-7	04/24/15	---	---	---	---	---
MW-7	05/19/15	---	---	---	---	---
MW-7	06/23/15	---	---	---	---	---
MW-7	09/01/15	---	---	---	---	---
MW-7	11/19/15	---	---	---	---	---
MW-7	03/21/16	---	---	---	---	---
MW-7	06/01/16	---	---	---	---	---
MW-7	08/22/16	---	---	---	---	---
MW-7	11/14/16	---	---	---	---	---
MW-8	08/12/14	$ND_{0.10}$	**22.7**	**1.0**	---	**70**
MW-8	03/12/15	$ND_{0.10}$	**10.0**	**0.70**	**34**	**340**
MW-8	04/24/15	$ND_{0.10}$	**28.1**	**1.2**	**42**	**42,000**
MW-8	05/19/15	$ND_{0.10}$	**1.7**	**0.59**	**18**	**180**
MW-8	06/23/15	$ND_{0.10}$	**10.7**	**0.27**	**18**	**180**
MW-8	09/01/15	$ND_{0.10}$	**41.0**	**1.0**	**100**	**1,000**
MW-8	11/19/15	$ND_{0.10}$	**66.9**	**0.11**	---	**5,000**
MW-8	03/21/16	$ND_{0.10}$	**1,050**	**1.7**	---	**200**
MW-8	06/01/16	$ND_{0.10}$	**1,280**	**1.1**	---	**3,000**
MW-8	08/22/16	**27.1**	**2,400**	0.051 J	---	**120**
MW-8	11/14/16	$ND_{1.0}$	**487**	**0.14**	---	**80**
MW-9	08/12/14	$ND_{0.10}$	**23.5**	**1.7**	---	**8,000**
MW-9	03/12/15	$ND_{0.10}$	**21.2**	**59.4**	**109**	**1,100**
MW-9	04/24/15	$ND_{0.10}$	**20.8**	**0.49**	**124**	**12,000**

Table 3
Groundwater Sample Analytical Results - Biodegradation Parameters
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Monitoring Well Number	Date Measured	Nitrate (mg/L)	Sulfate (mg/L)	Phosphorous (mg/L)	Colony Counts	Total Hydrocarbon Degraders (CFU/ml)
MW-9	05/19/15	$ND_{0.10}$	**17.2**	**0.23**	**32**	**320**
MW-9	06/23/15	$ND_{0.10}$	**12.4**	**0.072**	**14**	**140**
MW-9	09/01/15	$ND_{0.10}$	**13.3**	**0.24**	**85**	**850**
MW-9	11/19/15	$ND_{0.10}$	**18.1**	**0.11**	---	**1,300**
MW-9	03/21/16	$ND_{0.10}$	**20.2**	**0.40**	---	**100**
MW-9	06/01/16	$ND_{0.10}$	**21.1**	**0.56**	---	**100**
MW-9	08/22/16	$ND_{0.10}$	**20.3**	**0.39**	---	**300**
MW-9	11/14/16	$ND_{0.50}$	**21.7**	**0.21**	---	**80**
MW-10	08/11/14	$ND_{0.10}$	$ND_{2.5}$	**2.6**	---	**82,000**
MW-10	03/12/15	$ND_{0.10}$	$ND_{0.10}$	**1.7**	**72**	**72,000**
MW-10	04/24/15	$ND_{0.10}$	$ND_{0.10}$	**1.2**	**142**	**14,000**
MW-10	05/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.82**	---	ND_{10}
MW-10	06/23/15	---	---	---	---	---
MW-10	09/01/15	---	---	---	---	---
MW-10	11/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.070**	---	**34,000**
MW-10	03/21/16	$ND_{0.10}$	$ND_{0.50}$	**12.3**	---	**2,000**
MW-10	06/01/16	---	---	---	---	---
MW-10	08/22/16	$ND_{0.10}$	**2.6**	**2.0**	---	**80,000**
MW-10	11/14/16	$ND_{0.20}$	$ND_{1.0}$	**1.2**	---	**350**
MW-11	08/11/14	$ND_{0.10}$	$ND_{2.5}$	**1.6**	---	**2,500**
MW-11	03/12/15	$ND_{0.10}$	$ND_{0.10}$	**1.5**	**124**	**1,200**
MW-11	04/24/15	**0.24**	$ND_{0.10}$	**1.3**	**33**	**3,300**
MW-11	05/19/15	$ND_{0.10}$	$ND_{0.10}$	**0.73**	**70**	**700**
MW-11	06/23/15	$ND_{0.10}$	$ND_{0.10}$	**0.35**	**58**	**580**
MW-11	09/01/15	$ND_{0.10}$	$ND_{0.50}$	**0.86**	**65**	**6,500**
MW-11	11/19/15	---	---	---	---	---
MW-11	03/21/16	---	---	---	---	---
MW-11	06/01/16	---	---	---	---	---
MW-11	08/22/16	---	---	---	---	---
MW-11	11/14/16	$ND_{0.10}$	$ND_{0.50}$	**0.51**	---	**14,000**
MW-12	08/11/14	$ND_{0.10}$	$ND_{2.5}$	**2.8**	---	**160**
MW-12	03/12/15	$ND_{0.10}$	$ND_{0.10}$	**1.6**	**84**	**840**
MW-12	04/24/15	$ND_{0.10}$	$ND_{0.10}$	**1.3**	**26**	**260**
MW-12	05/19/15	$ND_{0.10}$	$ND_{0.10}$	**0.66**	**11**	**110**
MW-12	06/23/15	---	---	---	---	---
MW-12	09/01/15	---	---	---	---	---
MW-12	11/19/15	---	---	---	---	---
MW-12	03/21/16	$ND_{0.10}$	$ND_{0.50}$	**1.8**	---	**60,000**
MW-12	06/01/16	---	---	---	---	---
MW-12	08/22/16	$ND_{0.10}$	**19.7**	**2.0**	---	**60,000**
MW-12	11/14/16	$ND_{0.10}$	$ND_{0.50}$	**0.75**	---	**500**
MW-13	08/11/14	$ND_{0.10}$	$ND_{2.5}$	**2.3**	---	**620**
MW-13	03/12/15	$ND_{0.10}$	$ND_{0.10}$	**1.8**	**89**	**8,900**
MW-13	04/24/15	$ND_{0.10}$	$ND_{0.10}$	**1.2**	**44**	**44,000**

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Pacific Bell Telephone Company Facility
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San Jose, California

Monitoring Well Number	Date Measured	Nitrate (mg/L)	Sulfate (mg/L)	Phosphorous (mg/L)	Colony Counts	Total Hydrocarbon Degraders (CFU/ml)
MW-13	05/19/15	$ND_{0.10}$	$ND_{0.10}$	**0.71**	**7**	**70**
MW-13	06/23/15	$ND_{0.10}$	**6.7**	**0.29**	**7**	**70**
MW-13	09/01/15	---	---	---	---	---
MW-13	11/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.33**	---	**57,000**
MW-13	03/21/16	$ND_{0.10}$	$ND_{0.50}$	**1.8**	---	**80**
MW-13	06/01/16	$ND_{0.10}$	$ND_{0.50}$	**1.5**	---	**50**
MW-13	08/22/16	$ND_{0.10}$	**2.4**	**1.7**	---	**450**
MW-13	11/14/16	$ND_{2.5}$	$ND_{0.50}$	**0.64**	---	ND_{10}
MW-14	03/12/15	$ND_{0.10}$	**2.9**	**1.1**	**172**	**1,700,000**
MW-14	04/24/15	$ND_{0.10}$	$ND_{0.10}$	**1.4**	**264**	**260,000**
MW-14	05/19/15	$ND_{0.10}$	$ND_{0.10}$	**0.46**	**71**	**710**
MW-14	06/23/15	$ND_{0.10}$	**1.1**	**0.32**	**11**	**110**
MW-14	09/01/15	$ND_{0.10}$	$ND_{0.50}$	**0.80**	**55**	**5,500**
MW-14	11/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.070**	---	**3,300**
MW-14	03/21/16	$ND_{0.10}$	**2.1**	**1.3**	---	**10**
MW-14	06/01/16	$ND_{0.10}$	**1.8**	**1.4**	---	**500**
MW-14	08/22/16	$ND_{0.10}$	**4.1**	**1.6**	---	**600**
MW-14	11/14/16	$ND_{0.10}$	**0.56**	**0.41**	---	**12**
MW-15	03/12/15	**0.19**	**6.8**	**1.3**	**110**	**110,000**
MW-15	04/24/15	**0.14**	**0.83**	**1.4**	**74**	**74,000**
MW-15	05/19/15	**0.11**	**0.77**	**0.48**	**231**	**23,000**
MW-15	06/23/15	$ND_{0.10}$	$ND_{0.10}$	**0.14**	**140**	**1,400**
MW-15	09/01/15	$ND_{0.10}$	$ND_{0.50}$	**0.80**	**220**	**2,200**
MW-15	11/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.20**	---	**2,300**
MW-15	03/21/16	$ND_{0.10}$	**2.3**	**0.66**	---	**1,000**
MW-15	06/01/16	$ND_{0.10}$	**3.1**	**0.73**	---	**1,000**
MW-15	08/22/16	$ND_{0.10}$	**4.6**	**1.3**	---	**3,000**
MW-15	11/14/16	$ND_{0.10}$	$ND_{0.50}$	**0.42**	---	**40**
MW-16	03/12/15	**0.19**	5.5	**0.90**	**42**	**420,000**
MW-16	04/24/15	**0.16**	**0.88**	**1.2**	**126**	**13,000**
MW-16	05/19/15	**0.15**	**0.70**	**0.71**	**297**	**30,000**
MW-16	06/23/15	$ND_{0.10}$	$ND_{0.10}$	**0.27**	**180**	**1,800**
MW-16	09/01/15	$ND_{0.10}$	$ND_{0.10}$	**1.0**	**110**	**11,000**
MW-16	11/19/15	$ND_{0.10}$	$ND_{0.50}$	**0.13**	---	**6,700**
MW-16	03/21/16	$ND_{0.10}$	**19.8**	**0.86**	---	**2,000**
MW-16	06/01/16	$ND_{0.10}$	**0.52**	**0.83**	---	**5,000**
MW-16	08/22/16	$ND_{0.10}$	0.39 J	**1.2**	---	**90**
MW-16	11/14/16	**0.15**	$ND_{0.50}$	**0.30**	---	**12**

Notes:
--- = not analyzed or not available
mg/L - milligrams per liter
ND - below reporting limit
CFU/ml = Colony forming units per milliliter

Table 4
ORP Data
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

Well Number:	IW-1	IW-2	IW-3	IW-4	IW-5	IW-6	IW-7	IW-8	IW-9	IW-10	IW-11	MW-1	MW-2
Date	**ORP (mV)**												
03/12/15	---	---	---	---	---	---	---	---	---	---	---	FP	97.0
03/17/15	---	---	---	---	---	---	---	---	---	---	---	-213.1	-98.1
03/19/15	---	---	---	---	---	---	---	---	---	---	---	-74.9	-111.7
03/20/15	---	---	---	---	---	---	---	---	---	---	---	-81.8	-107.1
03/23/15	---	---	---	---	---	---	---	---	---	---	---	11.1	-108.3
03/24/15	---	---	---	---	---	---	---	---	---	---	---	-12.5	-105.3
03/25/15	---	---	---	---	---	---	---	---	---	---	---	-57.8	-155.2
04/02/15	---	---	---	---	---	---	---	---	---	---	---	-152.7	-151.2
04/10/15	---	---	---	---	---	---	---	---	---	---	---	-71.3	-132.1
04/17/15	---	---	---	---	---	---	---	---	---	---	---	-80.2	-135.1
04/24/15	---	---	---	---	---	---	---	---	---	---	---	-104.6	-69.4
05/01/15	-17.1	-38.7	-41.4	-58.6	27.8	34.4	19.2	32.8	-15.8	14.4	-47.9	---	---
05/19/15	---	---	---	---	---	---	---	---	---	---	---	-17.4	-33.9
06/23/15	---	---	---	---	---	---	---	---	---	---	---	-143.9	-138.1
07/13/15	234	402.7	412.5	456.4	424.5	425.3	421.3	430.5	73.2	493.8	453.1	-105.3	73.4
08/13/15	---	-80.5	-66.0	-11.1	---	---	---	---	---	---	---	---	-127.9
08/31/15	-20.4	-109.0	-140.7	-143.3	-16.2	-40.6	-27.4	6.4	-155.0	-69.7	-78.5	---	---
09/01/15	---	---	---	---	---	---	---	---	---	---	---	---	-141.4
10/22/15	-212.4	-161.4	-160.7	-158.3	-160.3	-150.4	-161.1	-163.7	-174.3	-161.3	-201.4	-151.7	-122.1
11/19/15	---	---	---	---	---	---	---	---	---	---	---	-120.4	-196.8
12/29/15	35.9	60.2	119.5	135.9	-135.3	2.8	55.7	11.2	-37.0	85.1	121.2	65.6	-103.6
02/02/16	-57.4	-35.5	-54.8	-24.4	-52.2	-10.3	26.6	288	26.6	14.4	18	-98.7	-142.2
03/29/16	10.3	4.6	-5.2	-261	-33.4	-63.6	---	---	---	-3.1	-50.3	-132.8	-124.1
04/27/16	62	---	---	49.6	-19.5	4.4	---	---	---	27.1	16.1	-80.2	-107.1
05/26/16	267.8	223.2	234	176.5	178.6	191.7	304.8	66.7	118.9	177.9	194.4	24	154.7
06/29/16	-368	-53.5	-29.1	-55.7	-157.5	-157.9	-332	-92	-134.6	-163.1	-46.1	-127.9	-188.3
07/21/16	-22.8	-28.2	32.3	45.3	-135.7	-168.3	35.3	-14.6	-178.2	-154.1	-33	-94.1	-109.3
08/23/16	21.5	113.1	133.7	97.6	-37.1	-92.1	73.2	148.6	-49.8	14.6	90.1	3.4	-72.8
09/22/16	11.6	32.1	-19.4	-32.6	-151.1	-152.9	-17.8	-114.5	-182.4	-15.9	-23.9	-136.1	-121.2
10/25/16	-56.6	-90.6	-16.1	-14.7	-127.2	-130.4	-4.4	-45.7	-160.6	-19.3	40.2	-134.6	-89.6
11/15/16	-79.5	-41	22	66.7	-121.2	-101.2	19.9	-72.1	-146.3	37	107.3	-28.3	-45.1
12/27/16	-145.9	-166.7	77.6	112.6	-62.1	-94.5	-92.1	-84.5	-45.8	46.5	87.6	-87.9	-68.2

Notes:
--- - not measured
FP - free product

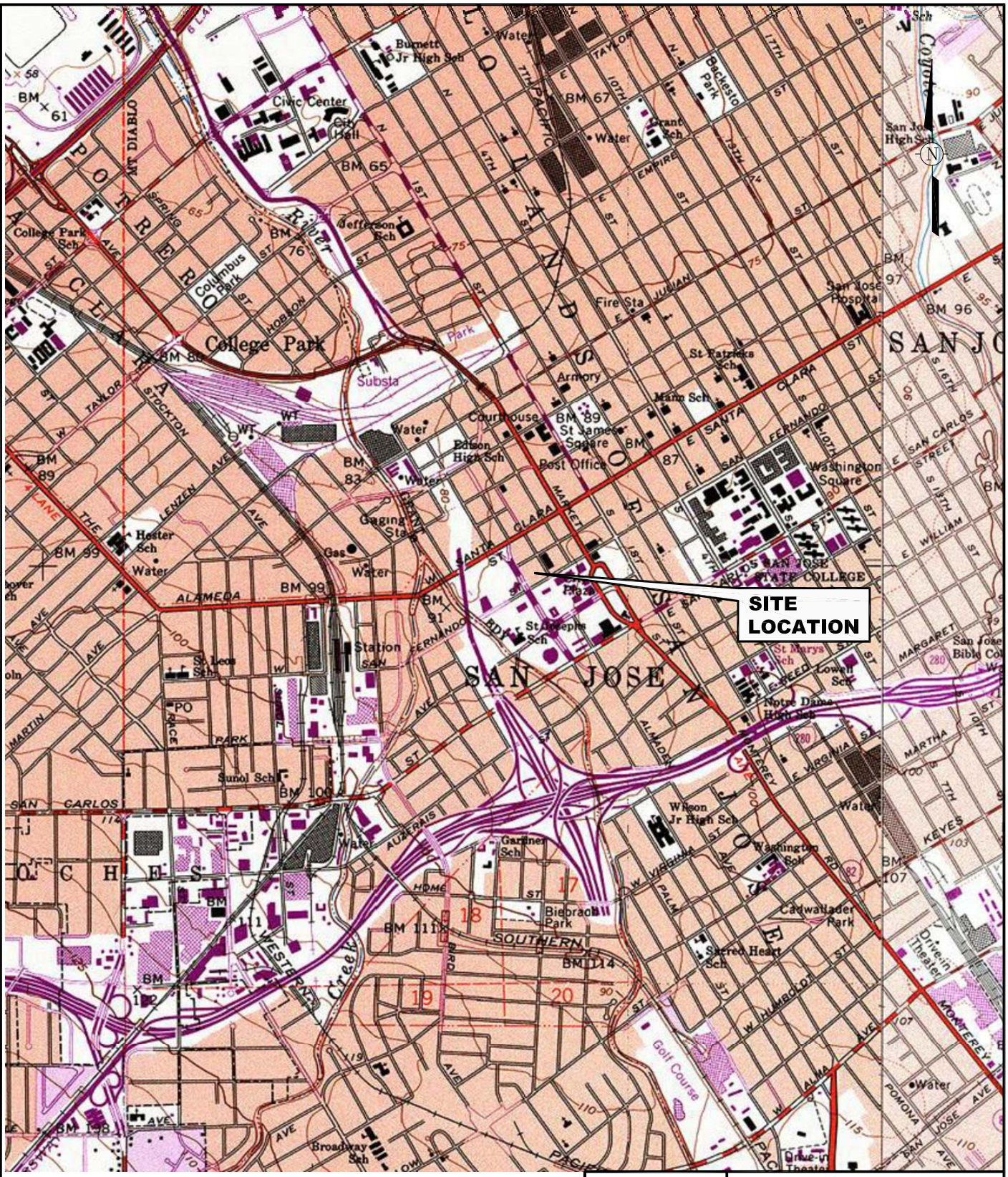
Table 4
ORP Data
Pacific Bell Telephone Company Facility
95 South Almaden Avenue
San Jose, California

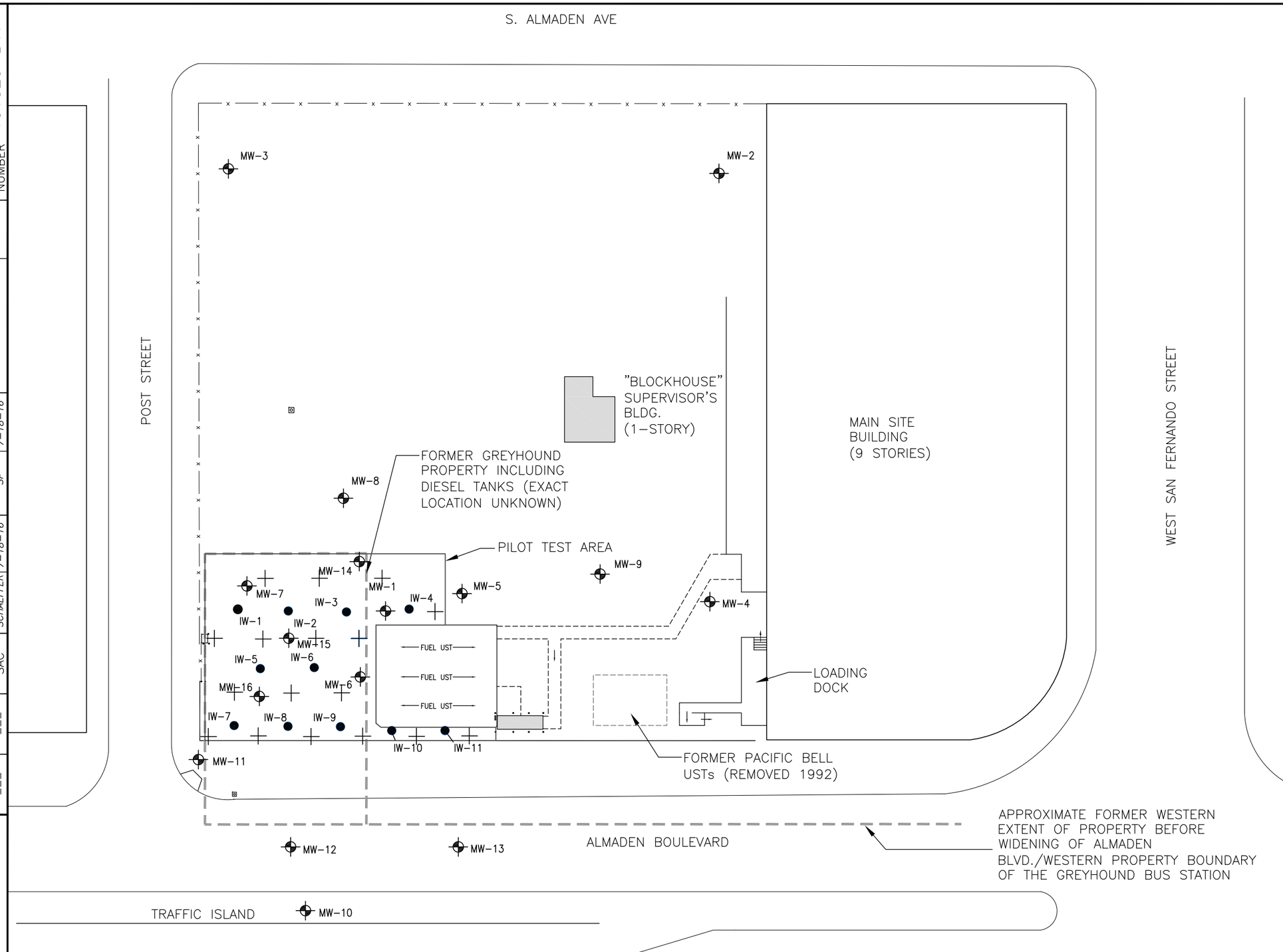
Well Number:	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Date	**ORP (mV)**													
03/12/15	99.0	23.0	DRY	FP	FP	48.0	-15.0	-112.0	-94.0	-138.0	-41.0	-35.0	-27.0	-16.0
03/17/15	-92.0	-97.0	-125.4	-145.7	-145.0	-134.0	-74.4	-148.0	-145.8	---	---	-119.3	-124.6	-121.3
03/19/15	-118.2	-57.1	-132.1	-132.2	-155.1	-136.0	-89.9	-116.3	-151.2	---	---	-120.3	-107.6	-104.0
03/20/15	-93.3	-115.1	-134.6	-147.5	-147.9	-137.8	-93.1	-134.3	-143.2	---	---	-125.1	-110.9	-110.3
03/23/15	-106.3	-100.3	-101.0	-110.9	-133.7	-135.7	-48.8	-119.4	-156.3	---	---	-120.8	-89.1	-103.8
03/24/15	-96.8	-102.0	-123.8	-130.5	-122.1	-132.7	-80.3	-120.6	-151.6	---	---	-121.1	-103.1	-101.3
03/25/15	-40.9	-98.4	-120.9	137.7	-140.5	-123.8	-73.6	-122.8	-153.8	---	---	-107.4	-111.7	-105.8
04/02/15	-98.5	-90.5	-115.3	-42.0	-138.4	-124.1	-85.3	-98.5	-110.5	---	---	-123.6	-80.9	-101.3
04/10/15	-96.7	-127.9	-133.5	-163.5	-161.3	-131.1	-102.7	-138.2	-159.1	---	---	-138.7	-108.5	-115.6
04/17/15	-95.2	-121.7	-131.2	-152.8	-153.5	-130.4	-110.7	-131.2	-138.1	---	---	-129.7	-102.5	-113.8
04/24/15	-82.1	-133.1	DRY	-36.1	-159.9	-171.1	-118.6	-157.3	-189.3	-171.3	-154.5	-148.7	-134.4	-106.9
05/01/15	---	---	---	---	---	---	---	---	---	---	---	---	---	---
05/19/15	-98.7	-131.2	DRY	-88.7	-34.7	-179.1	-13.1	-183.4	-161.8	-142.1	-171.4	-150.1	-118.9	25.3
06/23/15	-91.5	-157.7	DRY	-140.6	-211.0	-202.8	-122.1	-206.0	-184.6	-209.0	-208.1	-191.4	-166.8	-198.4
07/13/15	120.4	60.3	DRY	310.2	24.5	20.6	72.1	-14.8	-163.2	---	---	-93.7	-198.2	-120.0
08/13/15	-146.2	-144.0	DRY	---	---	---	-114.9	---	---	---	---	---	---	---
08/31/15	---	---	DRY	---	---	-196.9	---	-206.1	-166.5	---	---	-177.0	---	---
09/01/15	-140.5	-132.6	DRY	-171.6	-186.7	-204.9	-148.1	-193.7	-142.1	-195.3	-183.6	-152.1	-167.8	-179.9
10/22/15	-141.9	-133.9	DRY	-152.3	-141.5	-129.0	-119.1	-164.3	-158.1	---	---	-152.9	-135.3	-172.2
11/19/15	-201.3	-195.2	DRY	-247.2	-244.2	-237.9	-150.4	-264.4	-260.3	-245.8	-234.3	-215.3	-226.8	-227.5
12/29/15	-124.1	-116.2	DRY	-119.8	-145.5	-148.7	-112.4	-107.4	-125.1	---	---	-140.5	-122.9	-134.2
02/02/16	-139.7	-136.1	DRY	-14.9	-129.2	-168.1	-131.6	-115.3	-161.2	---	---	-16.12	-170.3	26.8
03/29/16	-70.7	-128.4	DRY	-224.6	-225.3	208.7	-132.1	-208.7	-195.4	-213	-180	-192.5	-206	-182
04/27/16	-99.7	-126.1	DRY	120.3	-180.2	-143.8	-98.8	-145.1	-140.3	---	---	-166.5	-168.2	-13.3
05/26/16	94.6	171.7	DRY	189.4	196.8	31.8	162	50.1	-32.1	---	---	-94.3	-88.7	-105.6
06/29/16	-143.2	-180.6	DRY	-147.1	-169.7	-174.3	-146	-188.8	-171.8	---	---	-187.9	-184.3	-155.9
07/21/16	-118.6	-114.6	DRY	-179.1	-180.5	17.2	-56.8	-157.1	-166.3	---	---	-153.6	-157.9	-138.4
08/23/16	-39.9	-88.9	86.1	-119.3	-89.6	112.4	-37.7	-93.8	-128.6	-94.4	-116.1	-109.8	-108.5	-116.9
09/22/16	-99.1	-127.9	DRY	-148.8	-176.2	-108.2	-147.8	-150.3	-163.2	---	---	-186.1	-151	-156.1
10/25/16	-97.3	-115.8	---	-164.5	-149.9	-100.3	-114.6	-119.6	-140.1	---	---	-163.3	-130	-161.5
11/15/16	-31.1	-50.1	-66.5	-100.6	---	-46.8	-41.9	-57.9	-70.4	-64.3	-84.7	-98	-85.7	-100.4
12/27/16	-74.7	-38.1	---	30.4	-127.7	-106.4	-80.6	-36.7	-186	---	---	-149.4	-119.8	-24.6

Notes:
--- - not measured
FP - free product

Figures

IMAGE	X-REF	OFFICE	DRAWN BY		CHECKED BY		APPROVED BY		DRAWING NUMBER
almaden.jpg	---	Concord	SCHAEFFER	4-21-16	PS	4-21-16	RD	4-21-16	151823-A37





LEGEND

- MW-5 EXISTING GROUNDWATER WELL
- IW-7 INJECTION WELL
- OSE II INJECTION POINT

TRUE NORTH

SITE NORTH

APPROXIMATE SCALE (FEET)

0 40 80

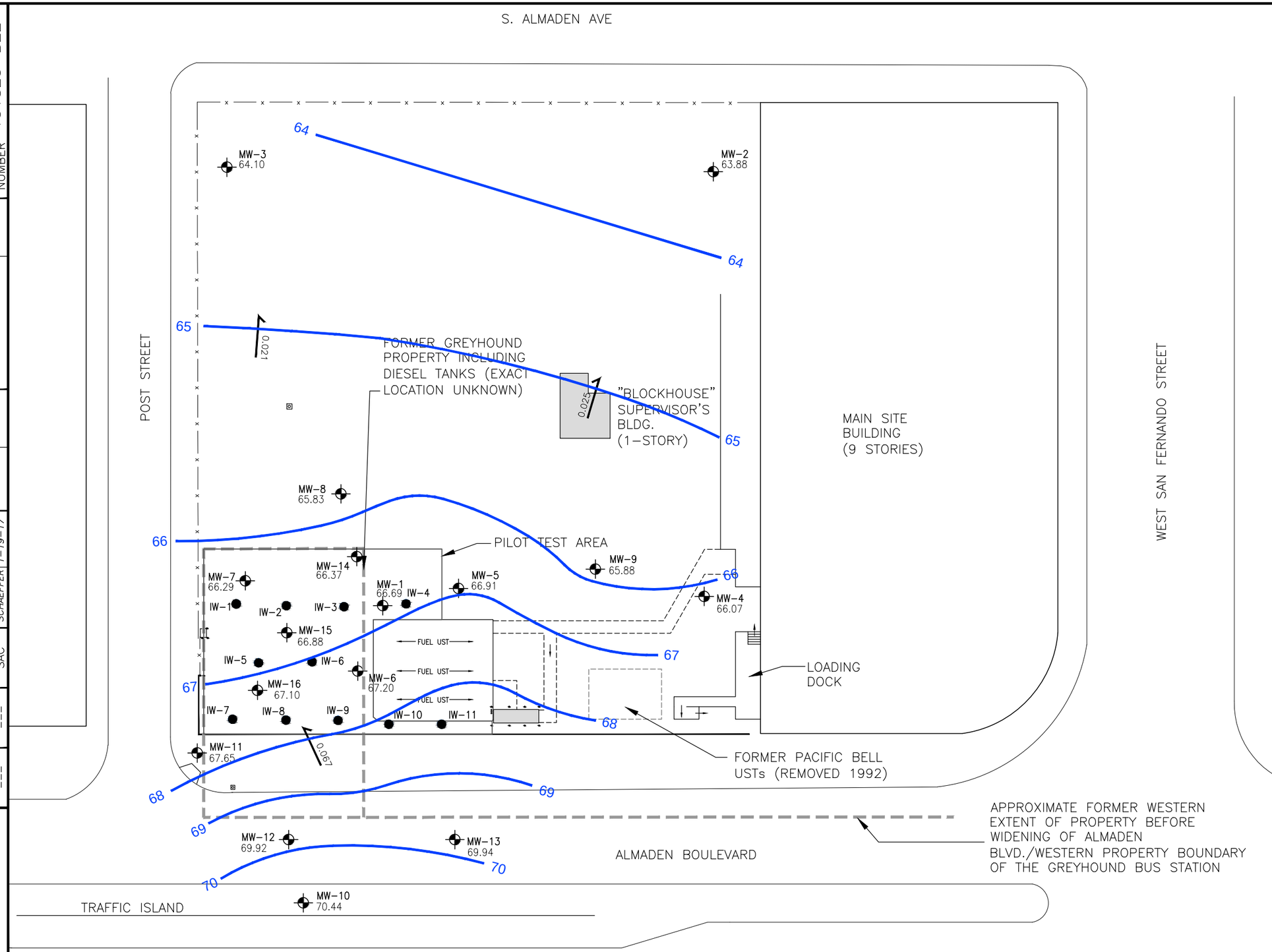
PREPARED FOR
AT&T
DALLAS, TEXAS

FIGURE 2

SITE PLAN

PACIFIC BELL TLELEPHONE COMPANY FACILITY
95 SOUTH ALMADEN AVENUE
SAN JOSE, CALIFORNIA

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	SAC	SCHAEFFER 7-18-16	SP 7-18-16		151823-B17



LEGEND

MW-5	EXISTING GROUNDWATER WELL
IW-7	INJECTION WELL
0.025	INFERRED GROUNDWATER GRADIENT AND DIRECTION OF FLOW
63.88	GROUNDWATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL)
64	GROUNDWATER CONTOUR LINE (FEET ABOVE MEAN SEA LEVEL)

TRUE NORTH

SITE NORTH

APPROXIMATE SCALE (FEET)

0 40 80

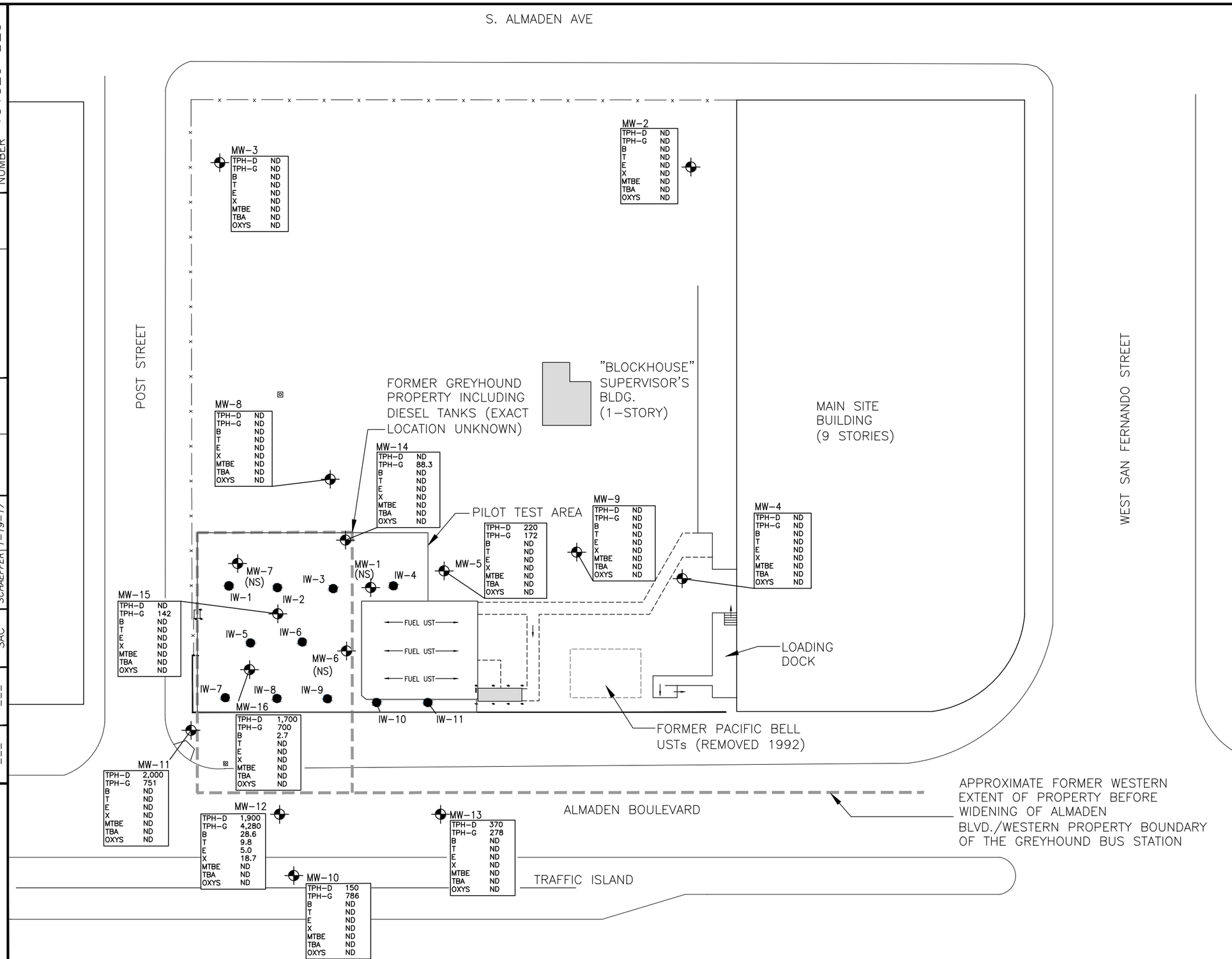
CBI

PREPARED FOR
AT&T
DALLAS, TEXAS

FIGURE 3
GROUNDWATER CONTOUR MAP
NOVEMBER 14, 2016

PACIFIC BELL TELEPHONE COMPANY FACILITY
95 SOUTH ALMADEN AVENUE
SAN JOSE, CALIFORNIA

DRAWING NUMBER	151823-B22
APPROVED BY	
CHECKED BY	
DRAWN BY	SCHAEFFER 1-19-17
OFFICE	SAC
X-REF	---
IMAGE	---



LEGEND

MW-5	EXISTING GROUNDWATER WELL
IW-7	INJECTION WELL
TPH-D	TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPH-G	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
B	BENZENE
T	TOLUENE
E	ETHYLBENZENE
X	XYLENES
MTBE	METHYL-T-BUTYL ETHER
TBA	T-BUTYL ALCOHOL
OXYS	DI-ISOPROPYL ETHER, TERT-AMYL METHYL ETHER AND ETHYL TERT-BUTYL ETHER
ND	NOT DETECTED ABOVE LABORATORY METHOD REPORTING LIMITS
NS	NOT SAMPLED

ALL RESULTS REPORTED IN MICROGRAMS PER LITER

TRUE NORTH

SITE NORTH

APPROXIMATE SCALE (FEET)

0 40 80

CBI

PREPARED FOR
AT&T
DALLAS, TEXAS

FIGURE 4
GROUNDWATER SAMPLE ANALYTICAL RESULTS
NOVEMBER 14, 2016

PACIFIC BELL TELEPHONE COMPANY FACILITY
95 SOUTH ALMADEN AVENUE
SAN JOSE, CALIFORNIA

DRAWING NUMBER	151823-B23
APPROVED BY	
CHECKED BY	
DRAWN BY	SCHAEFFER 1-19-17
OFFICE	SAC
X-REF	---
IMAGE	---

Appendix A

Site Background

Site Background

1992 UST Removal

In October 1992, five 10,000-gallon diesel USTs and associated piping were removed from the southwest corner of the site. Soil samples collected during the UST removals were reported to contain elevated concentrations of petroleum hydrocarbons indicating that a release occurred from the UST system. Three 20,000-gallon diesel USTs were subsequently installed in a new excavation about 90 feet north of the UST removal area (Figure 2).

A total of 22 soil borings were advanced between 1992 and 1995 to characterize the extent of petroleum hydrocarbon impact to soil and groundwater beneath the site (Versar, 1995). Analytical results of samples from soil borings located in the northwestern corner of the site indicated that petroleum hydrocarbons were present at depths less than 5 feet below ground surface (bgs). Soil impact in the southern and western portions of the site is reported to have occurred at depths in excess of 10 or 15 feet bgs.

1995 Monitoring Well Installation

In July 1995, six soil borings were advanced and converted into monitoring wells to evaluate groundwater conditions. Petroleum hydrocarbons have been detected in each of the monitoring wells. During the January 1996 monitoring event, free product was reported in monitoring well MW-1, located on the western portion of the site immediately east of the existing USTs.

During the October 1996 quarterly monitoring event, free product was observed floating on top of the groundwater in monitoring wells MW-1 and MW-6 at thicknesses of 0.25-feet and 0.02-feet, respectively. Active and passive removal of the free product was conducted between October 1996 and December 1996 using Soak-Ease absorbent socks and weekly bailing. Passive product removal was reinitiated in April 1997, with 0.01-feet and 0.02-feet of free-phase petroleum hydrocarbons encountered in MW-1 and MW-6, respectively. Subsequent product monitoring was performed on a semi-annual basis through 2014. Quarterly sampling was initiated in 2015.

1997 Historical Research

During the third quarter of 1997, historical research was performed to assess the source and nature of the free product discovered at the site. A review of Sanborn Fire Insurance Maps indicated that the current Pacific Bell property originally consisted of two separate lots that were divided by a street

extending parallel to San Fernando Avenue. Several businesses were located on portions of both lots that are now occupied by the Pacific Bell facility. In the 1950s, a Greyhound Bus Line service garage was located on the southwest portion of the site, which is the approximate location of the wells that have contained free product (e.g., MW-1 and MW-6).

Prior investigations had discovered petroleum hydrocarbons in borings upgradient and crossgradient of the former and current locations of the Pacific Bell USTs. Fingerprint groundwater sample analysis indicated that two separate hydrocarbon plumes exist on the southern and southwestern portions of the site. Samples of free product from monitoring well MW-1 were collected for fingerprint analysis and age dating. The laboratory analysis reported that the product was highly weathered and likely in excess of 20 years old at the time of sampling (IT, 1997). The data indicates that the plume located on the southwestern portion of the site predates Pacific Bell's acquisition and use of the property. Based on the location in relation to groundwater flow direction, depth of the impact, and fingerprint analysis and age dating, the hydrocarbon impact on the southwestern portion of the site is likely related to activities performed at the former bus maintenance garage and not to the nearby former and current Pacific Bell tank systems.

2001 Sensitive Receptor Survey

In February 2001, a sensitive receptor survey was conducted. The nearest water supply well was determined to be located 1,300 feet from the Pacific Bell property, and used for industrial purposes. City of San Jose drinking water wells are located 1,700 feet west of the Pacific Bell property. The water well located nearest to the site and the City wells are located at a distance whereby groundwater supplied by these wells would not likely be impacted by the release of petroleum hydrocarbons that occurred on the site.

2001 Corrective Action Plan and Oxygenating Compound Injection

In April 2001, IT Corporation (IT) generated a Corrective Action Plan (CAP) for remediation of petroleum impacted groundwater at the site in response to a request from the Santa Clara Valley Water District (IT, 2001). The CAP was approved for implementation in May 2001. Corrective actions consisted of the advancement of soil borings to depths below the water table and backfilling with an oxygen-releasing compound slurry. The oxygen-releasing compound was used to promote increased biodegradation of the remaining petroleum hydrocarbons in the site groundwater.

In July 2001, the corrective actions were implemented, with approximately 980 pounds of an oxygenating compound (ORC™) were injected into the upper 5 feet of the shallow groundwater table through 28 Geoprobe© soil borings located in the vicinity of the former UST systems by IT.

2002 Skimmer Installation

In 2002, Hydrologue, Inc. (HI) assumed sampling responsibilities of the on-site wells. In July 2002, HI replaced the absorbent socks in wells MW-1 and MW-6 with 0.2-gallons per hour passive skimmers. Product is removed on a quarterly basis as part of the ongoing quarterly monitoring activities.

2008 Monitoring Well Installation

In March 2008, HI installed three groundwater monitoring wells (MW-7, MW-8, and MW-9) at the site. Monitoring well MW-7 was installed within the approximate footprint of the former Greyhound Bus station, with wells MW-8 and MW-9 installed further down gradient of the former bus station. Intermittent occurrences of minor product or immeasurably thin iridescent petroleum sheen have been observed on the water surface within well MW-7.

2008 CAP Submittal

In a letter dated August 22, 2008, the SCCDEH requested submittal of a CAP detailing remediation of hydrocarbons at the site. AT&T subsequently requested Shaw Environmental, Inc. (Shaw) to prepare the CAP and assume sampling responsibilities of the on-site wells. In December 2008, Shaw submitted the CAP to the SCCDEH detailing completion of a pre-design investigation and subsequent excavation of vadose zone and zone of seasonal water table fluctuation ("smear zone").

2013 Additional Site Assessment

In June 2013, Shaw performed additional off-site investigation to delineate the extent of any underlying impact at the Pacific Bell facility along Almaden Boulevard and West San Fernando Street. Six soil borings were installed, with four completed as new groundwater monitoring wells. In addition, soil vapor samples were collected on the Pacific Bell property.

2014 Baseline Sampling Event

In June 2014, CB&I submitted a work plan detailing a proposed baseline sampling event to determine biodegradation parameters in groundwater. This work plan was subsequently approved by the

SCCDEH, with the baseline sampling event conducted in August 2014 in conjunction with the semi-annual groundwater sampling. Depth to groundwater and LNAPL thickness measurements were collected along with groundwater samples from the 13 onsite monitoring wells to evaluate current site conditions, the existing population of diesel-degrading bacteria, and physical parameters in the groundwater that affect biodegradation of hydrocarbons.

The results of the baseline sampling were presented in a *Pilot Test Work Plan* dated October 6, 2014, with the work plan proposing installation of 11 dedicated injection wells and three new groundwater monitoring wells followed by the injection of bioremediation catalysts into the groundwater.

2015 Monitoring and Injection Well Activities

Following approval of the *Pilot Test Work Plan* by the SCCDEH in a letter dated October 16, 2014, the three groundwater monitoring wells (MW-14, MW-15, MW-16) and eleven injection wells (IW-1 through IW-11) were installed at the site in January 2015. The iSOC oxygen injection system was installed in the eleven injection wells to increase dissolved oxygen concentrations in the groundwater to facilitate biodegradation of petroleum hydrocarbons, with oxygenation commencing within the injection wells in March 2015.

On June 2, 2015, the new monitoring and injection well coordinates and elevations were surveyed by Sandis, a licensed surveying company located in Sunnyvale, California. However, discrepancies were noted between the well elevations of the existing wells and the new wells. On September 21, 2015, the remaining wells were resurveyed by Sandis in order to address the discrepancies, with all the well elevations now referenced to a NAVD 88 benchmark.

2015 OSE II injection

In May 2015, approximately 110 gallons (900 pounds) of OSE II was injected at 17 locations to remediate residual free phase diesel fuel residing the vadose and phreatic zones. This correlated to approximately 5,500 gallons of OSE II mixture at a ratio of 50:1 potable water to OSE II. The OSE II will breakdown the residual free phase diesel fuel and make it bioavailable for the indigenous microbial population. A summary of the injection activities is included in the *System Installation Report* dated August 2015.

Appendix B

Field Data Sheets

FIELD REPORT
WATER LEVEL / FLOATING PRODUCT SURVEY

CB&I
180 Promenade Circle, Suite 320
Sacramento, Calif 95834
916-928-3300

PROJECT NO : 631215948

LOCATION : 95 Almaden Blvd, San Jose

DATE: 11-14-16

CLIENT : AT&T

SAMPLER : Paul Weinhardt

WELL ID	TOTAL DEPTH (Feet)	PREVIOUS DEPTH TO WATER 8/22/2016	PRE PURGE D.O. READINGS (mg/L)	DEPTH TO WATER (Feet)	DEPTH TO PRODUCT (Feet)	PRODUCT THICKNESS (Feet)	PID READINGS (ppm)	COMMENTS (Note any sheens present)
MW-1	29.00	17.27 (0.02' FP)	N/A	15.95	15.93	.02	—	
MW-2	31.23	21.76	.50	20.71	—	—		
MW-3	31.20	21.10	1.94	20.06	—	—		
MW-4	30.00	18.95	.88	18.15	—	—		
MW-5	22.45	17.27	1.14	16.46	—	—		
MW-6	29.00	17.50 (0.02' FP)	N/A	16.12	16.11	.01		
MW-7	30.00	18.59 (0.19' FP)	N/A	17.19	17.12	.07		
MW-8	30.00	18.20	.80	17.60	—	—		
MW-9	30.00	18.56	.74	17.92	—	—		
MW-10	27.02	16.02	.60	13.72	—	—		
MW-11	26.81	17.87 (0.02'FP)	1.11	16.06	—	—		
MW-12	27.00	15.09	.87	13.05	—	—		
MW-13	26.82	15.03	.41	13.31	—	—		
MW-14	28.00	17.49	.66	16.65	—	—		
MW-15	28.00	17.59	.70	16.30	—	—		
MW-16	28.00	18.10		16.58	—	—		

Comments :

Paul Weinhardt
Signature

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW1
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 29.00
DEPTH TO WATER (feet) : 15.95

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 3000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : N/A

END PURGE : ~~N/A~~ 1625
SAMPLING TIME : N/A

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1615	1000ML	6.92	409	20.99°	.61	-24.5
1620	2000ML	6.89	400	21.01°	.53	-26.2
1625	3000ML	6.86	396	21.03°	.49	-28.3

OTHER: COLOR: cloudy ODOR/PID: STRONG ____ 58.9 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer ____ Dedicated
Other: ____

WELL INTEGRITY: GOOD LOCK: NO

REMARKS: No Sample .02' of PRODUCT

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: PR PAGE 1 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW2
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 31.23
DEPTH TO WATER (feet) : 20.71

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 5000ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1020
SAMPLING TIME : 1026

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1000	1000ML	7.36	1661	19.08°	.32	-60.5
1005	2000ML	7.39	1549	18.94°	.25	-41.9
1010	3000ML	7.38	1537	18.91°	.27	-48.6
1015	4000ML	7.31	1519	18.93°	.27	-44.5
1020	5000ML	7.30	1517	18.96°	.27	-45.1

OTHER: COLOR: CLEAR ODOR/PID: NONE ____ 7.36 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: Tubing

WELL INTEGRITY: GOOD LOCK: yes

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: PR PAGE 2 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948 | SAMPLE ID : MW3
PURGED BY : Paul Weinhardt | CLIENT NAME : AT&T
SAMPLED BY : Paul Weinhardt | LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____ VOLUME IN CASING (gal.) : ____
DEPTH OF WELL (feet) : 31.20 CALCULATED PURGE (gal.) : ____
DEPTH TO WATER (feet) : 20.06 ACTUAL PURGE VOL. (gal.) : 4000 ML

DATE PURGED : 11-14-16 END PURGE : 945
DATE SAMPLED : 11-14-16 SAMPLING TIME : 951

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
930	1000 ML	7.24	1941	20.72°	1.41	-13.4
935	2000 ML	7.26	1942	20.55°	.76	-32.4
940	3000 ML	7.26	1940	20.50°	.49	-30.9
945	4000 ML	7.27	1939	20.50°	.47	-31.1

OTHER: COLOR: Clear ODOR/PID: NONE ____ 9.41 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: TUBING

WELL INTEGRITY: GOOD LOCK: yes

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 3 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW4
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 X (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 30.00
DEPTH TO WATER (feet) : 18.15

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1050
SAMPLING TIME : 1057

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1035	1000ML	7.34	1498	19.24°	.42	-60.2
1040	2000ML	7.34	1483	19.29°	.39	-62.4
1045	3000ML	7.34	1477	19.33°	.40	-48.9
1050	4000ML	7.34	1472	19.31°	.40	-50.1

OTHER: COLOR: CLEAR ODOR/PID: NONE ____ 8.17 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: TUBING

WELL INTEGRITY: GOOD LOCK: yes

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: PAGE 4 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW5
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 22.45
DEPTH TO WATER (feet) : 16.46

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11.14.16

END PURGE : 1220
SAMPLING TIME : 1226

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1205	1000 ML	7.05	1805	21.33°	.46	-66.4
1210	2000 ML	7.05	1752	21.30°	.36	-66.5
1215	3000 ML	7.05	1711	21.31°	.28	-70.0
1220	4000 ML	7.05	1724	21.32°	.27	-66.5

OTHER: COLOR: clear ODOR/PID: NONE ____ 16.7 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer ____ Dedicated
Other: ____

WELL INTEGRITY: Good LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 5 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW6
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 X (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : ____
DEPTH TO WATER (feet) : 16.12

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 2000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : N/A

END PURGE : 1609
SAMPLING TIME : N/A

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1603	1000ML	7.29	1834	20.85°	.28	-101.5
1606	1500ML	7.30	1825	20.85°	.23	-101.7
1609	2000ML	7.29	1816	20.85°	.21	-100.6

No Sample - DI of PRODUCT

OTHER: COLOR: Cloudy ODOR/PID: Strong ____ 78.6 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer ____ Dedicated
Other: ____

WELL INTEGRITY: Good LOCK: NO

REMARKS: No Sample - DI of PRODUCT

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____
SIGNATURE: Paul Weinhardt REVIEWED BY: DR PAGE 6 OF 16

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
SAMPLE ID : MW7
PURGED BY : Paul Weinhardt
CLIENT NAME : AT&T
SAMPLED BY : Paul Weinhardt
LOCATION : 1 San Jose Alameda

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 X (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
VOLUME IN CASING (gal.) : ____
DEPTH OF WELL (feet) : 300
CALCULATED PURGE (gal.) : ____
DEPTH TO WATER (feet) : 17.19
ACTUAL PURGE VOL. (gal.) : 3000ml

DATE PURGED : 11-14-16
END PURGE : 1630
DATE SAMPLED : N/A
SAMPLING TIME : N/A

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	COLOR (visual)	TURBIDITY (visual)
1620	1000ml	7.06	1622	21.51°	cloudy	93.7
1625	2000ml	7.09	1821	21.56°	cloudy	—
1630	3000ml	7.08	1862	21.62°	cloudy	—

OTHER: Cloudy
ODOR: Strong
____ (COBALT 0-100)
93.7 (NTU 0-200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump
____ Centrifugal Pump
____ Submersible Pump
____ Dispo Bailer
____ Bailer (Teflon)
____ Bailer (PVC)
____ Bailer (Stainless Steel)
____ Dedicated
Other: *Peristaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump
____ Bomb Sampler
____ Dipper
____ Dispo Bailer
____ Bailer (Teflon)
____ Bailer (Stainless Steel)
____ Submersible Pump
____ Dedicated
Other: ____

WELL INTEGRITY: Good
LOCK: NO

REMARKS: No Sample. .07 Product in well.

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____
SIGNATURE: Paul Weinhardt
REVIEWED BY: ____
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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948 SAMPLE ID : MW8

PURGED BY : Paul Weinhardt CLIENT NAME : AT&T

SAMPLED BY : Paul Weinhardt LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 X (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____ VOLUME IN CASING (gal.) : ____

DEPTH OF WELL (feet) : 30.00 CALCULATED PURGE (gal.) : ____

DEPTH TO WATER (feet) : 17.60 ACTUAL PURGE VOL. (gal.) : 4000ML

DATE PURGED : 11-14-16 END PURGE : 1120

DATE SAMPLED : 11-14-16 SAMPLING TIME : 1126

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1105	1000ML	7.09	2404	20.80°	.65	-42.7
1110	2000ML	7.09	2378	20.90°	.40	-51.1
1115	3000ML	7.08	2356	21.00°	.37	-44.7
1120	4000ML	7.08	2337	21.04°	.30	-46.8

OTHER: COLOR: CLEAR ODOR/PID: NONE ____ 16.8 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: TUBing

WELL INTEGRITY: GOOD LOCK: yes

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 8 OF 16

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WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW9
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 ____ (.163) 3 ____ (.367) 4 X (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 30.00
DEPTH TO WATER (feet) : 17.92

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000mL

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1150
SAMPLING TIME : 1156

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1135	1000mL	7.28	1363	19.66°	.68	-48.8
1140	2000mL	7.28	1348	19.77°	.38	-52.7
1145	3000mL	7.28	1345	19.79°	.29	-47.6
1150	4000mL	7.28	1345	19.76°	.28	-41.9

OTHER: COLOR: CLEAR ODOR/PID: ~~TRACE~~ NONE ____ 11.7 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer ____ Dedicated
Other: ____

WELL INTEGRITY: GOOD LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: [illegible] PAGE 9 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW10
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 * (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 27.02
DEPTH TO WATER (feet) : 13.72

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1420
SAMPLING TIME : 1426

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1405	1000ML	7.10	989	23.45	.21	-58.7
1410	2000ML	7.09	978	23.53	.20	-57.3
1415	3000ML	7.08	976	23.54	.19	-56.8
1420	4000ML	7.07	974	23.51	.19	-57.9

OTHER: COLOR: clear ODOR/PID: STRONG ____ 16.8 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer * Dedicated
Other: * TUBING

WELL INTEGRITY: GOOD LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____
SIGNATURE: Paul Weinhardt REVIEWED BY: PR PAGE 10 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW11
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 26.81
DEPTH TO WATER (feet) : 16.06

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 mL

DATE PURGED : 11.14.16
DATE SAMPLED : 11.14.16

END PURGE : 1450
SAMPLING TIME : 1456

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1435	1000 mL	7.06	1678	21.68°	.52	-59.4
1440	2000 mL	7.08	1713	21.71°	.50	-69.3
1445	3000 mL	7.08	1712	21.75°	.31	-68.3
1450	4000 mL	7.09	1710	21.76°	.30	-70.4

OTHER: COLOR: Cloudy ODOR/PID: Strong ____ 37.8 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ____ Centrifugal Pump
- ____ Submersible Pump
- ____ Dispo Bailer
- ____ Bailer (Teflon)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)
- ____ Dedicated

Other: Perastaltic

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ Bomb Sampler
- ____ Dipper
- ____ Dispo Bailer
- ____ Bailer (Teflon)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- X Dedicated

Other: Tubing

WELL INTEGRITY: Good LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 11 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW12
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 * (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 27.00
DEPTH TO WATER (feet) : 13.05

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000ml

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1320
SAMPLING TIME : 1326

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1305	1000ml	6.99	1226	23.33°	.84	-66.4
1310	2000ml	6.97	1220	23.54°	.34	-62.1
1315	3000ml	6.96	1202	23.55°	.25	-63.8
1320	4000ml	6.96	1202	23.57°	.21	-64.3

OTHER: COLOR: Cloudy ODOR/PID: Strong ____ 31.7 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer * Dedicated
Other: Tubing

WELL INTEGRITY: Good LOCK: No

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 12 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW13
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 26.82
DEPTH TO WATER (feet) : 13.31

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000mL

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1350
SAMPLING TIME : 1357

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1335	1000mL	7.11	1344	22.03°	.41	-84.3
1340	2000mL	7.12	1335	22.04°	.39	-86.1
1345	3000mL	7.12	1323	22.03°	.29	-82.4
1350	4000mL	7.12	1318	22.05°	.26	-84.7

OTHER: COLOR: cloudy ODOR/PID: strong ____ 26.7 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

- ____ 2" Bladder Pump
- ____ Centrifugal Pump
- ____ Submersible Pump
- ____ Dispo Bailer
- ____ Bailer (Teflon)
- ____ Bailer (PVC)
- ____ Bailer (Stainless Steel)
- ____ Dedicated

Other: Perastaltic

SAMPLING EQUIPMENT

- ____ 2" Bladder Pump
- ____ Bomb Sampler
- ____ Dipper
- ____ Dispo Bailer
- ____ Bailer (Teflon)
- ____ Bailer (Stainless Steel)
- ____ Submersible Pump
- X Dedicated

Other: Tubing

WELL INTEGRITY: Good LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____

E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____

Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: [illegible] PAGE 13 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW14
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 28.00
DEPTH TO WATER (feet) : 16.65

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1250
SAMPLING TIME : 1250

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1235	1000ML	7.25	1327	21.61°	.49	-97.7
1240	2000ML	7.24	1324	21.71°	.34	-98.9
1245	3000ML	7.22	1328	21.78°	.32	-98.1
1250	4000ML	7.20	1338	21.91°	.29	-98.0

OTHER: COLOR: CLEAR ODOR/PID: ~~NONE~~ FAINT ____ 18.7 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: TUBING

WELL INTEGRITY: GOOD LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: [illegible] PAGE 14 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW 15
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 28.00
DEPTH TO WATER (feet) : 16.30

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 mL

DATE PURGED : 11-14.16
DATE SAMPLED : 11.14.16

END PURGE : 1520
SAMPLING TIME : 1580

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1505	1000 mL	7.18	1746	21.77°	.38	-90.1
1510	2000 mL	7.16	1727	21.79°	.32	-91.3
1515	3000 mL	7.13	1714	21.80°	.29	-86.3
1520	4000 mL	7.10	1696	21.76	.27	-85.7

OTHER: COLOR: Cloudy ODOR/PID: Strong ____ 34.9 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: Tubing

WELL INTEGRITY: Good LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 15 OF 16

Rev. 1/97

WATER SAMPLE FIELD DATA SHEET

PROJECT NO : 631215948
PURGED BY : Paul Weinhardt
SAMPLED BY : Paul Weinhardt

SAMPLE ID : MW16
CLIENT NAME : AT&T
LOCATION : 95 S. Almaden, San Jose

TYPE: Groundwater X Surface Water ____ Leachate ____ Other ____

CASING DIAMETER (inches): 2 X (.163) 3 ____ (.367) 4 ____ (.652) 4.5 ____ (.826) 6 ____ (1.47) Other ____ (1"-.041 / 8"-2.61)

CASING ELEVATION (feet/MSL) : ____
DEPTH OF WELL (feet) : 28.00
DEPTH TO WATER (feet) : 16.58

VOLUME IN CASING (gal.) : ____
CALCULATED PURGE (gal.) : ____
ACTUAL PURGE VOL. (gal.) : 4000 ML

DATE PURGED : 11-14-16
DATE SAMPLED : 11-14-16

END PURGE : 1550
SAMPLING TIME : 1556

TIME (2400 HR)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm@25°c)	TEMPERATURE (°C)	D.O. (mg/L)	ORP (MV)
1535	1000ML	7.16	1947	21.40	.60	-90.4
1540	2000ML	7.11	1922	21.57°	.27	-96.3
1545	3000ML	7.09	1905	21.65°	.22	-99.6
1550	4000ML	7.08	1902	21.68°	.21	-100.4

OTHER: COLOR: cloudy ODOR/PID: Strong ____ 39.8 Turbidity

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1) : ____

PURGING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Centrifugal Pump ____ Bailer (PVC)
____ Submersible Pump ____ Bailer (Stainless Steel)
____ Dispo Bailer ____ Dedicated
Other: Perastaltic

SAMPLING EQUIPMENT

____ 2" Bladder Pump ____ Bailer (Teflon)
____ Bomb Sampler ____ Bailer (Stainless Steel)
____ Dipper ____ Submersible Pump
____ Dispo Bailer X Dedicated
Other: Tubing

WELL INTEGRITY: Good LOCK: NO

REMARKS: ____

pH, E.C., Temp. Meter Calibration: Date: ____ Time: ____ Meter Serial No.: ____
E.C. 1000 ____ / ____ pH 7 ____ / ____ pH 10 ____ / ____ pH 4 ____ / ____
Temperature °C ____

SIGNATURE: Paul Weinhardt REVIEWED BY: ____ PAGE 16 OF 16

Appendix C

Laboratory Analytical Report and Chain-of-Custody Documentation

Pace Analytical Services, LLC
2795 Second Street - Suite 300
Davis, CA 95618
(530) 297-4800

January 18, 2017

Rob Delnagro
CB&I
4005 Port Chicago Highway
Concord, CA 94520

RE: Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Dear Rob Delnagro:
Enclosed are the analytical results for sample(s) received by the laboratory on November 15, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses have been subcontracted outside of the Pace Network. The subcontracted laboratory report has been attached.

This is a revised report which includes TPHg results.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carrie Jensen
carrie.jensen@pacelabs.com
Project Manager

Enclosures

cc: Jason Ramsay, CB&I Environmental & Infrastructure
Sheila Richgels, CB&I Environmental & Infrastructure

REPORT OF LABORATORY ANALYSIS

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2795 Second Street - Suite 300
Davis, CA 95618
(530) 297-4800

CERTIFICATIONS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
Alaska Certification UST-107
525 N 8th Street, Salina, KS 67401
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

Davis Cerification IDs

2795 Second Street Suite 300 Davis, CA 95618
North Dakota Certification #: R-214
Oregon Certification #: CA300002
Washington Certification #: C926-15a
California Certification #: 08263CA
Minnesota Department of Health Certification #: 006-999-465

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SAMPLE SUMMARY

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab ID	Sample ID	Matrix	Date Collected	Date Received
1278993001	**MW-2**	Water	11/14/16 10:26	11/15/16 13:46
1278993002	**MW-3**	Water	11/14/16 09:51	11/15/16 13:46
1278993003	**MW-4**	Water	11/14/16 10:57	11/15/16 13:46
1278993004	**MW-5**	Water	11/14/16 12:26	11/15/16 13:46
1278993005	**MW-8**	Water	11/14/16 11:26	11/15/16 13:46
1278993006	**MW-9**	Water	11/14/16 11:56	11/15/16 13:46
1278993007	**MW-10**	Water	11/14/16 14:26	11/15/16 13:46
1278993008	**MW-11**	Water	11/14/16 14:56	11/15/16 13:46
1278993009	**MW-12**	Water	11/14/16 13:26	11/15/16 13:46
1278993010	**MW-13**	Water	11/14/16 13:57	11/15/16 13:46
1278993011	**MW-14**	Water	11/14/16 12:56	11/15/16 13:46
1278993012	**MW-15**	Water	11/14/16 15:26	11/15/16 13:46
1278993013	**MW-16**	Water	11/14/16 15:56	11/15/16 13:46
1278993014	**Trip Blank**	Water	11/14/16 00:00	11/15/16 13:46

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Davis, CA 95618
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SAMPLE ANALYTE COUNT

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
1278993001	**MW-2**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993002	**MW-3**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993003	**MW-4**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993004	**MW-5**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993005	**MW-8**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993006	**MW-9**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993007	**MW-10**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993008	**MW-11**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993009	**MW-12**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993010	**MW-13**	EPA 8015B	JSD	2	PASI-DAV

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SAMPLE ANALYTE COUNT

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993011	**MW-14**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993012	**MW-15**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993013	**MW-16**	EPA 8015B	JSD	2	PASI-DAV
		EPA 8260B	JCP	13	PASI-DAV
		EPA 300.0	SJ1	2	PASI-DAV
		SM 4500-P E	DCL	1	PASI-M
1278993014	**Trip Blank**	EPA 8260B	JCP	13	PASI-DAV

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SUMMARY OF DETECTION

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
1278993001	**MW-2**					
EPA 300.0	Sulfate	96.3	mg/L	2.5	11/15/16 15:43	
SM 4500-P E	Phosphorus	0.22	mg/L	0.050	11/29/16 09:40	
1278993002	**MW-3**					
EPA 300.0	Sulfate	76.4	mg/L	5.0	11/15/16 15:25	
SM 4500-P E	Phosphorus	0.54	mg/L	0.050	11/29/16 09:41	
1278993003	**MW-4**					
EPA 300.0	Sulfate	66.0	mg/L	2.5	11/15/16 16:21	
SM 4500-P E	Phosphorus	0.22	mg/L	0.050	11/29/16 09:41	
1278993004	**MW-5**					
EPA 8015B	TPH-DRO (C10-C28)	0.22	mg/L	0.097	11/17/16 17:07	
EPA 8260B	TPH as Gas	172	ug/L	50.0	11/16/16 15:15	
EPA 300.0	Sulfate	50.8	mg/L	2.5	11/15/16 17:17	
SM 4500-P E	Phosphorus	1.6	mg/L	0.050	11/29/16 09:42	
1278993005	**MW-8**					
EPA 300.0	Sulfate	487	mg/L	5.0	11/15/16 16:12	
SM 4500-P E	Phosphorus	0.14	mg/L	0.050	11/29/16 09:42	
1278993006	**MW-9**					
EPA 300.0	Sulfate	21.7	mg/L	2.5	11/15/16 17:08	
SM 4500-P E	Phosphorus	0.21	mg/L	0.050	11/29/16 09:43	
1278993007	**MW-10**					
EPA 8015B	TPH-DRO (C10-C28)	0.15	mg/L	0.098	11/17/16 18:40	DG
EPA 8260B	TPH as Gas	786	ug/L	50.0	11/16/16 16:13	
SM 4500-P E	Phosphorus	1.2	mg/L	0.050	11/29/16 09:45	
1278993008	**MW-11**					
EPA 8015B	TPH-DRO (C10-C28)	2.0	mg/L	0.096	11/17/16 19:11	
EPA 8260B	TPH as Gas	751	ug/L	50.0	11/16/16 16:32	
SM 4500-P E	Phosphorus	0.51	mg/L	0.050	11/29/16 09:46	
1278993009	**MW-12**					
EPA 8015B	TPH-DRO (C10-C28)	1.9	mg/L	0.097	11/17/16 19:42	
EPA 8260B	Benzene	28.6	ug/L	1.0	11/18/16 12:09	
EPA 8260B	Ethylbenzene	5.0	ug/L	1.0	11/18/16 12:09	
EPA 8260B	TPH as Gas	4280	ug/L	100	11/18/16 12:09	1V
EPA 8260B	Toluene	9.8	ug/L	1.0	11/18/16 12:09	
EPA 8260B	Xylene (Total)	18.7	ug/L	3.0	11/18/16 12:09	
SM 4500-P E	Phosphorus	0.75	mg/L	0.050	11/29/16 09:46	
1278993010	**MW-13**					
EPA 8015B	TPH-DRO (C10-C28)	0.37	mg/L	0.097	11/17/16 20:13	
EPA 8260B	TPH as Gas	278	ug/L	50.0	11/17/16 13:54	
SM 4500-P E	Phosphorus	0.64	mg/L	0.050	11/29/16 09:47	
1278993011	**MW-14**					
EPA 8260B	TPH as Gas	88.3	ug/L	50.0	11/17/16 16:54	

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SUMMARY OF DETECTION

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
1278993011	**MW-14**					
EPA 300.0	Sulfate	0.56	mg/L	0.50	11/15/16 18:14	
SM 4500-P E	Phosphorus	0.41	mg/L	0.050	11/29/16 09:47	
1278993012	**MW-15**					
EPA 8260B	TPH as Gas	142	ug/L	50.0	11/17/16 17:14	
SM 4500-P E	Phosphorus	0.42	mg/L	0.050	11/29/16 09:48	
1278993013	**MW-16**					
EPA 8015B	TPH-DRO (C10-C28)	1.7	mg/L	0.097	11/17/16 21:46	
EPA 8260B	Benzene	2.7	ug/L	0.50	11/17/16 17:34	
EPA 8260B	TPH as Gas	700	ug/L	50.0	11/17/16 17:34	
EPA 300.0	Nitrate as N	0.15	mg/L	0.10	11/16/16 13:26	
SM 4500-P E	Phosphorus	0.30	mg/L	0.050	11/29/16 09:50	M1

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-2 **Lab ID: 1278993001** Collected: 11/14/16 10:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	ND	mg/L	0.098	1	11/16/16 09:38	11/17/16 15:02		
Surrogates								
n-Octacosane (S)	103	%.	75-139	1	11/16/16 09:38	11/17/16 15:02	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 14:18	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 14:18	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:18	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 14:18	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:18	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/16/16 14:18		
Toluene	ND	ug/L	0.50	1		11/16/16 14:18	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 14:18	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 14:18	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 14:18	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	70-130	1		11/16/16 14:18	17060-07-0	
Toluene-d8 (S)	102	%.	70-130	1		11/16/16 14:18	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	70-130	1		11/16/16 14:18	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**96.3**	mg/L	2.5	5		11/15/16 15:43	14808-79-8	
Nitrate as N	ND	mg/L	0.50	5		11/15/16 15:43	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E	Preparation Method: SM 4500-P B						
Phosphorus	**0.22**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:40	7723-14-0	

Sample: MW-3 **Lab ID: 1278993002** Collected: 11/14/16 09:51 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	ND	mg/L	0.097	1	11/16/16 09:38	11/17/16 22:17		
Surrogates								
n-Octacosane (S)	91	%.	75-139	1	11/16/16 09:38	11/17/16 22:17	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 14:37	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 14:37	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:37	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 14:37	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:37	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/16/16 14:37		
Toluene	ND	ug/L	0.50	1		11/16/16 14:37	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 14:37	1330-20-7	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-3 **Lab ID: 1278993002** Collected: 11/14/16 09:51 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 14:37	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 14:37	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	70-130	1		11/16/16 14:37	17060-07-0	
Toluene-d8 (S)	101	%.	70-130	1		11/16/16 14:37	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	70-130	1		11/16/16 14:37	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**76.4**	mg/L	5.0	10		11/15/16 15:25	14808-79-8	
Nitrate as N	ND	mg/L	1.0	10		11/15/16 15:25	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.54**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:41	7723-14-0	

Sample: MW-4 **Lab ID: 1278993003** Collected: 11/14/16 10:57 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B Preparation Method: EPA 3511							
TPH-DRO (C10-C28)	ND	mg/L	0.097	1	11/16/16 09:38	11/17/16 16:36		
Surrogates								
n-Octacosane (S)	96	%.	75-139	1	11/16/16 09:38	11/17/16 16:36	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 14:56	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 14:56	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:56	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 14:56	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 14:56	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/16/16 14:56		
Toluene	ND	ug/L	0.50	1		11/16/16 14:56	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 14:56	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 14:56	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 14:56	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	70-130	1		11/16/16 14:56	17060-07-0	
Toluene-d8 (S)	101	%.	70-130	1		11/16/16 14:56	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	70-130	1		11/16/16 14:56	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**66.0**	mg/L	2.5	5		11/15/16 16:21	14808-79-8	
Nitrate as N	ND	mg/L	0.50	5		11/15/16 16:21	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.22**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:41	7723-14-0	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-5 **Lab ID: 1278993004** Collected: 11/14/16 12:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	**0.22**	mg/L	0.097	1	11/16/16 09:38	11/17/16 17:07		
Surrogates								
n-Octacosane (S)	95	%.	75-139	1	11/16/16 09:38	11/17/16 17:07	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 15:15	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 15:15	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:15	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 15:15	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:15	1634-04-4	
TPH as Gas	**172**	ug/L	50.0	1		11/16/16 15:15		
Toluene	ND	ug/L	0.50	1		11/16/16 15:15	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 15:15	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 15:15	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 15:15	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%.	70-130	1		11/16/16 15:15	17060-07-0	
Toluene-d8 (S)	102	%.	70-130	1		11/16/16 15:15	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	70-130	1		11/16/16 15:15	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**50.8**	mg/L	2.5	5		11/15/16 17:17	14808-79-8	
Nitrate as N	ND	mg/L	0.50	5		11/15/16 17:17	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E	Preparation Method: SM 4500-P B						
Phosphorus	**1.6**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:42	7723-14-0	

Sample: MW-8 **Lab ID: 1278993005** Collected: 11/14/16 11:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	ND	mg/L	0.097	1	11/16/16 09:38	11/17/16 17:38		
Surrogates								
n-Octacosane (S)	90	%.	75-139	1	11/16/16 09:38	11/17/16 17:38	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 15:35	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 15:35	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:35	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 15:35	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:35	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/16/16 15:35		
Toluene	ND	ug/L	0.50	1		11/16/16 15:35	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 15:35	1330-20-7	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-8 **Lab ID: 1278993005** Collected: 11/14/16 11:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 15:35	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 15:35	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	70-130	1		11/16/16 15:35	17060-07-0	
Toluene-d8 (S)	102	%.	70-130	1		11/16/16 15:35	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	70-130	1		11/16/16 15:35	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**487**	mg/L	5.0	10		11/15/16 16:12	14808-79-8	
Nitrate as N	ND	mg/L	1.0	10		11/15/16 16:12	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.14**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:42	7723-14-0	

Sample: MW-9 **Lab ID: 1278993006** Collected: 11/14/16 11:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B Preparation Method: EPA 3511							
TPH-DRO (C10-C28)	ND	mg/L	0.097	1	11/16/16 09:38	11/17/16 18:09		
Surrogates								
n-Octacosane (S)	93	%.	75-139	1	11/16/16 09:38	11/17/16 18:09	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 15:54	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 15:54	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:54	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 15:54	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 15:54	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/16/16 15:54		
Toluene	ND	ug/L	0.50	1		11/16/16 15:54	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 15:54	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 15:54	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 15:54	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	70-130	1		11/16/16 15:54	17060-07-0	
Toluene-d8 (S)	101	%.	70-130	1		11/16/16 15:54	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	70-130	1		11/16/16 15:54	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**21.7**	mg/L	2.5	5		11/15/16 17:08	14808-79-8	
Nitrate as N	ND	mg/L	0.50	5		11/15/16 17:08	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.21**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:43	7723-14-0	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-10 **Lab ID: 1278993007** Collected: 11/14/16 14:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	**0.15**	mg/L	0.098	1	11/16/16 09:38	11/17/16 18:40		DG
Surrogates								
n-Octacosane (S)	92	%.	75-139	1	11/16/16 09:38	11/17/16 18:40	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 16:13	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 16:13	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 16:13	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 16:13	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 16:13	1634-04-4	
TPH as Gas	**786**	ug/L	50.0	1		11/16/16 16:13		
Toluene	ND	ug/L	0.50	1		11/16/16 16:13	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 16:13	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 16:13	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 16:13	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	70-130	1		11/16/16 16:13	17060-07-0	
Toluene-d8 (S)	104	%.	70-130	1		11/16/16 16:13	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	70-130	1		11/16/16 16:13	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	1.0	2		11/15/16 17:55	14808-79-8	
Nitrate as N	ND	mg/L	0.20	2		11/15/16 17:55	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E	Preparation Method: SM 4500-P B						
Phosphorus	**1.2**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:45	7723-14-0	

Sample: MW-11 **Lab ID: 1278993008** Collected: 11/14/16 14:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	**2.0**	mg/L	0.096	1	11/16/16 09:38	11/17/16 19:11		
Surrogates								
n-Octacosane (S)	94	%.	75-139	1	11/16/16 09:38	11/17/16 19:11	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/16/16 16:32	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/16/16 16:32	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 16:32	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/16/16 16:32	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/16/16 16:32	1634-04-4	
TPH as Gas	**751**	ug/L	50.0	1		11/16/16 16:32		
Toluene	ND	ug/L	0.50	1		11/16/16 16:32	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/16/16 16:32	1330-20-7	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-11 **Lab ID: 1278993008** Collected: 11/14/16 14:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/16/16 16:32	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/16/16 16:32	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	70-130	1		11/16/16 16:32	17060-07-0	
Toluene-d8 (S)	102	%.	70-130	1		11/16/16 16:32	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	70-130	1		11/16/16 16:32	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	0.50	1		11/15/16 18:04	14808-79-8	
Nitrate as N	ND	mg/L	0.10	1		11/15/16 18:04	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.51**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:46	7723-14-0	

Sample: MW-12 **Lab ID: 1278993009** Collected: 11/14/16 13:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B Preparation Method: EPA 3511							
TPH-DRO (C10-C28)	**1.9**	mg/L	0.097	1	11/16/16 09:38	11/17/16 19:42		
Surrogates								
n-Octacosane (S)	97	%.	75-139	1	11/16/16 09:38	11/17/16 19:42	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	**28.6**	ug/L	1.0	2		11/18/16 12:09	71-43-2	
Diisopropyl ether	ND	ug/L	1.0	2		11/18/16 12:09	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	1.0	2		11/18/16 12:09	637-92-3	
Ethylbenzene	**5.0**	ug/L	1.0	2		11/18/16 12:09	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	1.0	2		11/18/16 12:09	1634-04-4	
TPH as Gas	**4280**	ug/L	100	2		11/18/16 12:09		1V
Toluene	**9.8**	ug/L	1.0	2		11/18/16 12:09	108-88-3	
Xylene (Total)	**18.7**	ug/L	3.0	2		11/18/16 12:09	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	1.0	2		11/18/16 12:09	994-05-8	
tert-Butyl Alcohol	ND	ug/L	10.0	2		11/18/16 12:09	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	106	%.	70-130	2		11/18/16 12:09	17060-07-0	
Toluene-d8 (S)	99	%.	70-130	2		11/18/16 12:09	2037-26-5	
4-Bromofluorobenzene (S)	88	%.	70-130	2		11/18/16 12:09	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	0.50	1		11/15/16 18:25	14808-79-8	
Nitrate as N	ND	mg/L	0.10	1		11/15/16 18:25	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.75**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:46	7723-14-0	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-13 **Lab ID: 1278993010** Collected: 11/14/16 13:57 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	**0.37**	mg/L	0.097	1	11/16/16 09:38	11/17/16 20:13		
Surrogates								
n-Octacosane (S)	83	%.	75-139	1	11/16/16 09:38	11/17/16 20:13	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/17/16 13:54	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/17/16 13:54	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 13:54	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/17/16 13:54	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 13:54	1634-04-4	
TPH as Gas	**278**	ug/L	50.0	1		11/17/16 13:54		
Toluene	ND	ug/L	0.50	1		11/17/16 13:54	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/17/16 13:54	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/17/16 13:54	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/17/16 13:54	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/17/16 13:54	17060-07-0	
Toluene-d8 (S)	100	%.	70-130	1		11/17/16 13:54	2037-26-5	
4-Bromofluorobenzene (S)	91	%.	70-130	1		11/17/16 13:54	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	2.5	5		11/15/16 17:46	14808-79-8	
Nitrate as N	ND	mg/L	0.50	5		11/15/16 17:46	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E	Preparation Method: SM 4500-P B						
Phosphorus	**0.64**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:47	7723-14-0	

Sample: MW-14 **Lab ID: 1278993011** Collected: 11/14/16 12:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	ND	mg/L	0.097	1	11/16/16 09:38	11/17/16 20:44		
Surrogates								
n-Octacosane (S)	90	%.	75-139	1	11/16/16 09:38	11/17/16 20:44	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/17/16 16:54	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/17/16 16:54	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 16:54	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/17/16 16:54	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 16:54	1634-04-4	
TPH as Gas	**88.3**	ug/L	50.0	1		11/17/16 16:54		
Toluene	ND	ug/L	0.50	1		11/17/16 16:54	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/17/16 16:54	1330-20-7	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-14 **Lab ID: 1278993011** Collected: 11/14/16 12:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/17/16 16:54	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/17/16 16:54	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/17/16 16:54	17060-07-0	
Toluene-d8 (S)	100	%.	70-130	1		11/17/16 16:54	2037-26-5	
4-Bromofluorobenzene (S)	91	%.	70-130	1		11/17/16 16:54	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	**0.56**	mg/L	0.50	1		11/15/16 18:14	14808-79-8	
Nitrate as N	ND	mg/L	0.10	1		11/15/16 18:14	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.41**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:47	7723-14-0	

Sample: MW-15 **Lab ID: 1278993012** Collected: 11/14/16 15:26 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B Preparation Method: EPA 3511							
TPH-DRO (C10-C28)	ND	mg/L	0.098	1	11/16/16 09:38	11/17/16 21:15		
Surrogates								
n-Octacosane (S)	89	%.	75-139	1	11/16/16 09:38	11/17/16 21:15	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/17/16 17:14	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/17/16 17:14	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:14	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/17/16 17:14	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:14	1634-04-4	
TPH as Gas	**142**	ug/L	50.0	1		11/17/16 17:14		
Toluene	ND	ug/L	0.50	1		11/17/16 17:14	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/17/16 17:14	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/17/16 17:14	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/17/16 17:14	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/17/16 17:14	17060-07-0	
Toluene-d8 (S)	99	%.	70-130	1		11/17/16 17:14	2037-26-5	
4-Bromofluorobenzene (S)	93	%.	70-130	1		11/17/16 17:14	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	0.50	1		11/16/16 13:17	14808-79-8	
Nitrate as N	ND	mg/L	0.10	1		11/16/16 13:17	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E Preparation Method: SM 4500-P B							
Phosphorus	**0.42**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:48	7723-14-0	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: MW-16 **Lab ID: 1278993013** Collected: 11/14/16 15:56 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8015 GCS Water, Silica Gel	Analytical Method: EPA 8015B	Preparation Method: EPA 3511						
TPH-DRO (C10-C28)	**1.7**	mg/L	0.097	1	11/16/16 09:38	11/17/16 21:46		
Surrogates								
n-Octacosane (S)	109	%.	75-139	1	11/16/16 09:38	11/17/16 21:46	630-02-4	
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	**2.7**	ug/L	0.50	1		11/17/16 17:34	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/17/16 17:34	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:34	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/17/16 17:34	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:34	1634-04-4	
TPH as Gas	**700**	ug/L	50.0	1		11/17/16 17:34		
Toluene	ND	ug/L	0.50	1		11/17/16 17:34	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/17/16 17:34	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/17/16 17:34	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/17/16 17:34	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	70-130	1		11/17/16 17:34	17060-07-0	
Toluene-d8 (S)	100	%.	70-130	1		11/17/16 17:34	2037-26-5	
4-Bromofluorobenzene (S)	91	%.	70-130	1		11/17/16 17:34	460-00-4	
300.0 IC Anions	Analytical Method: EPA 300.0							
Sulfate	ND	mg/L	0.50	1		11/16/16 13:26	14808-79-8	
Nitrate as N	**0.15**	mg/L	0.10	1		11/16/16 13:26	14797-55-8	
SM4500P-E, Total Phosphorus	Analytical Method: SM 4500-P E	Preparation Method: SM 4500-P B						
Phosphorus	**0.30**	mg/L	0.050	1	11/28/16 09:56	11/29/16 09:50	7723-14-0	M1

Sample: Trip Blank **Lab ID: 1278993014** Collected: 11/14/16 00:00 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
Benzene	ND	ug/L	0.50	1		11/17/16 17:54	71-43-2	
Diisopropyl ether	ND	ug/L	0.50	1		11/17/16 17:54	108-20-3	
Ethyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:54	637-92-3	
Ethylbenzene	ND	ug/L	0.50	1		11/17/16 17:54	100-41-4	
Methyl-tert-butyl ether	ND	ug/L	0.50	1		11/17/16 17:54	1634-04-4	
TPH as Gas	ND	ug/L	50.0	1		11/17/16 17:54		
Toluene	ND	ug/L	0.50	1		11/17/16 17:54	108-88-3	
Xylene (Total)	ND	ug/L	1.5	1		11/17/16 17:54	1330-20-7	
tert-Amylmethyl ether	ND	ug/L	0.50	1		11/17/16 17:54	994-05-8	
tert-Butyl Alcohol	ND	ug/L	5.0	1		11/17/16 17:54	75-65-0	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%.	70-130	1		11/17/16 17:54	17060-07-0	
Toluene-d8 (S)	100	%.	70-130	1		11/17/16 17:54	2037-26-5	

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ANALYTICAL RESULTS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Sample: Trip Blank **Lab ID: 1278993014** Collected: 11/14/16 00:00 Received: 11/15/16 13:46 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV UST Water	Analytical Method: EPA 8260B							
Surrogates								
4-Bromofluorobenzene (S)	93	%.	70-130	1		11/17/16 17:54	460-00-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 100229 | Analysis Method: EPA 8015B
QC Batch Method: EPA 3511 | Analysis Description: 8015 GCS Water, SI Gel
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011, 1278993012, 1278993013

METHOD BLANK: 398062 | Matrix: Water
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011, 1278993012, 1278993013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TPH-DRO (C10-C28)	mg/L	ND	0.10	11/17/16 16:05	
n-Octacosane (S)	%.	102	75-139	11/17/16 16:05	

LABORATORY CONTROL SAMPLE: 398063

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
TPH-DRO (C10-C28)	mg/L	1	0.84	80	59-125	
n-Octacosane (S)	%.			93	75-139	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398064 398065

Parameter	Units	1278931006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
TPH-DRO (C10-C28)	mg/L	1050 ug/L	.98	1	1.7	2.1	69	102	57-125	18	25	
n-Octacosane (S)	%.						76	76	75-139			

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 100263 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260 MSV UST Water
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008

METHOD BLANK: 398156 | Matrix: Water
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.50	11/16/16 11:24	
Diisopropyl ether	ug/L	ND	0.50	11/16/16 11:24	
Ethyl-tert-butyl ether	ug/L	ND	0.50	11/16/16 11:24	
Ethylbenzene	ug/L	ND	0.50	11/16/16 11:24	
Methyl-tert-butyl ether	ug/L	ND	0.50	11/16/16 11:24	
tert-Amylmethyl ether	ug/L	ND	0.50	11/16/16 11:24	
tert-Butyl Alcohol	ug/L	ND	5.0	11/16/16 11:24	
Toluene	ug/L	ND	0.50	11/16/16 11:24	
TPH as Gas	ug/L	ND	50.0	11/16/16 11:24	
Xylene (Total)	ug/L	ND	1.5	11/16/16 11:24	
1,2-Dichloroethane-d4 (S)	%.	102	70-130	11/16/16 11:24	
4-Bromofluorobenzene (S)	%.	102	70-130	11/16/16 11:24	
Toluene-d8 (S)	%.	101	70-130	11/16/16 11:24	

LABORATORY CONTROL SAMPLE: 398157

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	40	40.3	101	75-125	
Diisopropyl ether	ug/L	40	39.4	98	75-126	
Ethyl-tert-butyl ether	ug/L	40	38.0	95	75-125	
Ethylbenzene	ug/L	40	39.5	99	75-125	
Methyl-tert-butyl ether	ug/L	40	38.3	96	73-125	
tert-Amylmethyl ether	ug/L	40	37.7	94	75-125	
tert-Butyl Alcohol	ug/L	400	388	97	75-125	
Toluene	ug/L	40	38.4	96	75-125	
Xylene (Total)	ug/L	120	113	94	75-125	
1,2-Dichloroethane-d4 (S)	%.			97	70-130	
4-Bromofluorobenzene (S)	%.			105	70-130	
Toluene-d8 (S)	%.			101	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398158 398159

Parameter	Units	1278928002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	40	40	40.8	42.0	102	105	75-125	3	30	
Diisopropyl ether	ug/L	ND	40	40	39.6	41.0	99	103	75-130	4	30	
Ethyl-tert-butyl ether	ug/L	ND	40	40	37.9	40.1	95	100	73-128	6	30	
Ethylbenzene	ug/L	ND	40	40	41.7	42.8	104	107	74-125	3	30	

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398158 398159

Parameter	Units	1278928002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methyl-tert-butyl ether	ug/L	ND	40	40	39.1	41.7	98	104	73-129	7	30	
tert-Amylmethyl ether	ug/L	ND	40	40	37.3	39.3	93	98	75-126	5	30	
tert-Butyl Alcohol	ug/L	ND	400	400	417	409	104	102	65-128	2	30	
Toluene	ug/L	ND	40	40	39.6	41.0	99	102	75-125	3	30	
Xylene (Total)	ug/L	ND	120	120	119	122	99	102	61-129	3	30	
1,2-Dichloroethane-d4 (S)	%.						97	98	70-130			
4-Bromofluorobenzene (S)	%.						105	103	70-130			
Toluene-d8 (S)	%.						101	102	70-130			

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 100409 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260 MSV UST Water
Associated Lab Samples: 1278993009, 1278993010, 1278993011, 1278993012, 1278993013, 1278993014

METHOD BLANK: 398741 | Matrix: Water
Associated Lab Samples: 1278993009, 1278993010, 1278993011, 1278993012, 1278993013, 1278993014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	0.50	11/17/16 13:34	
Diisopropyl ether	ug/L	ND	0.50	11/17/16 13:34	
Ethyl-tert-butyl ether	ug/L	ND	0.50	11/17/16 13:34	
Ethylbenzene	ug/L	ND	0.50	11/17/16 13:34	
Methyl-tert-butyl ether	ug/L	ND	0.50	11/17/16 13:34	
tert-Amylmethyl ether	ug/L	ND	0.50	11/17/16 13:34	
tert-Butyl Alcohol	ug/L	ND	5.0	11/17/16 13:34	
Toluene	ug/L	ND	0.50	11/17/16 13:34	
TPH as Gas	ug/L	ND	50.0	11/17/16 13:34	
Xylene (Total)	ug/L	ND	1.5	11/17/16 13:34	
1,2-Dichloroethane-d4 (S)	%.	102	70-130	11/17/16 13:34	
4-Bromofluorobenzene (S)	%.	90	70-130	11/17/16 13:34	
Toluene-d8 (S)	%.	100	70-130	11/17/16 13:34	

LABORATORY CONTROL SAMPLE: 398742

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	40	38.8	97	75-125	
Diisopropyl ether	ug/L	40	39.5	99	75-126	
Ethyl-tert-butyl ether	ug/L	40	40.1	100	75-125	
Ethylbenzene	ug/L	40	38.1	95	75-125	
Methyl-tert-butyl ether	ug/L	40	37.1	93	73-125	
tert-Amylmethyl ether	ug/L	40	40.2	101	75-125	
tert-Butyl Alcohol	ug/L	400	374	94	75-125	
Toluene	ug/L	40	38.5	96	75-125	
Xylene (Total)	ug/L	120	112	93	75-125	
1,2-Dichloroethane-d4 (S)	%.			100	70-130	
4-Bromofluorobenzene (S)	%.			92	70-130	
Toluene-d8 (S)	%.			99	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398743 398744

Parameter	Units	1278993010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	40	40	39.1	39.7	98	99	75-125	2	30	
Diisopropyl ether	ug/L	ND	40	40	39.0	40.6	98	101	75-130	4	30	
Ethyl-tert-butyl ether	ug/L	ND	40	40	39.9	41.8	100	104	73-128	5	30	
Ethylbenzene	ug/L	ND	40	40	38.3	39.0	96	98	74-125	2	30	

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398743 398744

Parameter	Units	1278993010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Methyl-tert-butyl ether	ug/L	ND	40	40	38.5	39.9	96	100	73-129	4	30	
tert-Amylmethyl ether	ug/L	ND	40	40	40.0	41.8	100	104	75-126	4	30	
tert-Butyl Alcohol	ug/L	ND	400	400	378	393	95	98	65-128	4	30	
Toluene	ug/L	ND	40	40	38.6	39.8	96	100	75-125	3	30	
Xylene (Total)	ug/L	ND	120	120	112	114	93	95	61-129	2	30	
1,2-Dichloroethane-d4 (S)	%.						99	102	70-130			
4-Bromofluorobenzene (S)	%.						92	92	70-130			
Toluene-d8 (S)	%.						99	99	70-130			

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 100163 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 1278993012, 1278993013

METHOD BLANK: 397759 | Matrix: Water
Associated Lab Samples: 1278993012, 1278993013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.10	11/16/16 14:04	
Sulfate	mg/L	ND	0.50	11/16/16 14:04	

LABORATORY CONTROL SAMPLE: 397760

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	5	5.0	100	90-110	
Sulfate	mg/L	25	24.7	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 398261 398262

Parameter	Units	1278993012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	ND	5	5	4.8	4.9	95	95	90-110	0	20	
Sulfate	mg/L	ND	25	25	25.6	25.6	101	101	90-110	0	20	

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 100178 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011

METHOD BLANK: 397857 | Matrix: Water
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrate as N	mg/L	ND	0.10	11/15/16 15:06	
Sulfate	mg/L	ND	0.50	11/15/16 15:06	

LABORATORY CONTROL SAMPLE: 397858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrate as N	mg/L	5	4.9	98	90-110	
Sulfate	mg/L	25	24.5	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 397859 397860

Parameter	Units	1278993002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrate as N	mg/L	ND	5	5	4.6	4.6	91	91	90-110	0	20	
Sulfate	mg/L	76.4	25	25	101	101	100	97	90-110	1	20	E

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 448904 | Analysis Method: SM 4500-P E
QC Batch Method: SM 4500-P B | Analysis Description: SM4500P-E, Total Phosphorus
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011, 1278993012

METHOD BLANK: 2457916 | Matrix: Water
Associated Lab Samples: 1278993001, 1278993002, 1278993003, 1278993004, 1278993005, 1278993006, 1278993007, 1278993008, 1278993009, 1278993010, 1278993011, 1278993012

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.050	11/29/16 09:30	

LABORATORY CONTROL SAMPLE: 2457917

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1	1.0	104	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2457918 2457919

Parameter	Units	10369809001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phosphorus	mg/L	0.057	1	1	1.1	1.0	100	96	80-120	3	30	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2457920 2457921

Parameter	Units	10369810001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phosphorus	mg/L	ND	1	1	1.0	0.99	101	97	80-120	4	30	

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QUALITY CONTROL DATA

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

QC Batch: 448905 | Analysis Method: SM 4500-P E
QC Batch Method: SM 4500-P B | Analysis Description: SM4500P-E, Total Phosphorus
Associated Lab Samples: 1278993013

METHOD BLANK: 2457922 | Matrix: Water
Associated Lab Samples: 1278993013

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Phosphorus	mg/L	ND	0.050	11/29/16 09:48	

LABORATORY CONTROL SAMPLE: 2457923

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phosphorus	mg/L	1	0.94	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2457924 2457925

Parameter	Units	1278993013 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phosphorus	mg/L	0.30	1	1	0.69	0.72	39	41	80-120	3	30	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2457926 2457927

Parameter	Units	10370290002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Phosphorus	mg/L	ND	1	1	1.0	0.99	102	98	80-120	4	30	

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QUALIFIERS

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-DAV	Pace Analytical Services - Davis
PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

1V	The continuing calibration for this compound is above Pace Analytical acceptance limits. The results may be biased.
DG	Lower boiling hydrocarbons present, atypical for Diesel Fuel.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
1278993001	**MW-2**	EPA 3511	100229	EPA 8015B	100326
1278993002	**MW-3**	EPA 3511	100229	EPA 8015B	100326
1278993003	**MW-4**	EPA 3511	100229	EPA 8015B	100326
1278993004	**MW-5**	EPA 3511	100229	EPA 8015B	100326
1278993005	**MW-8**	EPA 3511	100229	EPA 8015B	100326
1278993006	**MW-9**	EPA 3511	100229	EPA 8015B	100326
1278993007	**MW-10**	EPA 3511	100229	EPA 8015B	100326
1278993008	**MW-11**	EPA 3511	100229	EPA 8015B	100326
1278993009	**MW-12**	EPA 3511	100229	EPA 8015B	100326
1278993010	**MW-13**	EPA 3511	100229	EPA 8015B	100326
1278993011	**MW-14**	EPA 3511	100229	EPA 8015B	100326
1278993012	**MW-15**	EPA 3511	100229	EPA 8015B	100326
1278993013	**MW-16**	EPA 3511	100229	EPA 8015B	100326
1278993001	**MW-2**	EPA 8260B	100263		
1278993002	**MW-3**	EPA 8260B	100263		
1278993003	**MW-4**	EPA 8260B	100263		
1278993004	**MW-5**	EPA 8260B	100263		
1278993005	**MW-8**	EPA 8260B	100263		
1278993006	**MW-9**	EPA 8260B	100263		
1278993007	**MW-10**	EPA 8260B	100263		
1278993008	**MW-11**	EPA 8260B	100263		
1278993009	**MW-12**	EPA 8260B	100409		
1278993010	**MW-13**	EPA 8260B	100409		
1278993011	**MW-14**	EPA 8260B	100409		
1278993012	**MW-15**	EPA 8260B	100409		
1278993013	**MW-16**	EPA 8260B	100409		
1278993014	**Trip Blank**	EPA 8260B	100409		
1278993001	**MW-2**	EPA 300.0	100178		
1278993002	**MW-3**	EPA 300.0	100178		
1278993003	**MW-4**	EPA 300.0	100178		
1278993004	**MW-5**	EPA 300.0	100178		
1278993005	**MW-8**	EPA 300.0	100178		
1278993006	**MW-9**	EPA 300.0	100178		
1278993007	**MW-10**	EPA 300.0	100178		
1278993008	**MW-11**	EPA 300.0	100178		
1278993009	**MW-12**	EPA 300.0	100178		
1278993010	**MW-13**	EPA 300.0	100178		
1278993011	**MW-14**	EPA 300.0	100178		
1278993012	**MW-15**	EPA 300.0	100163		
1278993013	**MW-16**	EPA 300.0	100163		
1278993001	**MW-2**	SM 4500-P B	448904	SM 4500-P E	448962
1278993002	**MW-3**	SM 4500-P B	448904	SM 4500-P E	448962
1278993003	**MW-4**	SM 4500-P B	448904	SM 4500-P E	448962
1278993004	**MW-5**	SM 4500-P B	448904	SM 4500-P E	448962
1278993005	**MW-8**	SM 4500-P B	448904	SM 4500-P E	448962
1278993006	**MW-9**	SM 4500-P B	448904	SM 4500-P E	448962

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Pace Analytical Services, LLC
2795 Second Street - Suite 300
Davis, CA 95618
(530) 297-4800

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: ATT, 95S. Almaden Blvd, SanREV
Pace Project No.: 1278993

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
1278993007	**MW-10**	SM 4500-P B	448904	SM 4500-P E	448962
1278993008	**MW-11**	SM 4500-P B	448904	SM 4500-P E	448962
1278993009	**MW-12**	SM 4500-P B	448904	SM 4500-P E	448962
1278993010	**MW-13**	SM 4500-P B	448904	SM 4500-P E	448962
1278993011	**MW-14**	SM 4500-P B	448904	SM 4500-P E	448962
1278993012	**MW-15**	SM 4500-P B	448904	SM 4500-P E	448962
1278993013	**MW-16**	SM 4500-P B	448905	SM 4500-P E	448963

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CHAIN OF CUSTODY / LABORATORY ANALYSIS REQUEST FORM

CBI Environmental & Infrastructure
180 Promenade Circle, Suite 320, Sacramento, CA 95834

Purchase Order: **Direct Bill to Titan/ATT**
Lab: **Pace Labs, Davis**

Project Name: **ATT, 95 S. Almaden Blvd, San Jose**
4th Quarter 2016 Ground Water Sampling
Geo Loc: N1011 / W.O. TS13CBI010T2
Project Number: **631215948**
Report/Invoice to: **<Sandra.Pimienta@cbi.com>**
Dir Phone: 916-565-4359

Sampler's Signature: Paul Weinhardt

1278993

Analysis Requested

Sample I.D.	2016 Date	Time	LAB I.D.	Sample Matrix	Number of Containers	TPHD (8015M w/ Silica gel cleanup) (14 day hold time)	TPHG (8260)	BTEX/ MTBE, TBA, DIPE, TAME, ETBE (8260B)	Nitrate (300.0) (48-hr hold time)	Sulfate (300.0)	Phosphorous, total	**Hydrocarbon degrading Bacteria (Sub Lab, 3-day HOLD)					REMARKS
						VOAs	VOAs		250 LPE		250 LPE	Liter LPE					Container Types
						HCl	HCl		NP		H2SO4	NP					Preservations
~~MW-1~~				Water	9	2	4		1		1	1					
MW-2	11-14	1026		Water	9	2	4		1		1	1					001
MW-3	11-14	951		Water	9	2	4		1		1	1					002
MW-4	11-14	1057		Water	9	2	4		1		1	1					003
MW-5	11-14	1226		Water	9	2	4		1		1	1					004
~~MW-6~~				~~Water~~	~~9~~	~~2~~	~~4~~		~~1~~		~~1~~	~~1~~					
~~MW-7~~				~~Water~~	~~9~~	~~2~~	~~4~~		~~1~~		~~1~~	~~1~~					
MW-8	11-14	1126		Water	9	2	4		1		1	1					005
MW-9	11-14	1156		Water	9	2	4		1		1	1					006

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Paul Weinhardt	Signature:	Signature:	Signature:
Printed Name: **Paul Weinhardt**	Printed Name: David Diaz	Printed Name: David Diaz	Printed Name: David Diaz
Firm: **CBI**	Firm: Pace	Firm: Pace	Firm: Pace
Date/Time: 11-15-16 1110	Date/Time: 111516 1140	Date/Time: 111516 1346	Date/Time: 111516 1346

TURNAROUND REQUIREMENTS
___ 24 hr ___ 48 hr ___ 5 day
X Standard (~10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX Preliminary Results
Requested Report Date: _____

REPORT REQUIREMENTS
X I. Routine Report
___ II. Report (includes DUP, MS MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ RWQCB (MDLs/PQLs/TRACE#)

RELINQUISHED BY	RECEIVED BY
Signature	Signature
Printed Name	Printed Name
Firm	Firm
Date/Time	Date/Time

Special Instructions/Comments:

Please include on Invoice/Lab report:
95 South Almaden, San Jose, CA
Geo Loc: N1011 / W.O. TS13CBI010T2

@ 0.8 °C

Need EDDS for Geotracker.
Global ID: T0608501640

Please send lab-received chain to <sheila.richgels@CBI.com>

SAMPLES TO:
Titan/ATT Contracted Lab:
Pace Labs
2795 Second Street, Suite 300
Davis, Ca 95618
Contacts: Scott Forbes
530-297-4800 ext. 109
Michelle Spencer
530-297-4800 x125

CHAIN OF CUSTODY / LABORATORY ANALYSIS REQUEST FORM

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Purchase Order: **Direct Bill to Titan/ATT**
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						VOAs	VOAs		250 LPE		250 LPE	Liter LPE					Container Types
						HCl	HCl		NP		H2SO4	NP					Preservations
MW-10	11-14	1426		Water	9	2	4		1		1	1					007
MW-11	11-14	1456		Water	9	2	4		1		1	1					008
MW-12	11-14	1326		Water	9	2	4		1		1	1					009
MW-13	11-14	1357		Water	9	2	4		1		1	1					010
MW-14	11-14	1256		Water	9	2	4		1		1	1					011
MW-15	11-14	1526		Water	9	2	4		1		1	1					012
MW-16	11-14	1556		Water	9	2	4		1		1	1					013
Trip Blank	11-14	N/A		Water	2		2										014

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Paul Weinhardt	Signature:	Signature:	Signature:
Printed Name: **Paul Weinhardt**	Printed Name: David Diaz	Printed Name: David Diaz	Printed Name: David Diaz
Firm: **CBI**	Firm: Pace	Firm: PACE	Firm: PACE
Date/Time: 11-15-16 1110	Date/Time: 11/15/16 1110	Date/Time: 11/15/16 1347	Date/Time: 11/15/16 1347

TURNAROUND REQUIREMENTS

- ___ 24 hr ___ 48 hr ___ 5 day
- X Standard (~10-15 working days)
- ___ Provide Verbal Preliminary Results
- ___ Provide FAX Preliminary Results
- ___ Requested Report Date: ___

REPORT REQUIREMENTS

- X I. Routine Report
- ___ II. Report (includes DUP, MS MSD, as required, may be charged as samples)
- ___ III. Data Validation Report (includes All Raw Data)
- ___ RWQCB (MDLs/PQLs/TRACE#)

RELINQUISHED BY	RECEIVED BY
Signature	Signature
Printed Name	Printed Name
Firm	Firm
Date/Time	Date/Time

Special Instructions/Comments:

Please include on Invoice/Lab report:
95 South Almaden, San Jose, CA
Geo Loc: N1011 / W.O. TS13CBI010T2

@ 0.8 °c

Need EDDS for Geotracker.
Global ID: T0608501640

Please send lab-received chain to <sheila.richgels@CBI.com>

SAMPLES TO:
Titan/ATT Contracted Lab:
Pace Labs
2795 Second Street, Suite 300
Davis, Ca 95618
Contacts: Scott Forbes
530-297-4800 ext. 109
Michelle Spencer
530-297-4800 x125

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 25Feb2015 Page 1 of 1
	Document No.: **F-DAV-C-002-rev.02**	Issuing Authority: Pace Davis, CA Quality Office

Sample Condition Upon Receipt

Client Name: CB1

Project #: WO#: 1278993 1278993

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☑ Pace ☐ OnTrac ☐ Other:

Tracking Number: DJD

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other: **Temp Blank?** ☐ Yes ☑ No

Thermom. Used: ☑ DA1434 ☐ DA2285 **Type of Ice:** ☑ Wet ☐ Blue ☐ Dry Ice ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read(°C): 0.2 **Cooler Temp Corrected(°C):** 0.8 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.6 **Date and Initials of Person Examining Contents:** DJD

				Comments:
Chain of Custody Present?	☑ Yes	☐ No	☐ N/A	1. 2 Extra Trip Blanks were
Chain of Custody Filled Out?	☑ Yes	☐ No	☐ N/A	2. received
Chain of Custody Relinquished?	☑ Yes	☐ No	☐ N/A	3. 2 extra poly containers
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4. were received
Samples Arrived within Hold Time?	☑ Yes	☐ No	☐ N/A	5. 001 for Sample 012 and
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	☐ N/A	6. 001 for Sample 013
Rush Turn Around Time Requested?	☐ Yes	☑ No	☐ N/A	7.
Sufficient Volume?	☑ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☑ Yes	☐ No	☐ N/A	
Containers Intact?	☑ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☑ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☐ Yes	☑ No	☐ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☑ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes	☐ No		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☑ Yes	☐ No	☐ N/A	14. One trip blank container
Trip Blank Present?	☑ Yes	☐ No	☐ N/A	15. has headspace > 6mm
Trip Blank Custody Seals Present?	☐ Yes	☑ No	☐ N/A	
Pace Trip Blank Lot # (if purchased):				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: [signature] **Date:** 11/15/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e out of hold, incorrect preservative, out of temp, incorrect containers)

Environmental Microbiology Laboratory Report

Randall von Wedel, Ph.D.
Department of Chemistry & Biochemistry, CSU Chico

Research Foundation
25 Main Street, Suite 103
Chico, CA 95929 USA

Pace Analytical Davis
2795 2nd Street, Suite 300
Davis, CA 95618
Project Manager: **Michelle Spencer**
E-mail**:** scott.forbes@pacelabs.com
Michelle.Spencer@pacelabs.com Tel 530-297-4800

Reporting Date: **November 28, 2016**
CSU Chico RF Lab Login: **16-10**
Project Name: **ATT Qtr. Monitoring**
Site: **95 S. Alameda Blvd, San Jose**
Pace Work Order: **1278993**

Samples: 13 groundwater samples packed on ice were received on November 16, 2016. The samples were assayed in our CSU Chico laboratory on the same day, November 16, 2016. Please see the attached chain of custody (COC) form from Pace Analytical Davis.

AEROBIC
Hydrocarbon-Degrading Bacteria Enumeration Assays

Analysis Request: Enumeration of aerobic hydrocarbon-degrading bacteria by Standard Method 9215B modified for aerobic hydrocarbon-degrading bacteria.

Carbon Source for Hydrocarbon-Degrading Bacteria: Pasteurized Chevron regular gasoline and diesel were dissolved into agar plates as the sole carbon and energy source for the growth of aerobic hydrocarbon-degrading bacteria.

Protocol for Hydrocarbon-Degrading Bacteria: Sterile agar plates (100 x 15 mm) were prepared with minimal salts medium at pH 6.8 with agar and pasteurized gasoline-diesel hydrocarbons, without any other carbon sources or nutrients added. Sets of triplicate plates were inoculated with 1.0 ml of each sample (log dilution10^{0}) and log dilutions of each sample at 10^{0}, 10^{-1}, 10^{-2}, and 10^{-3}. Hydrocarbon plates were counted after 10 days incubation at 30°C. The plate count data is reported as colony forming units (cfu) per milliliter (ml). Each enumeration value represents a statistical average of the plate count data obtained from two of the four inoculating log dilutions assayed. Colonies were very distinct and displayed consistent densities among replicate plates across the range of water sample dilutions.

AEROBIC
Hydrocarbon-Degrading Bacteria
Enumeration Assay Results

Lab Numbers Order 1278993	Customer Sample Name/Field ID	Sample Date	Total Hydrocarbon Degraders (cfu/ml)	Target Hydrocarbons Tested
1	MW-2	11/14/16	2×10^{1}	Gasoline / Diesel
2	MW-3	11/14/16	7×10^{1}	Gasoline / Diesel
3	MW-4	11/14/16	1.3×10^{2}	Gasoline / Diesel
4	MW-5	11/14/16	2×10^{3}	Gasoline / Diesel
5	MW-8	11/14/16	8×10^{1}	Gasoline / Diesel
6	MW-9	11/14/16	8×10^{1}	Gasoline / Diesel
7	MW-10	11/14/16	3.5×10^{2}	Gasoline / Diesel
8	MW-11	11/14/16	1.4×10^{4}	Gasoline / Diesel
9	MW-12	11/14/16	5×10^{2}	Gasoline / Diesel
10	MW-13	11/14/16	$< 1 \times 10^{1}$	Gasoline / Diesel
11	MW-14	11/14/16	1.2×10^{1}	Gasoline / Diesel
12	MW-15	11/14/16	4×10^{1}	Gasoline / Diesel
13	MW-16	11/14/16	1.2×10^{1}	Gasoline / Diesel
Sterile water		11/16/16	0	Gasoline / Diesel
Air control		11/16/16	0	Gasoline / Diesel
HCD Positive Control		11/16/16	1.3×10^{12}	Gasoline / Diesel

Reporting Limit for enumeration data is 1.0×10^{1} cfu/ml.

A positive control sample of hydrocarbon-degrading bacteria was run concurrently with these samples using a mixed flask culture of bacteria isolated from contaminated groundwater sites.

The data suggest an elevated level of bacteria density is present in just 1 of the 13 groundwater wells: MW-11 with 14,000 cfu/ml of aerobic hydrocarbon-degrading bacteria. The higher value in this well may be due to sufficient dissolved phase product as a food source and other favorable conditions (pH, bioavailable nutrients, dissolved oxygen levels).

The remaining 12 GW samples had populations ranging from moderate densities (130 to 2,000 cfu/ml) in monitoring wells (descending order) MW-5, MW-12, MW-10 and MW-4 to very low (under 100 cfu/ml) in MW-2, MW-3, MW-8, MW-9, and MWs 13-16.

Dr. von Wedel is available on a consulting basis to assist in the interpretation of these data and their application to fine tuning field bioremediation protocols. Our association with Dr. Gordon Wolfe, an experienced microbiologist in the Department of Biology also allows to offer clients the opportunity to identify the diversity and genetics (classes, strains) of bacteria populations in groundwater samples using PCR and pyrosequencing of microbial DNA.

Student Researcher, CSU Chico

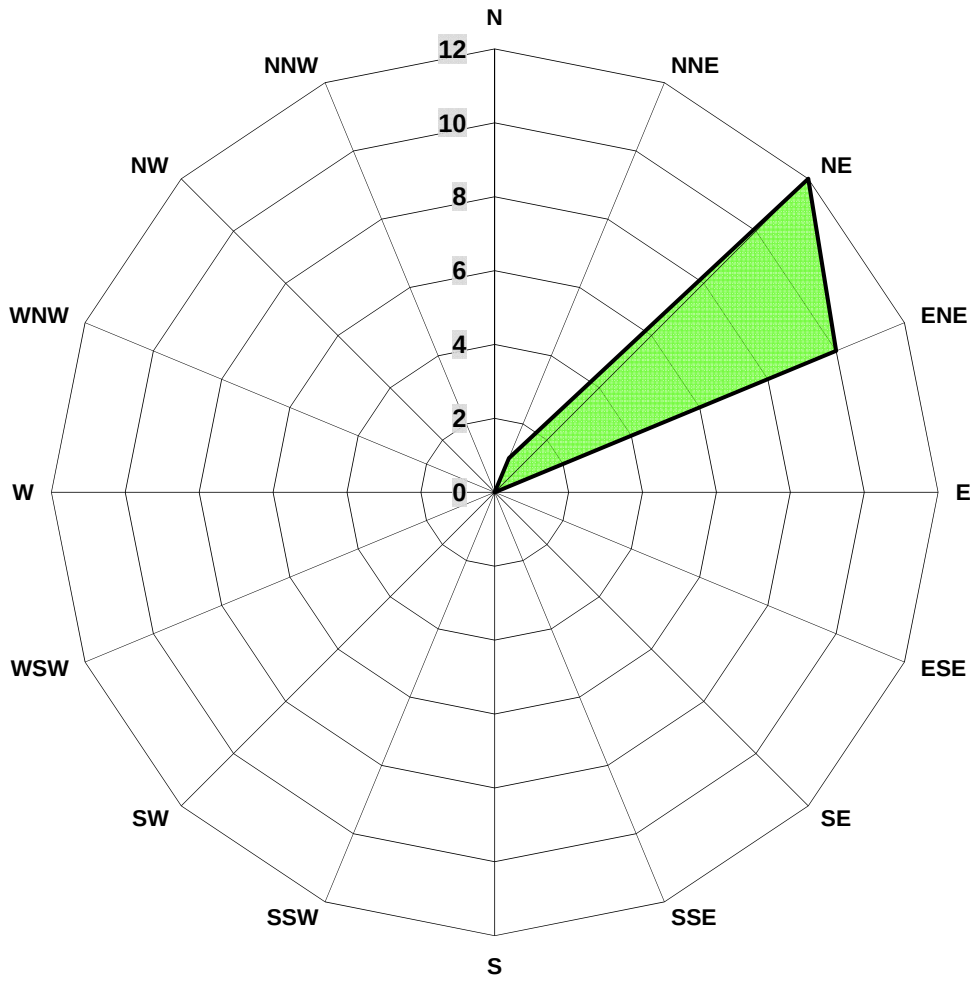
Randall von Wedel, Ph.D.
Principal Biochemist

Appendix D

Groundwater Gradient Rose Diagrams and Charts

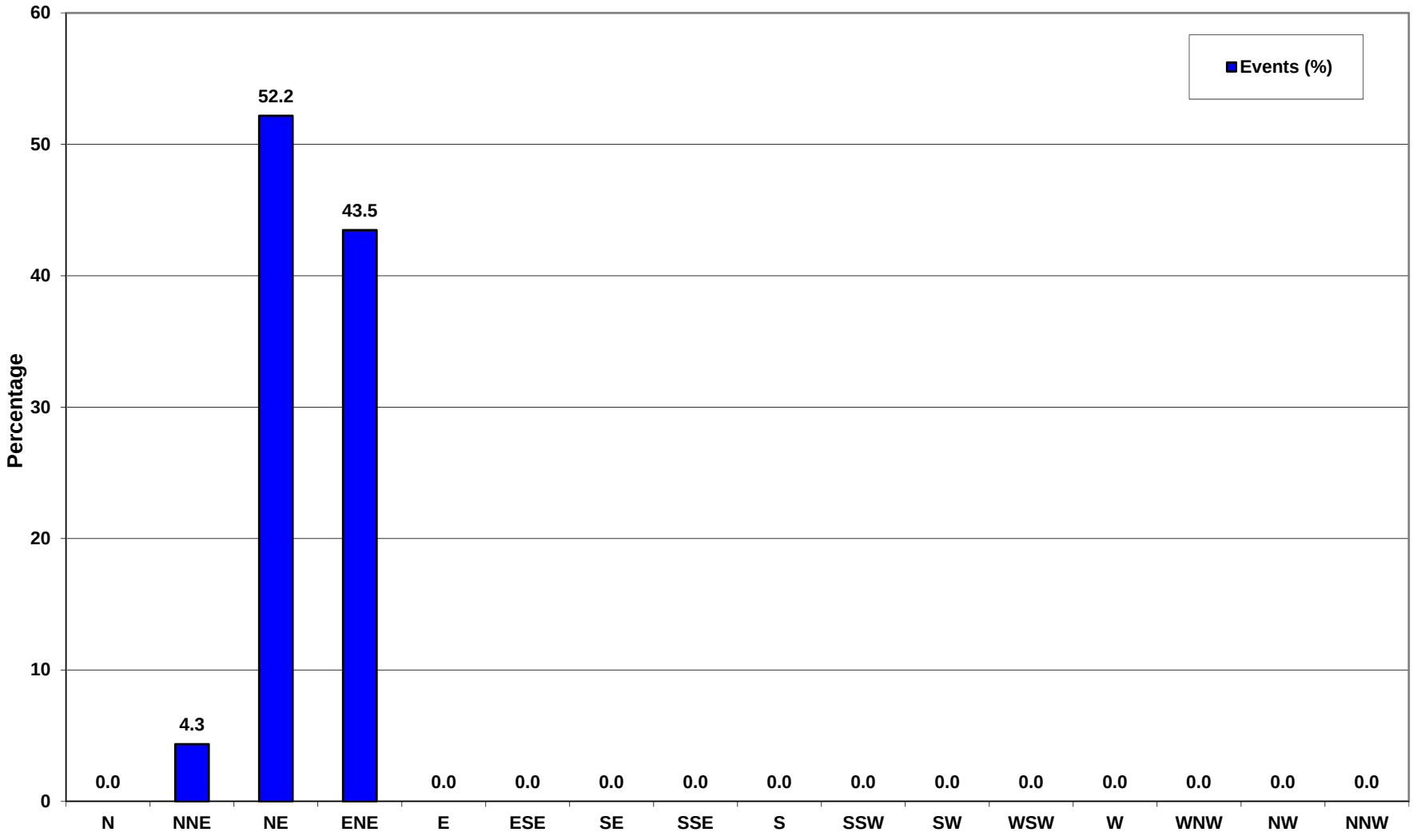
95 South Almaden Avenue
San Jose, California
Data: March 27, 2008 - November 14, 2016

Groundwater Flow Direction Rose Diagram



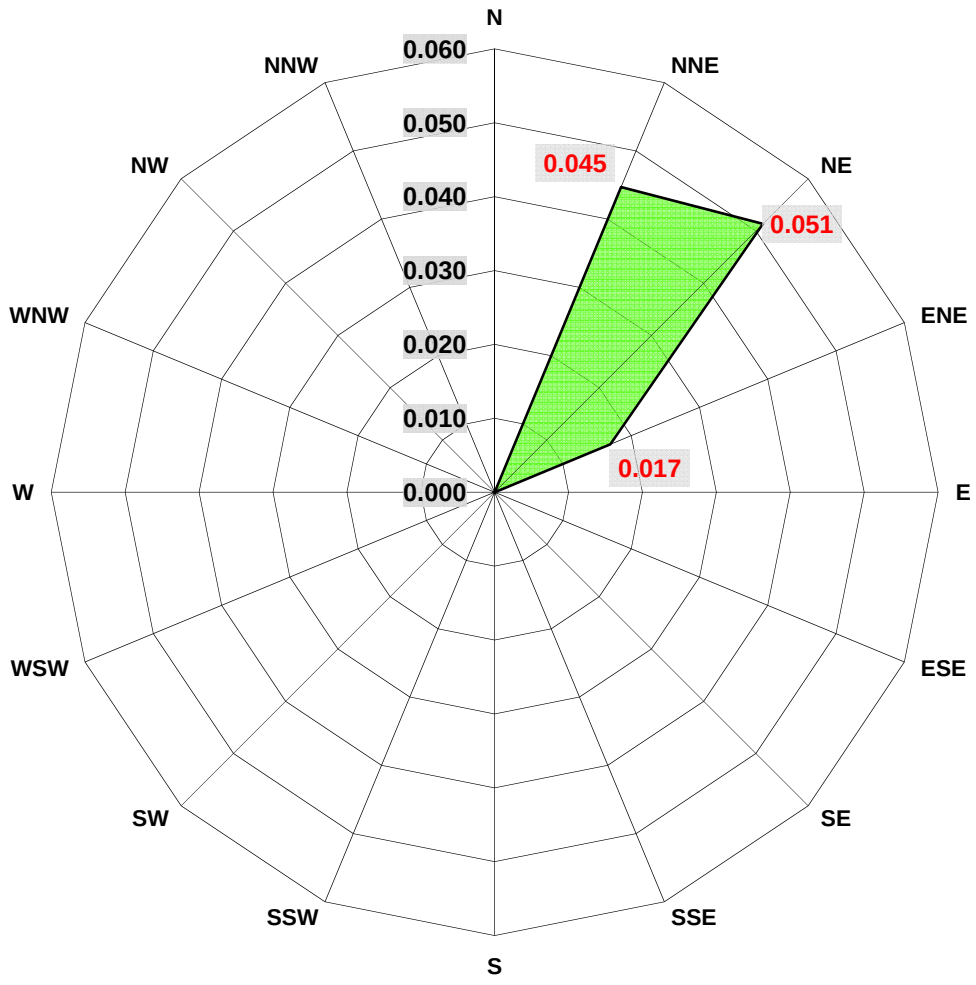
95 South Almaden Avenue
San Jose, California
Data: March 27, 2008 - November 14, 2016

Distribution of Gradient Directions



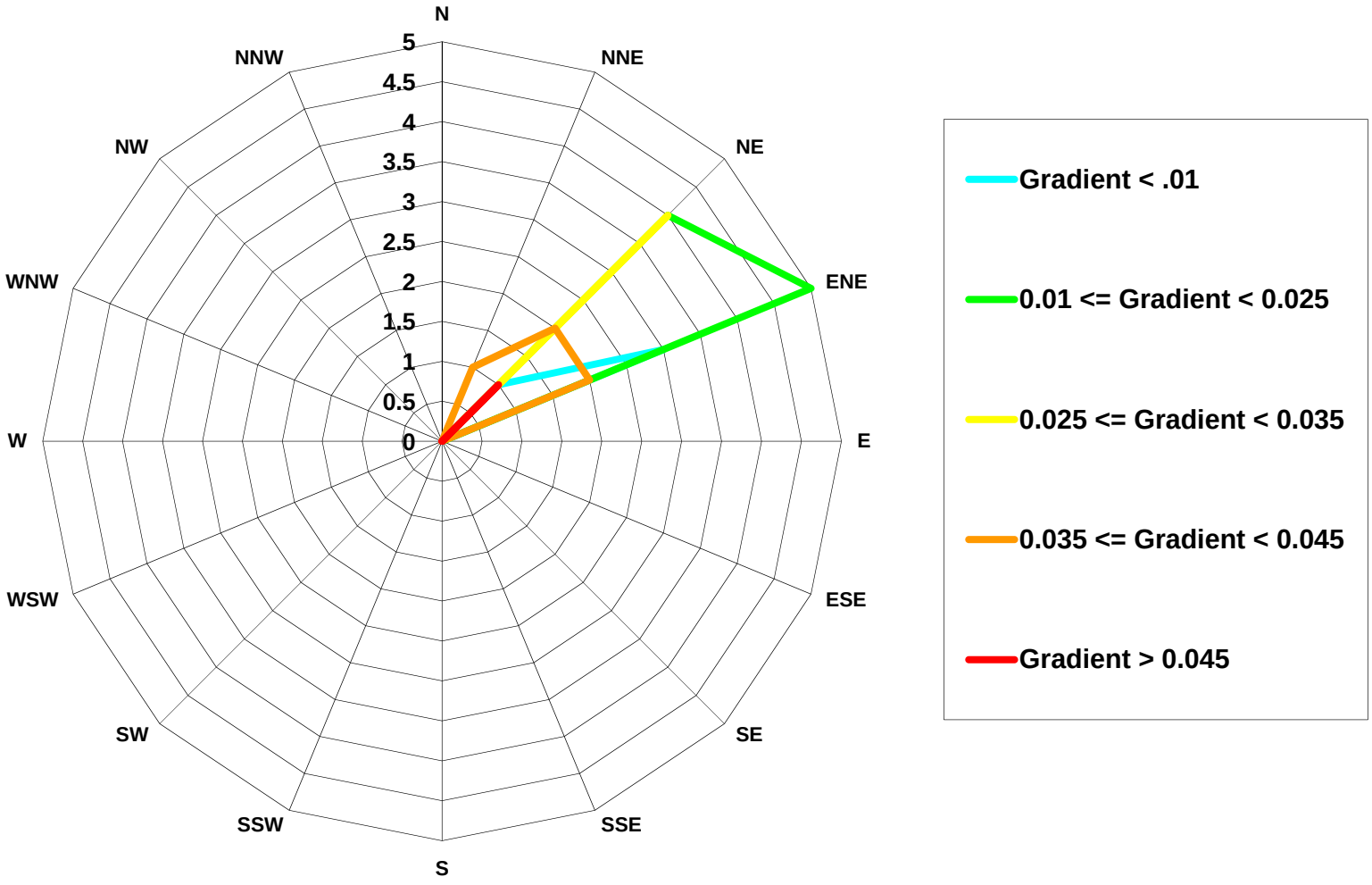
95 South Almaden Avenue
San Jose, California
Data: March 27, 2008 - November 14, 2016

Average Gradient (ft/ft)



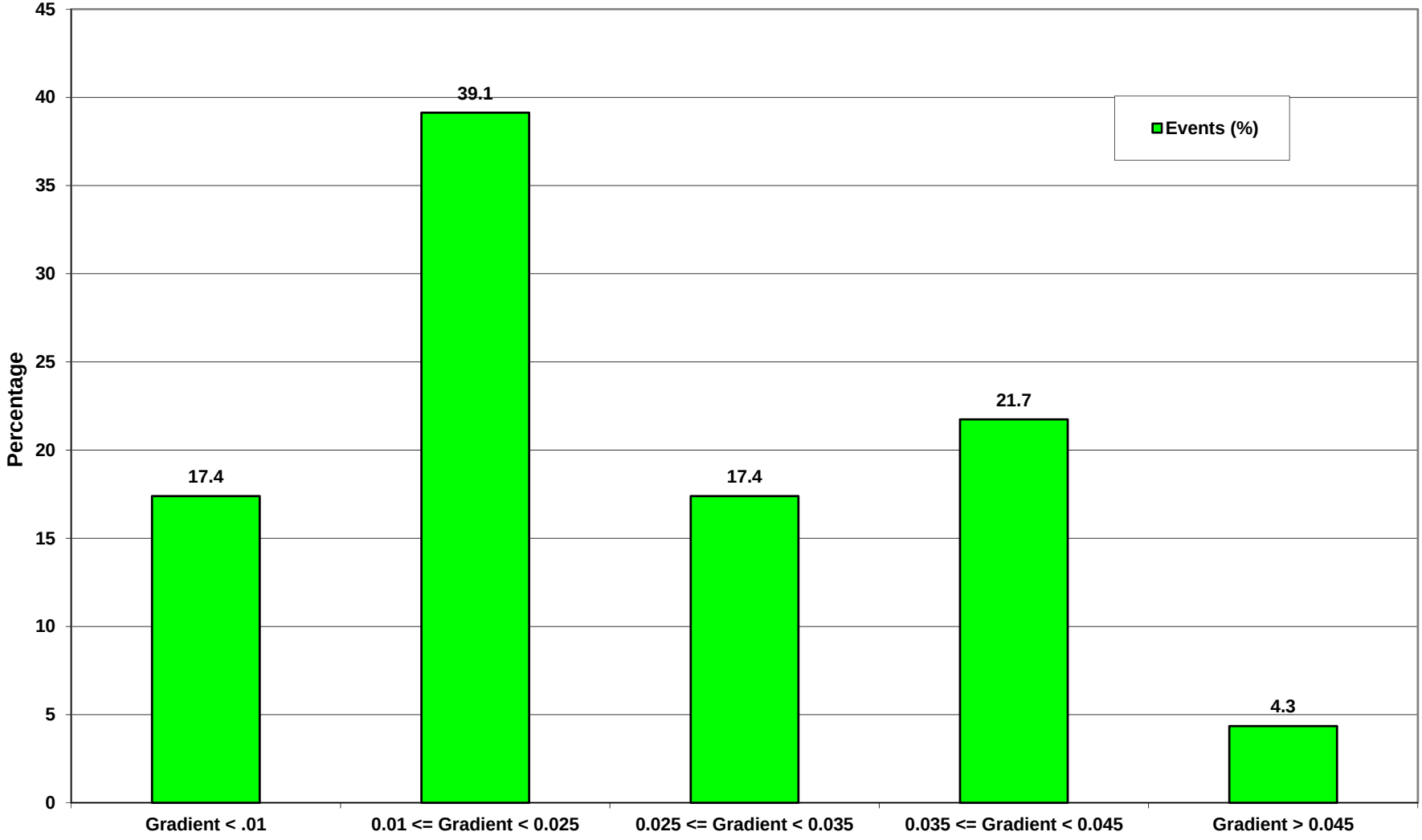
95 South Almaden Avenue
San Jose, California
Data: March 27, 2008 - November 14, 2016

Gradient Frequency Rose Diagram



95 South Almaden Avenue
San Jose, California
Data: March 27, 2008 - November 14, 2016

Distribution of Gradient Magnitude



Appendix E

System Monitoring Logs

iSOC System Monitoring Form

AT&T 95S Almaden Avenue, San Jose, California

Location	Date	Time	DTW (ft)	NTU	pH	Temperature (°C)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	Pressure (Bar)	Pressure (psi)
MW-1	10/25	9:30	16.50/16.51	69.5	7.56	21.1	436.2	0.96	-134.6		
MW-2	10/24	13:20	20.15	5.7	7.22	19.3	1693	0.72	-89.6		
MW-3	10/24	13:00	20.45	25.7	7.00	2.11	2082	0.70	-97.3		
MW-4	10/24	13:35	18.62	8.1	7.14	19.4	1621	0.70	-115.8		
MW-5	NA										
MW-6	10/24	14:40	16.69/16.70	68.2	7.08	21.2	1965	0.53	-164.5		
MW-7	10/25	8:55	17.60	149.7	6.98	21.5	1961	0.78	-149.9		
MW-8	10/24	13:50	18.06	13.7	6.78	21.3	2874	1.22	-100.3		
MW-9	10/24	13:45	18.43	28.8	7.09	19.9	1465	1.44	-114.6		
MW-10	10/25	11:10	14.30	90.6	7.09	23.1	1194	0.65	-119.6		
MW-11	10/25	11:20	16.60	68.6	6.95	21.5	1821	0.53	-140.1		
MW-12	NA										
MW-13	NA										
MW-14	10/24	14:00	17.16	565.4	7.01	21.7	1492	1.01	-163.3		
MW-15	10/24	14:30	16.95	122.1	6.97	21.6	2015	0.97	-150.0		
MW-16	10/24	14:15	17.05	86.3	6.91	21.7	2078	0.55	-161.5		
IW-1	10/25	8:40	17.58	412.7	7.47	21.8	1598	35.48	-56.6	50	50
IW-2	10/25	9:10	17.12	206.2	7.09	21.8	1925	0.85	-90.6	98	50
IW-3	10/25	9:20	16.58	360.2	7.32	21.8	1540	33.72	16.1	100	50
IW-4	10/25	9:40	16.53	119.8	7.24	21.3	1467	32.52	-14.7	140	50
IW-5	10/25	10:00	17.20	1959.1	7.03	21.7	2136	0.65	-127.2	170	50
IW-6	10/25	9:50	17.05	629.2	7.09	21.8	1716	0.78	-130.4	140	50
IW-7	10/25	10:10	16.93	129.8	7.35	21.7	1645	35.63	-4.4	140	50
IW-8	10/25	10:25	16.95	605.4	7.13	21.5	1765	17.53	-45.7	70	50
IW-9	10/25	10:35	16.80	205.9	7.17	21.3	1648	0.87	-160.6	110	50
IW-10	10/25	10:45	16.27	316.4	7.27	21.6	1329	27.70	-19.3	40	50
IW-11	10/25	10:55	16.10	690.5	7.08	21.2	1533	32.45	40.2	140	50

Personnel on site: NA

Signature: [signature] Date: 10/24-25/16

iSOC System Monitoring Form

AT&A 95 S Almaden Avenue, San Jose, CA

Location	Date	Time	DTW (ft)	NTU	pH	Temperature C°	Conductivity uS/cm	DO (mg/L)	ORP (mV)	Pressure (Bar) / TANK
MW-1										
MW-2										
MW-3										
MW-4										
MW-5										
MW-6										
MW-7										
MW-8										
MW-9										
MW-10										
MW-11										
MW-12										
MW-13										
MW-14										
MW-15										
MW-16										
IW-1	11/15	7:40	16.90	315.2	7.65	20.7	1450	30.34	79.5	50 / 40
IW-2	11/15	8:10	16.53	198.3	7.35	21.4	1677	1.03	-41.0	50 / 900
IW-3	11/15	8:30	15.95	320.1	7.31	21.3	1315	13.77	22.0	50 / 900
IW-4	11/15	8:45	15.89	101.2	7.71	20.8	1285	29.10	66.7	50 / 1100
IW-5	11/15	9:15	16.65	187.24	7.36	21.1	1855	0.17	-121.2	50 / 160
IW-6	11/15	9:00	16.47	510.1	7.30	20.9	1453	1.17	-101.2	50 / 130
IW-7	11/15	9:30	16.33	101.8	7.73	21.4	1426	33.56	19.9	50 / 130
IW-8	11/15	9:45	16.35	527.3	7.30	21.2	1545	5.20	-72.1	50 / 50
IW-9	11/15	10:00	16.22	189.3	7.38	21.1	1410	1.10	-146.3	50 / 100
IW-10	11/15	10:20	15.67	285.1	7.63	21.4	1045	29.22	37.0	50 / 20
IW-11	11/15	11:00	15.43	552.8	7.37	21.1	1254	23.34	107.3	50 / 120

iSOC System Monitoring Form

AT&T 95S Almaden Avenue, San Jose, California

TANK

Location	Date	Time	DTW (ft)	NTU	pH	Temperature (°C)	Conductivity (µS/cm)	DO (mg/L)	ORP (mV)	Pressure (Bar)	Pressure (psi)
MW-1	12/27	12:25	16.02/16.03	38.4	7.85	19.6	194.3	1.13	-87.9		
MW-2	12/27	9:37	20.25	33.9	7.21	16.4	1593	0.68	-68.2		
MW-3	12/27	9:25	19.73	7.6	6.99	18.8	1920	0.94	-74.7		
MW-4	12/27	9:50	18.48	3.8	7.25	16.8	1487	1.26	-38.1		
MW-5											
MW-6	12/27	12:40	16.94/16.95	834.6	6.94	20.0	1870	0.41	30.4		
MW-7	12/27	11:10	17.53	13.7	6.94	19.7	1856	0.86	-127.7		
MW-8	12/27	10:10	17.85	34.4	6.89	18.6	2148	1.03	-106.4		
MW-9	12/27	10:00	18.33	52.1	7.22	17.1	1403	1.79	-80.6		
MW-10	12/28	10:20	16.35	33.2	7.59	20.6	871	1.05	-36.7		
MW-11	12/28	10:30	16.85	34.1	7.07	19.1	1071	2.10	-18.6		
MW-12											
MW-13											
MW-14	12/27	10:20	17.08	184.1	7.05	19.2	1414	0.95	-149.4		
MW-15	12/27	10:45	16.91	59.1	7.04	18.9	1823	0.89	-119.8		
MW-16	12/27	14:00	17.18	138.0	6.99	19.3	2017	0.31	-24.6		
IW-1	12/27	11:00	17.44	58.1	7.17	19.1	1704	1.64	-145.9	150	50
IW-2	12/27	11:29	17.18	360.9	7.05	20.3	1927	1.28	-166.7	85	50
IW-3	12/27	11:55	16.64	4315	7.31	20.4	1492	10.53	+77.6	70	50
IW-4	12/27	12:08	16.63	299.4	7.53	19.6	1345	41.06	112.6	85	50
IW-5	12/27	13:08	17.25	741.9	6.74	21.4	2114	1.02	-62.1	160	50
IW-6	12/27	12:55	17.23	403.5	6.94	21.2	1674	1.37	-94.5	130	50
IW-7	12/28	10:45	17.22	1502	7.33	20.2	1567	39.80	92.1	110	50
IW-8	12/28	10:55	17.28	5403.5	6.94	21.2	1674	2.37	84.5	140	50
IW-9	12/28	11:05	17.20	2182	7.11	19.9	1536	1.05	-45.8	95	50
IW-10	12/28	11:15	16.95	429.0	7.36	19.8	1233	38.65	46.5	120	50
IW-11	12/28	11:30	16.88	1231.1	7.28	19.9	1175	38.29	87.6	90	50

Personnel on site: [illegible]

Signature: [illegible]

Date: 12/27-28/16

Project Name:					
Construction Phase	**Equipment (*See next page for example of commonly used equipment*)**	**Quantity**	**Average Hours Used Per Day**	**How Many Work Days**	**Fuel Type - if other than Diesel**
Demolition *Duration: 21* **Start Date:** 4/1/17 **End Date**: 5/1/17	• Excavator	2	8	5	
	• Dump Truck	2	8	5	Included in trrips
	• Rubber Tire Dozer	1	8	5	
	• Backhoe	1	8	5	
	• Generator*	0	0	0	Temporary line power
Site Preparation *Duration: 11* **Start Date:** 5/1/17 **End Date**: 5/15/17	• Rubber Tire Dozer	2	8	5	
	• Backhoe	1	8	5	
	• Water Truck	1	8	5	Included in trips
	• Generator*	0	0	0	Temporary Line power
	•				
Grading/Excavation *Duration: 145* **Start Date:** 5/15/17 **End Date**: 12/1/17	• Excavator	3	8	5	
	• Grader/Scraper	2	8	5	
	• Dump Truck	6	8	5	Included in trips
	• Loader	2	8	5	
	• Water Truck	1	8	5	Included in trips
Trenching *Duration: 45* **Start Date:** 12/1/17 **End Date**: _2/1/18	• Backhoe	1	8	5	
	• Dump Truck	1	8	5	Included in trips
	•				
	•				
	•				
Building – Exterior *Duration: 261* **Start Date:** 12/1/17 **End Date**: 12/1/18	• Crane	0	0	0	Electric
	• Forklift	0	0	0	
	• Rough Terrain Forklift	1	5	5	Gradall
	• Concrete Pumps	2	8	5	
	•				
Building – Interior/ Architectural Coating *Duration: 217* **Start Date:** 6/1/17 **End Date**: 4/1/19	• Crane	0	0	0	Electric Man Lift
	• Forklift	1	5	5	Propane
	• Rough Terrain Forklift	1	5	5	Gradall
Paving *Duration: 22* **Start Date:** 3/1/19_ **End Date**: 4/1/19	• Cement and Mortar Mixers	1	8	5	
	• Pavers	1	8	5	
	• Paving Equipment	1	8	5	
	• Rollers	1	8	5	
	• Concrete Saw	1	8	5	
OTHER – Provide as Applicable					
Soil Hauling Volume	Export volume = _____118,331___ cubic yards?				

Project Name:					
Construction Phase	**Equipment (*See next page for example of commonly used equipment*)**	**Quantity**	**Average Hours Used Per Day**	**How Many Work Days**	**Fuel Type - if other than Diesel**
	Import volume = _____ cubic yards?				
Demolition Volume	Square footage of buildings to be demolished, or total tons to be hauled. =_20,880__ square feet or =___ hauling volume (tons) Pavement demolished and hauled = 47,800 square feet				
Power	Line Power (Y/N) __Y or Generator use (Y/N) _N_? If generator use, then fuel type (diesel/gasoline/propane)				
Cement	Cement Trucks = _10,620_ Total Round-Trips OR Cement =__ cubic yards				
Asphalt	_____ cy or _____ round trips				

*** Based on agreement with PG&E**

Example of Equipment Commonly Used for Each Construction Phase
Demolition
Concrete/Industrial Saws
Excavators
Rubber-Tired Dozers
Site Preparation
Rubber Tired Dozers
Tractors/Loaders/Backhoes
Grading / Excavation
Excavators
Graders
Scrapers
Rubber Tired Dozers
Tractors/Loaders/Backhoes
Trenching
Excavator
Tractor/Loader/Backhoe
Building - Exterior
Cranes
Forklifts
Generator Sets
Tractors/Loaders/Backhoes
Welders
Building – Interior/ Architectural Coating
Air Compressors
Aerial Lift
Paving
Cement and Mortar Mixers

Pavers
Paving Equipment
Rollers
Tractors/Loaders/Backhoes

SECTION 5.0 COPIES OF COMMENT LETTERS RECEIVED ON THE DRAFT SEIR

Santa Clara Valley Transportation Authority

February 22, 2017

City of San Jose
Department of Planning and Building
200 East Santa Clara Street
San Jose, CA 95113

Attention: Krinjal Mathur

Subject: Greyhound Residential Project

Dear Ms. Mathur:

Santa Clara Valley Transportation Authority (VTA) staff have reviewed the Supplemental Draft EIR (DEIR) for 781 residential units and 20,000 square feet of ground floor retail at 70 Almaden Avenue. We have the following comments.

Land Use

VTA strongly supports the proposed land use intensification of this site strategically located on the transportation network within walking distance of multiple VTA Light Rail Transit lines and several Local Bus lines; the Rapid 522 line, currently undergoing an enhancement as the Alum Rock-Santa Clara Bus Rapid Transit corridor; and future Downtown San Jose BART service. Additionally, by increasing the number of residences in close proximity to the numerous shops, restaurants, services and work sites in Downtown San Jose, the project will increase opportunities for daily tasks to be accomplished by walking and biking, thereby incrementally reducing automobile trips and greenhouse gas emissions generated by the project. Downtown San Jose is identified as a Regional Core in VTA's Community Design & Transportation (CDT) Program Cores, Corridors and Station Areas framework, which shows VTA and local jurisdiction priorities for supporting concentrated development in the County. The CDT Program was developed through an extensive community outreach strategy in partnership with VTA Member Agencies, and was endorsed by all 15 Santa Clara County cities and the county.

Pedestrian Accommodations

The Supplement DEIR and corresponding Traffic Operations Analysis state that the Almaden Avenue sidewalk would be widened to 15 feet and the Post Street and S. San Pedro Street sidewalks would be widened to 12 feet. VTA supports the widening of surrounding sidewalks to enhance the pedestrian experience and recommends the inclusion of a pedestrian buffer. Resources on pedestrian quality of service, such as the Highway Capacity Manual 2010 Pedestrian Level of Service methodology, indicate that accommodations such as a buffer

containing a continuous green strip, closely planted street trees, and/or lamp posts improve pedestrian perceptions of comfort and safety on a roadway.

Bicycle Accommodations

VTA supports the inclusion of 195 bicycle parking spaces as stated in the project description. Per VTA's Notice of Preparation (NOP) Scoping letter dated September 23, 2016, it was requested that further details on bicycle access to onsite facilities be clearly documented on the site plan. The Supplement DEIR did not provide any further details as to the location of bicycle parking on the site plan or how bicyclists will access this parking location when patronizing onsite retail. The Traffic Operations Analysis displays a different ground level site plan, Figure 6, which appears to display the bike parking but in a different configuration. VTA requests additional clarity on how many spaces the garage level parking area will support and how bicycle access to onsite facilities will be provided.

Bicycle parking facilities can include bicycle lockers or secure indoor parking for all-day storage and bicycle racks for short-term parking. VTA's Bicycle Technical Guidelines provide guidance for estimating supply, siting and design for bicycle parking facilities. This document may be downloaded from www.vta.org/bikeprogram.

Transportation Demand Management – Transit Incentives

VTA continues to encourage the City to work with the applicant to explore Transportation Demand Management (TDM) measures that would reduce the number of single-occupant vehicle trips generated by the project and increase transit ridership. VTA recommends that the City work with the applicant to implement a parking management plan, parking cash-out, resident education program, reduced parking ratios, and transit fare incentives to residents of the development, such as free or discounted transit passes on a continuing basis.

Thank you for the opportunity to review this project. If you have any questions, please call me at (408) 321-5784.

Sincerely,

Roy Molseed
Senior Environmental Planner

cc: Michael Liw, San Jose Development Services
Patricia Maurice
Brian Ashurst, Caltrans SJ1618

Mathur, Krinjal

From: Connolly, Mark <Mark.Connolly@PLN.SCCGOV.ORG>
Sent: Monday, January 09, 2017 4:53 PM
To: Mathur, Krinjal
Subject: ALUC comment

Good afternoon Krinjal-

1. Please ensure project conformance with the ALUC San Jose International Airport CLUP
2. If appropriate, please ensure the project proponents obtain an No Hazard determination from the FAA

Feel free to contact me with any questions.

Thank you,

Mark J. Connolly
Senior Planner / Staff to the ALUC
70 W. Hedding Street 7th Floor East Wing
San Jose, CA 95110
408-299-5786l

Please visit our website at www.sccplanning.org
To look up unincorporated property zoning information: www.sccplanning.org/gisprofile
Questions on Plan Check Status?, please e-mail: PLN-PermitCenter@pln.sccgov.org

PRESERVATION ACTION COUNCIL OF SAN JOSE

Dedicated to Preserving San Jose's Architectural Heritage

February 14, 2017

Via Email: krinjal.mathur@sanjoseca.gov

Krinjal Mathur
Department of Planning, Building, and Code Enforcement
200 East Santa Clara St., 3rd Floor
San José, CA 95113

Dear Krinjal:

Preservation Action Council of San Jose appreciates the opportunity to comment on DSEIR for the **Greyhound Residential Project**.

It is important that San Jose residents and our City's leaders be fully informed about potential project impacts on historic resources. That is why it is critical that the DSEIR examine different project alternatives. It appears only two project alternatives have been presented thus far. While leaving the Greyhound Bus building in place could "underutilize" the site, there are adaptive reuse projects in San Jose and across the country where incorporating an historic resource into a new project has been done. A variety of alternatives that reuse and incorporate the Greyhound Bus building need to be included in the DEIR.

The applicant is citing the deteriorated condition of the exterior of this Skidmore, Owings and Merrill (SOM) building as partial justification as to why reuse or incorporation of this existing building into the proposed project is not feasible. The fact that the current or previous owners allowed deferred maintenance or neglect to compromise the exterior of the building does not diminish the very clear fact that this building is a Structure of Merit and potential City Landmark. Allowing developers to justify demolition due to deteriorated condition of a building only creates a situation that perpetuates itself in the future. In addition, the developer is calling out the removal of interior elements, the deterioration, the existence of a mezzanine and even one wall being constructed of concrete block as impediments to adaptive reuse. Interior modifications that support a different use are allowed and exterior modifications could even be allowed with sufficient justification.

Secondly, the DSEIR must examine the cumulative impacts of the loss of historic resources in the area. While it is unlikely anyone could imagine the future demolition of the Sunol Building, what about the nearby Berger Building? The Greyhound Bus building appears to be the only mid-century work by Skidmore, Owings and Merrill left in the downtown. The applicant is calling out the presence of a similar building on N. 2nd Street that is in good shape as justification for removal of this "minor work" of SOM.

Finally, this building was constructed as part of a "$5 million statewide effort by Greyhound to modernize bus terminals". Certainly that was a lot of money in the mid-1950's. How many other cities received similar upgrades? The fact that they retained the services of a nationally known architectural firm points to Greyhound's confidence in the future of and the importance of bus transportation throughout California. Further research into how this contributes to an historic context in San Jose and California is justified.

Thank you for the opportunity to provide comments on the DSEIR.

Sincerely,

Brian K. Grayson
Executive Director

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building, and Code Enforcement
HARRY FREITAS, DIRECTOR

February 15, 2017

Krinjal Mather
Environmental Project Manager
Department of Planning, Building and Code Enforcement
200 East Santa Clara Street Jose, CA 95112

RE: Historic Landmarks Commission Comments on the Draft EIR for the Greyhound Residential Project, 70 So. Almaden Avenue (File No. SP16-021)

Dear Ms. Mather,

The City of San Jose Historic Landmarks Commission discussed the Greyhound Bus Station project and the associated Draft Environmental Impact Report (File #SP16-021) at its February 1, 2017 meeting. In a 4-0 decision (Joshua Marcotte absent) the Commission voted to forward this comment letter, signed by the Chair, to the Director of Planning, Building and Code Enforcement.

Overall, the Commission agreed with the findings and conclusions of the Historic Report, and they offered the following comments on the Draft EIR:

1. The DEIR should include a broader range of design alternatives aimed at saving the historic aspects of the Greyhound Bus Station. The additional design alternatives should range from retention of the Greyhound Bus Station facade and construction of the tower project above the existing station to partial demolition of the Greyhound building but retention and repurposing of elements of the historic bus station's façade and materials.

2. The EIR's discussion of alternatives should include a more detailed analysis of the façade design, reuse with graphics if possible.

3. The lobby of the new building should pay homage to the Greyhound Bus Station and some of the former history of the site pertaining to San Jose's history as the first electrified city west of the Rocky Mountains, and San Jose's Light Tower. The lobby should include an interpretative display of the history of the Greyhound Bus Station

Should you have any further questions regarding the above matter, please feel free to contact me at by e-mail at edward@saumdesignconsulting.com.

Sincerely,

Edward Saum, Chair
City Historic Landmarks Commission

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February 22, 2017

Via Email and Overnight Mail

Krinjal Mathur
City of San Jose
Department of Planning, Building, and Code Enforcement
200 East Santa Clara St., 3rd Floor
San Jose, CA 95113
Email: krinjal.mathur@sanjoseca.gov

Re: Comments on the Draft Supplemental Environmental Impact Report for the Greyhound Residential Project (File Nos. SP16-021 and T16-017)

Dear Ms. Mathur:

We write on behalf of San Jose Residents for Responsible Development to provide comments on the Draft Supplemental Environmental Impact Report ("DSEIR") prepared by the City of San Jose ("City"), pursuant to the California Environmental Quality Act ("CEQA"),[1] for the Greyhound Residential Project ("Project"). The Project would be located on a 1.74-acre site on five parcels located on the block defined by S. Almaden Avenue, W. San Fernando Street, S. San Pedro Street and Post Street in the downtown core of San Jose. The Project includes demolition of existing structures and construction of two residential towers with 781 residential units and 20,000 square feet of ground floor commercial space. The proposed building towers would be 242 and 252 feet tall. The Project would include four levels of below-grade parking and two levels of above-grade parking.

The purpose of the DSEIR is to provide a project-level review supplementing the program-level Downtown Strategy 2000 Final Environmental Impact Report (Downtown Strategy 2000 FEIR) certified by the San Jose City Council in 2005, and the San Jose 2040 General Plan Final Environmental Impact Report (General Plan FEIR) certified by the San Jose City Council in 2011.

[1] Pub. Resources Code, §§ 21000 et seq.

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As explained more fully below, the DSEIR fails to adequately evaluate the Project's air quality, greenhouse gas emissions, hazardous materials and public health impacts. As a result of its shortcomings, the DSEIR lacks substantial evidence to support its conclusions and fails to properly mitigate the Project's significant environmental impacts. The DSEIR's numerous defects in its air quality modeling and impact analyses render it inadequate as an informational document. In light of the DSEIR's fundamentally flawed nature, the comments contained in this letter should be viewed as illustrative of the problems with the document, rather than as a comprehensive catalogue of the document's deficiencies. Based on the findings of this comment letter, a revised DSEIR must be prepared and recirculated before the City may legally approve the Project.

We have reviewed the DSEIR and its technical appendices with assistance from Matt Hagemann and Jessie Jaeger from Soil / Water / Air Protection Enterprise ("SWAPE").[2] The City must respond to these consultants' comments separately and individually.

I. STATEMENT OF INTEREST

San Jose Residents for Responsible Development ("San Jose Residents") is an unincorporated association of individuals and labor unions that may be adversely affected by the potential public and worker health and safety hazards and environmental impacts of the Project. The association includes: City of San Jose residents Jeff Dreyer, Gabriel Montes and Eric Comstock; the International Brotherhood of Electrical Workers Local 332, Plumbers & Steamfitters Local 393, Sheet Metal Workers Local 104, Sprinkler Fitters 483, and their members and their families; and other individuals that live and/or work in the City of San Jose and Santa Clara County.

Individual members of San Jose Residents and the affiliated unions live, work, recreate and raise their families in Santa Clara County, including the City of San Jose. They would be directly affected by the Project's environmental and health and safety impacts. Individual members may also work on the Project itself. Accordingly, they will be first in line to be exposed to any health and safety hazards

[2] *See* **Attachment A**: Letter from Matt Hagemann and Jessie Jaeger, SWAPE, to Rachael Koss re: Comments on the Greyhound Residential Project, February 10, 2017.

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that exist onsite. San Jose Residents has an interest in enforcing environmental laws that encourage sustainable development and ensure a safe working environment for its members. Environmentally detrimental projects can jeopardize future jobs by making it more difficult and more expensive for business and industry to expand in the region, and by making it less desirable for businesses to locate and people to live there.

II. THE CITY FAILED TO PROVIDE ACCESS TO ALL DOCUMENTS REFERENCED IN THE DSEIR FOR THE ENTIRE COMMENT PERIOD

CEQA requires that all documents referenced in an environmental review document be made available to the public for the entire comment period.[3] Once documents are properly made available, CEQA requires a minimum of 45 days for public review and comment. The City violated CEQA when it failed to make all documents referenced in the DSEIR available for public review during the entire comment period.

The DSEIR was released on December 22, 2016. On December 27, pursuant to CEQA, we requested that all documents referenced in the DSEIR be made available for public review. On January 11, 2017, the City provided a link to documents which purportedly included those responsive to our request for all documents referenced in the DSEIR. However, the documents provided did not include reference documents. We informed the City that the link did not contain the referenced documents, and on January 23, nearly a month after our original request, the City provided some documents referenced in the DSEIR. On January 25, we notified the City that that not all referenced documents were included in the linked documents. We also explained that because the City failed to provide all documents referenced in the DSEIR for the entire public comment period as required by CEQA, the City must extend the public comment deadline.

The City denied our request for an extension on January 30, incorrectly stating that all referenced documents were publicly available for the entire comment period. On January 31, we again requested that the City make available all documents referenced in the DSEIR, and again requested an extension of the comment period. We even provided a list of many of the documents that were

[3] See Pub. Resources Code § 21092(b)(1); 14 Cal. Code Regs. ("CEQA Guidelines") § 15087(c)(5).

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referenced in the DSEIR, but were not made available. We also explained that, without reviewing the documents, it is impossible to meaningfully assess and comment on the DSEIR's analyses of the Project's potentially significant impacts.

On February 10, five days before the comment deadline, the City called to request an additional two weeks to respond to our request for all documents referenced in the DSEIR. At 4:24 p.m. on February 15, 2017, the day of the comment deadline, the City extended the comment deadline by one week. That same evening, the City provided nearly 750 pages of additional reference documents related to potentially significant impacts from hazardous materials. While we appreciate the City finally providing additional reference documents, four business days to review, analyze and comment on 750 pages of technical material is insufficient and violates CEQA.

The City has clearly violated CEQA by failing to make available all documents referenced in the DSEIR during the entire comment period. We reserve the right to supplement these comments once the City makes all referenced documents available for public review.

III. CEQA REQUIRES THE DISCLOSURE OF ALL POTENTIALLY SIGNIFICANT IMPACTS AND THE INCORPORATION OF ALL FEASIBLE MITIGATION MEASURES NECESSARY TO REDUCE SUCH IMPACTS TO BELOW A LEVEL OF SIGNIFICANCE

CEQA has two basic purposes. First, CEQA is designed to inform decision makers and the public about the potential, significant environmental effects of a project.[4] Except in certain limited circumstances, CEQA requires that an agency analyze the potential environmental impacts of its proposed actions in an environmental impact report.[5] An EIR's purpose is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, an EIR "protects not only the environment but also informed self-government."[6]

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[4] CEQA Guidelines § 15002(a)(1).
[5] See, e.g., Pub. Resources Code § 21100.
[6] *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564.

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To fulfill this function, the discussion of impacts in an EIR must be detailed, complete, and "reflect a good faith effort at full disclosure."[7] CEQA requires an EIR to disclose all potential direct and indirect, significant environmental impacts of a project.[8] In addition, an adequate EIR must contain the facts and analysis necessary to support its conclusions.[9]

The second purpose of CEQA is to require public agencies to avoid or reduce environmental damage when possible by requiring appropriate mitigation measures and through the consideration of environmentally superior alternatives.[10] If an EIR identifies potentially significant impacts, it must then propose and evaluate mitigation measures to minimize these impacts.[11] CEQA imposes an affirmative obligation on agencies to avoid or reduce environmental harm by adopting feasible project alternatives or mitigation measures.[12] Without an adequate analysis and description of feasible mitigation measures, it would be impossible for agencies relying upon the EIR to meet this obligation.

As discussed in detail below, the DSEIR fails to meet either of these two key goals of CEQA. The DSEIR fails to disclose and evaluate all potentially significant environmental impacts of the Project. In addition, it fails to propose all feasible measures to mitigate the Project's potentially significant impacts to a less than significant level. The DSEIR fails to satisfy the basic purposes of CEQA. The DSEIR's conclusions regarding impacts to air quality and greenhouse gas emissions, hazardous materials and public health are not supported by substantial evidence. An EIR may conclude that impacts are insignificant only after providing an adequate analysis of the magnitude of the impacts and the degree to which they will be mitigated. Thus, if the City fails to fully investigate a potential impact, its finding of insignificance will not withstand legal scrutiny.[13] The City must address these shortcomings and recirculate a revised DSEIR for public review and comment.

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[7] CEQA Guidelines § 15151; *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 721-722.
[8] Pub. Resources Code § 21100(b)(1); CEQA Guidelines § 15126.2(a).
[9] See *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 568.
[10] CEQA Guidelines § 15002(a)(2)-(3); see also, *Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners* (2001) 91 Cal.App.4th 1344, 1354; *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564; *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 391, 400.
[11] Pub. Resources Code §§ 21002.1(a), 21100(b)(3).
[12] Pub. Resources Code §§ 21002-21002.1.
[13] Pub. Res. Code § 21081.6(b); CEQA Guidelines § 15126.4(a)(2).

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IV. THE DSEIR FAILS TO ADEQUATELY DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S IMPACTS FROM HAZARDOUS MATERIALS

The DSEIR fails to adequately evaluate the Project's impacts from hazardous materials. The DSEIR fails to disclose key baseline information, fails to fully evaluate the Project's impacts and fails to support significance findings with substantial evidence. The City must prepare a revised DSEIR that adequately addresses these issues.

The Project site is located just northeast of a Pac Bell site, which is listed on the State Water Resources Control Board Geotracker website. The Pac Bell site is under active regulatory oversight for cleanup of contaminated soil and groundwater. SWAPE explains in their comments that an August 2015 report prepared for the Pac Bell site documented the presence of a light nonaqueous phase liquid ("LNAPL") from past diesel spills originating from an underground storage tank pit. SWAPE explains that the LNAPL is a continuing source of dissolved phase diesel contamination of groundwater. Notably, groundwater flows from the Pac Bell site directly to the Project site.

The August 2015 report documents the presence of total petroleum hydrocarbons as diesel ("TPH-d") in the groundwater monitoring wells closest to the Project site, just southwest of S. Almaden Avenue. SWAPE notes that the northeastern down gradient edge of the TPH-d plume has not been defined and no groundwater monitoring data have been recently collected at the Project site. SWAPE explains that monitoring data must be collected at the Project site to ensure that contamination does not exist that would pose a risk to construction workers or future residents. This is because day lighting of the water table will result in the potential for TPH-d vapors to off-gas to ambient air, providing an exposure pathway for breathing contaminated vapors. The DSEIR fails to analyze potentially significant health impacts from TPH-d vapors.

Groundwater monitoring data is also necessary to ensure that dewatering of the Project site will not result in the unpermitted discharge of TPH-d contamination to the sanitary sewer. Groundwater at the Project site is at a depth of 20 feet. The Project requires excavation of the entire site to 41 feet below the ground surface for underground parking. SWAPE explains that "interception of the water table will

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result in the need to dewater the Project site for construction," resulting in potentially significant groundwater impacts. The DSEIR failed to disclose or analyze this potentially significant impact. Without groundwater monitoring data, it is impossible to determine the extent of the Project's potentially significant impacts from dewatering. The groundwater monitoring results must be included in a revised DSEIR that is circulated for public review and comment.

The TPH-d groundwater plume originating at the Pac Bell site was not identified or analyzed in the DSEIR, the Downtown Strategy 2000 FEIR or the General Plan FEIR. No mitigation measures have been required that would reduce potentially significant impacts from the plume to a less than significant level. A revised DSEIR must disclose, analyze and mitigate potentially significant public health and water quality impacts from the plume.

V. THE DSEIR FAILS TO ADEQUATELY DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S AIR QUALITY AND PUBLIC HEALTH IMPACTS

The DSEIR fails to adequately evaluate the Project's air quality and public health impacts. Air pollutant emissions associated with the Project are underestimated and result in new and more significant impacts when correctly evaluated. A revised DSEIR should be prepared to adequately address these issues and incorporate all feasible mitigation measures.

A. The DSEIR Relies on Air Quality Modeling that Underestimates Project Construction and Operation Emissions

The DSEIR relies on emissions calculated from the California Emissions Estimator Model Version CalEEMod.2013.2.2 ("CalEEMod"). CalEEMod provides recommended default values based on site specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but CEQA requires that such changes be justified by substantial evidence. Once all values are inputted

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into the model, the project's construction and operational emissions are calculated and "output files" are generated. These output files disclose to the reader what parameters were used in calculating a project's emissions, and make known which default values were changed.

Here, several of the values used in the Project's CalEEMod output files are incorrect and are not consistent with information disclosed in the DSEIR. As a result, emissions associated with the Project are underestimated. When corrected, modeling shows that the Project would have significant air quality impacts.

1. The Modeling Fails to Account for Total Parking Area

The DSEIR states that the Project includes 786 parking spaces. The CalEEMod output files, however, show that only 736 parking spaces were used to model the Project's emissions. By using 50 less parking spaces, the model underestimates the Project's construction and operation emissions. SWAPE explains that paving for parking spaces involves laying concrete or asphalt, and architectural coating activities involve the use of paint and other coating materials. These activities result in construction air pollutant emissions. During operation, architectural coating activities and electricity usage from outdoor lighting, ventilation and elevators in the parking structures will result in air pollutant emissions. By underestimating the total number of parking spaces, Project construction and operation emissions are underestimated. A revised DSEIR must be prepared that includes an updated CalEEMod model that accurately assesses Project emissions.

2. The Model's Use of Alternatively Fueled Equipment is Unsupported

The model assumes that Project construction will use off-road construction equipment fueled by compressed natural gas ("CNG") and bio-diesel. However, there are no conditions or mitigation measures in the DSEIR that require the use of non-diesel equipment for Project construction. As a result, the model (and the DSEIR) underestimates the Project's construction emissions.

3. The Model Uses an Incorrect Intensity Factor

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SWAPE explains that the model relies on an incorrect carbon dioxide ("CO_2") intensity factor to estimate the Project's operation emissions. When PG&E is the utility provider, as it would be for the Project, CalEEMod assumes a default CO_2 intensity factor of 641.35 pounds per megawatt-hour. The intensity factor is used to estimate the CO_2 emissions generated from electricity usage during Project operation. The intensity factor used in the CalEEMod model for the Project, however, was 429.6 pounds per megawatt-hour. There is no justification for reducing the intensity factor to estimate Project emissions.

4. The Model Uses Incorrect Off-Road Equipment and Off-Road Equipment Usage Hours

The off-road construction equipment list and usage hours used to estimate the Project's construction emissions are inconsistent with the off-road construction equipment list and duration disclosed in the DSEIR. SWAPE explains in their comments that the equipment and usage hours used in the model underestimate the Project's construction emissions. Specifically, the emissions were modeled assuming that most of the off-road equipment would operate for 30 minutes to two hours per day. The DSEIR, however, shows that this is not the case. According to the DSEIR, every piece of off-road construction equipment would be used for a minimum of eight hours per day. Moreover, the model does not include all of the equipment necessary to construct the Project. Several pieces of equipment listed in the DSEIR were omitted from the model, including dump trucks and water trucks. Thus, the Project's construction emissions are substantially underestimated.

5. The Model Incorrectly Assumes the Use of a Tier 4 Construction Fleet

The DSEIR states that "all diesel-powered off-road equipment larger than 25 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent."[14] To determine the emission reductions from this mitigation measure, the Project's construction emissions were calculated with the assumption that every piece of heavy-duty machinery greater than 25 hp would be equipped with Tier 4

[14] DSEIR, p. ix, MM AIR-1.1.

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Final engines. SWAPE explains that this assumption is unsubstantiated and unrealistic.

The U.S. Environmental Protection Agency's ("EPA") 1998 non road engine emission standards were structured as a three-tiered progression. Tier 1 standards were phased-in from 1996 to 2000 and Tier 2 emission standards were phased in from 2001 to 2006. Tier 3 standards, which applied to engines from 37-560 kilowatts (kW) only, were phased in from 2006 to 2008. The Tier 4 emission standards were introduced in 2004, and were phased in from 2008 to 2015.[15] SWAPE explains that these tiered emission standards, however, are only applicable to newly manufactured non road equipment. According to the EPA "if products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements."[16] Therefore, pieces of equipment manufactured prior to 2000 are not required to adhere to Tier 2 emission standards, and pieces of equipment manufactured prior to 2006 are not required to adhere to Tier 3 emission standards. SWAPE explains that construction equipment often lasts more than 30 years and, therefore, Tier 1 equipment and non-certified equipment are currently still in use.

Although Tier 4 Final engines are currently being produced and installed in new off-road construction equipment, the majority of existing diesel off-road construction equipment in California is not currently equipped with Tier 4 Final engines.[17] According to the *San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects*, in 2014, 25% of all off-road equipment in the state of California were equipped with Tier 2 engines, approximately 12% were equipped with Tier 3 engines, approximately 18% were equipped with Tier 4 Interim engines, and only 4% were equipped with Tier 4 Final

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[15] Emission Standards, Non road Diesel Engines, *available at:* https://www.dieselnet.com/standards/us/nonroad.php#tier3

[16] "Frequently Asked Questions from Owners and Operators of Non road Engines, Vehicles, and Equipment Certified to EPA Standards." United States Environmental Protection Agency, August 2012. *Available at:* http://www.epa.gov/oms/highway-diesel/regs/420f12053.pdf

[17] California Industry Air Quality Coalition White Paper, p. 3, *available at:* http://www.agc-ca.org/uploadedFiles/Member_Services/Regulatory-Advocacy-Page-PDFs/White_Paper_CARB_OffRoad.pdf

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engines.[18] Thus, the DSEIR relies on a construction equipment fleet that only accounts for 4% of all off-road equipment available in the state of California.

SWAPE notes that there are construction equipment regulations that apply to construction companies. For example, the California Air Resources Board ("CARB") prohibits smaller construction companies from adding construction equipment with Tier 0 engines to their fleets, and prohibits medium and large construction companies from adding equipment with Tier 1 engines to their fleets.[19] However, CARB does not require that off-road construction fleets be comprised solely of Tier 4 Final engines. According to CARB, regulations requiring that new additions to off-road vehicle fleets be equipped with Tier 4 engines will not take effect for years. CARB states, "Beginning January 1, 2018, for large and medium fleets, and January 1, 2023, for small fleets, a fleet may not add vehicles with a Tier 2 engine to its fleet. The engine tier must be Tier 3 or higher." [20] Therefore, SWAPE concludes that "it is highly unrealistic to assume that the entire construction fleet used during Project construction will be made up of construction machinery equipped with Tier 4 Final engines, exclusively."

The assumption that the Project will use an entire fleet of off-road equipment with Tier 4 Final engines during the construction phase is unsupported and results in an underestimation of emissions.

6. An Updated Analysis Shows that the Project Would Result in Significant Pollutant Emissions

SWAPE prepared an updated CalEEMod model to accurately determine the Project's emissions. SWAPE's analysis shows that, when the various inconsistencies, inaccuracies and unsupported assumptions described above are corrected, the Project's emissions significantly increase. ROG emissions increase by about 28%, NOx emissions increase by about 282%, PM10 exhaust emissions increase by about 800% and PM2.5 exhaust emissions increase by about 760%.

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[18] "San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects." August 2015, *available at:* https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf, p. 6

[19] CARB Fact Sheet dated February 2014, p. 3, *available at:* http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf

[20] http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf

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SWAPE found that the Project's construction-related NOx emissions rise from 27.1 pounds per day to 103.5 pounds per day, which exceeds the Bay Area Air Quality Management District's ("BAAQMD") significance threshold of 54 pounds per day. SWAPE's corrected model shows that the Project would result in a significant impact that was not identified or mitigated in the DSEIR. The City must prepare a revised DSEIR that accurately analyzes the Project's emissions.

B. The DSEIR Fails to Adequately Evaluate Health Risks from Diesel Particulate Matter Emissions

The DSEIR's analysis of health risks from diesel particulate matter ("DPM") emissions is inadequate in two ways. First, the City's health risk assessment ("HRA") for the Project's constructed-related health risks from DPM emissions is unsupported. The HRA relies on emission estimates from the DSEIR's CalEEMod model. As described in detail above, the model relies upon incorrect input parameters that artificially reduce the Project's construction emissions. Therefore, the City must prepare an updated construction-related HRA to accurately determine the Project's health risk impact.

Second, the DSEIR concludes that exposure to DPM during Project operation would be less than significant, but there is no operational HRA to support this conclusion. The DSEIR attempts to justify the omission of an operational HRA, stating "[o]peration of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project."[21] This is incorrect. SWAPE explains that "the Project will, in fact, generate localized toxic air contaminant (TAC) emissions during operation that may have adverse health impacts on the surrounding sensitive receptors." The Project will generate additional vehicle trips that would emit substantial amounts of DPM during operation, potentially exposing nearby sensitive receptors to substantial air pollutants. This may result in long term exposure to DPM and other TACs, causing a significant health risk impact. Therefore, the City must conduct an operational HRA.

The omission of a quantified HRA is inconsistent with the most recent guidance published by the Office of Environmental Health Hazard Assessment

[21] DSEIR, Appendix C, p. 8.

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("OEHHA"), the organization responsible for providing recommendations and guidance on how to conduct health risk assessments in California. In February of 2015, OEHHA released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, which was formally adopted in March of 2015.[22] This guidance document describes the types of projects that warrant the preparation of a HRA.

Construction of the Project will produce DPM emissions from exhaust stacks of construction equipment and on-road heavy duty trucks over a construction period of 528 days. The OEHHA recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors.[23] Once construction is complete, Project operation will generate truck trips, which will produce additional exhaust emissions, thus continuing to expose nearby sensitive receptors to DPM emissions. The OEHHA recommends that exposure from projects lasting more than 6 months be evaluated for the duration of the project, and recommends that an exposure duration of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident.[24] We can reasonably assume that the Project will operate for at least 30 years, if not more. Therefore, health risks from Project operation should have been evaluated as a 30-year exposure duration, which vastly exceeds the OEHHA's 6-month threshold. These recommendations reflect the most recent health risk policy.

To demonstrate the potential health risks to nearby sensitive receptors from Project construction and operation, SWAPE prepared a simple screening-level HRA. SWAPE used the OEHHA- and EPA-recommended AERSCREEN as the air dispersion model. SWAPE used the annual PM10 exhaust estimates from its updated CalEEMod model and the location of the closest sensitive receptors described in the DSEIR. Consistent with recommendations set forth by OEHHA, SWAPE used a residential exposure duration of 30 years, starting from the infantile stage of life. SWAPE's detailed calculations are provided in their comments.

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[22] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/hotspots2015.html
[23] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf, p. 8-18
[24] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf, p. 8-6, 8-15

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SWAPE found that the excess cancer risk to adults, children, and infants at a sensitive receptor located 75 meters away over the course of Project construction and operation are 81, 530, and 1,300 in one million, respectively. The excess cancer risk over the course of a residential lifetime (30 years) is approximately 1,922 in one million. The infantile, child, adult, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million. SWAPE notes that their analysis is a screening-level HRA, which is known to be more conservative, and tends to err on the side of health protection. If the results of a screening-level HRA are above applicable thresholds, then a more refined HRA must be conducted.

SWAPE's screening-level HRA shows that construction and operation of the Project could result in potentially significant health risk impacts. Therefore, a refined HRA must be prepared using site-specific meteorology and specific equipment usage schedules. The refined HRA must be included a revised DSEIR that is circulated for public review and comment.

C. The City Must Require All Feasible Mitigation Measures for the Project's Air Quality and Public Health Impacts

SWAPE's updated air quality analysis and HRA provides substantial evidence that the Project would result in significant air quality and public health impacts that were not identified in the DSEIR. The City must prepare a revised DSEIR that discloses and mitigates these impacts to a less than significant level.

SWAPE provides examples of some of the kinds of feasible mitigation measures to reduce the Project's air quality and public health impacts that should be required. They include, for example, limiting the idling of heavy duty vehicles to five minutes or less, requiring that diesel generators present on site for more than 10 days be equipped with emission control technology and using electric and hybrid construction equipment. SWAPE's recommended measures are more prescriptive than those included in the DSEIR and would help reduce the Project's NOx, PM and DPM emissions. The City must consider these measures and identify and explore other measures to reduce air quality and public health impacts below a level of significance.

VI. THE DSEIR FAILS TO DISCLOSE, EVALUATE AND MITIGATE THE PROJECT'S IMPACTS FROM GREENHOUSE GAS EMISSIONS

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The DSEIR fails to adequately evaluate the Project's impacts on global climate change. The DSEIR concludes, without support, that the Project's impact from greenhouse gas ("GHG") emissions would be less than significant. In fact, the DSEIR does not even quantify the GHGs associated with the Project. Instead, the DSEIR states:

> Because construction would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32…Since the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy. Projects that are consistent with the GHG Reduction Strategy (such as the proposed project) would have a less than significant impact related to GHG emissions.[25]

This is not an "analysis," as required by CEQA. Moreover, the statements are unsupported.

The DSEIR states that the Project is consistent with the City's GHG Reduction Strategy and General Plan, but the DSEIR fails to demonstrate compliance with all of the applicable Voluntary and Mandatory Criteria in the GHG Reduction Strategy. The City provides that "[a]pplicants can complete the 'Evaluation of Project Compliance with the City of San Jose Greenhouse Gas Reduction Strategy' worksheet to demonstrate conformance to the Greenhouse Gas Reduction Strategy."[26]

Appendix A of the DSEIR shows that the Project complies with three of the applicable Mandatory Criteria, but there is no evidence that the Project complies with the fourth mandatory criterion or with any of the voluntary measures. The DSEIR states that "compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG

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[25] DSEIR, Appendix A, p. 59.
[26] "Greenhouse Gas Reduction Strategy." *City of San Jose, available at:* http://www.sanjoseca.gov/index.aspx?NID=3687

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Reduction Strategy."[27] Because compliance with all applicable Voluntary and Mandatory Criteria set forth in the GHG Reduction Strategy is not demonstrated, the City cannot conclude that the Project is consistent with the City's GHG Reduction Strategy. Therefore, there is no support for the DSEIR's conclusion that the Project would have a less than significant impact from GHG emissions.

In addition, while a lead agency enjoys substantial discretion in its choice of methodology to analyze impacts, the methodology must still be supported by substantial evidence. Under CEQA, a lead agency may consider the use of a qualitative analysis that relies upon consistency with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions when assessing the significance of impacts from GHGs, but such regulations or requirements must be adopted by the agency through a public review process and must include specific requirements that reduce or mitigate a project's incremental contribution of greenhouse gas emissions.[28] In this case, the DSEIR's method was not adopted by an agency and there is no evidence that compliance with this very limited list of measures would actually result in compliance with the statewide goals in AB 32. The DSEIR fails to provide substantial evidence to support the use of a consistency analysis with the City's General Plan and GHG Reduction Strategy to determine the Project's impacts.

The BAAQMD's recommended GHG significance thresholds (discussed below) must be used to determine the Project's impacts from GHG emissions. The BAAQMD's thresholds have undergone a public review process as part of stakeholder working group meetings that are open to the public, and the BAAQMD's Guidance document provides the substantial evidence relative to the methodology for developing the interim GHG significance thresholds, consistent with requirements set forth by CEQA.[29]

To determine the Project's impact on global climate change, SWAPE conducted a simple analysis using the emission estimates provided in the DSEIR and the BAAQMD's Air Quality Guidelines. As stated in the City's GHG Reduction

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[27] DSEIR, Appendix A, p. 59.
[28] CEQA Guidelines § 15064.4(b); *see also* http://resources.ca.gov/ceqa/docs/FINAL_Text_of_Proposed_Amendemts.pdf
[29] Air Quality Guidelines, BAAQMD, June 2010, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en

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Strategy, the BAAQMD Air Quality Guidelines are intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects (Project-level) and plans (Plan-level) in the San Francisco Bay Area.[30]

The Guidelines include information on legal requirements, BAAQMD rules, plans and procedures, methods of analyzing air quality impacts, thresholds of significance, mitigation measures and background air quality information. In June 2010, the BAAQMD Board of Directors set forth new CEQA thresholds of significance and updated their CEQA Guidelines. The BAAQMD's updated Guidelines recommend quantifying a project's indirect and direct GHG emissions, and comparing these emissions to the BAAQMD's screening threshold of 1,100 metric tons per year of carbon dioxide equivalents (MT CO_2e/year).[31] If a project would generate GHG emissions greater than 1,100 MT CO_2e/year, it would make a cumulatively considerable contribution to GHG emissions and result in a cumulatively significant impact to global climate change.

Consistent with BAAQMD Guidelines, SWAPE quantified the Project's construction and operational GHG emissions and compared the emissions to the BAAQMD recommended thresholds of 1,100 MT CO_2e/year. SWAPE found that the Project's total GHG emissions, where construction emissions were amortized over 30 years then added to the Project's operational emissions, were 5,855 MT CO_2e/year, which clearly exceeds the BAAQMD threshold of 1,100 MT CO_2e/year. This is a significant impact that the DSEIR fails to disclose or mitigate. The City must prepare a revised DSEIR that adequately analyzes and mitigates the Project's impacts from GHG emissions.

SWAPE provides examples of some of the kinds of feasible measures that would reduce the Project's impact from GHG emissions. Notably, some of the measures would also reduce the Project's operational DPM emissions. The measures include, for example, limiting the hours of operation of outdoor lighting, using CARB-certified or electric landscaping equipment and providing electric vehicle charging stations that are accessible for trucks. SWAPE's recommended measures provide a feasible way to incorporate lower-emitting design features into

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[30] "Greenhouse Gas Reduction Strategy." City of San Jose, *available at:* http://www.sanjoseca.gov/documentcenter/view/9388, p. 12

[31] Air Quality Guidelines, BAAQMD, June 2010, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en, p. 2-2

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the Project, thereby reducing GHG emissions. The City must require these measures and identify and explore other measures to reduce the Project's GHG emissions and climate change impacts. The City must prepare a revised DSEIR that includes a GHG analysis that is supported by substantial evidence.

VII. CONCLUSION

The DSEIR fails to adequately disclose and evaluate the full extent of the Project's air quality, greenhouse gas emissions, hazardous materials and public health impacts. The City must prepare a revised DSEIR that addresses these inadequacies and recirculate the revised DSEIR for public review and comment.

Sincerely,

Rachael E. Koss

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ATTACHMENT A

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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February 10, 2017

Rachael Koss
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South San Francisco, CA 94080

Subject: Comments on the Greyhound Residential Project

Dear Ms. Koss,

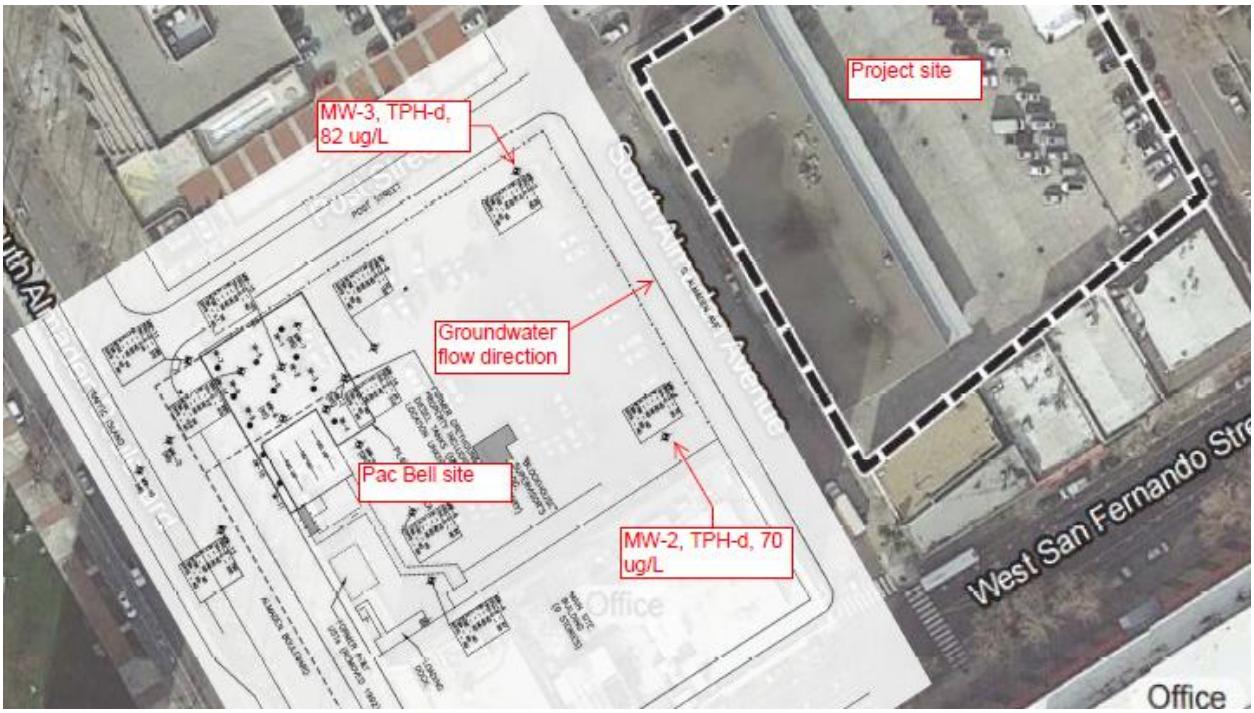
We have reviewed the December 2016 Draft Supplemental Environmental Impact Report (DSEIR) and associated appendices for the Greyhound Residential Project ("Project") located in the City of San Jose. A one-story commercial building and Greyhound bus station are currently located on the Project site. The proposed Project would demolish both buildings and construct two residential towers with ground floor retail. The north tower would be 23 stories (242 feet tall) with up to 371 residential units and the south tower would be 24 stories (252 feet tall) with up to 410 residential units, for a combined total of 781 residential units (449 dwelling units/acre). Approximately 20,000 square feet of ground floor retail would be located within the towers along S. Almaden Avenue, Post Street, and San Pedro Street. The first floor would include the retail space and parking and the second floor would be for parking. The residential units would be located on the remaining floors. The building would have a total square footage of 1,029,065, with a floor area ratio (FAR) of 13.6.

Our review concludes that the DSEIR fails to adequately evaluate the Project's Hazards and Hazardous Waste, Air Quality, and Greenhouse Gas (GHG) impacts. As a result, emissions and health impacts associated with construction and operation of the proposed Project are underestimated and inadequately addressed. An updated DSEIR should be prepared to adequately assess and mitigate the hazards, air quality, greenhouse gas, and potential health impacts the Project may have on the surrounding environment.

Hazards and Hazardous Waste

The Project site is directly northeast of a Pac Bell site that is under active regulatory oversight for cleanup of contaminated soil and groundwater. The Pac Bell site is listed on the California State Water Resources Control Board Geotracker website.[1] An August 2015 report prepared for the Pac Bell site documented the presence of a light nonaqueous phase liquid (LNAPL) from past diesel spills originating from an underground storage tank pit.[2] The LNAPL serves as a continuing source of dissolved phase diesel contamination of groundwater. Groundwater flow from the Pac Bell site is northeastward[3], in the direction of the Project Site.

The August 2015 report documents the presence of total petroleum hydrocarbons as diesel (TPH-d) in the groundwater monitoring wells closest to the Project site, just southwest of South Almaden Ave. The northeastern downgradient edge of the TPH-d plume has not been defined; no groundwater monitoring data have been recently collected at the Project site.



Data from Fig. 6, August 2015 Report

Because the plume of TPH-d in groundwater is flowing directly from the Pac Bell site toward the Project site, and because the downgradient edge of the plume has not been defined, groundwater monitoring data should be collected at the Project site to ensure contamination does not exist that would pose a risk to construction workers and future residents. Daylighting of the water table will result in the potential for TPH-d vapors to off-gas to ambient air, posing an exposure pathway for construction

[1] http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0608501640
[2] System Installation Report, OSE II/iSOC Pilot Test Pacific Bell Telephone Facility, 95 South Almaden Avenue San Jose, California, CB&I, August 28, 2015
[3] Ibid., p. 3

workers to breathe contaminated vapors. The DSEIR should be revised to consider this potential and to provide for protective measures to safeguard worker safety.

The collection of groundwater monitoring data is also necessary to ensure that dewatering of the Project site will not result in the unpermitted discharge of TPH-d contamination to the sanitary sewer. The results of the groundwater monitoring should be presented in a revised DSEIR.

The presence of the plume originating from the Pac Bell site was not identified in the DSEIR. The presence of the plume originating from the Pac Bell site was not identified in the Downtown Strategy 2000 FEIR or in the San Jose 2040 General Plan FEIR. The Phase I ESA prepared for the Project site (appendix E) did not identify the plume originating from the Pac Bell site and moving in the direction of the Project site as a potential source of contamination. No mitigation measures have been prepared in these three documents that would address the potential presence of groundwater contamination beneath the Project site.

On the basis of data from the Pac Bell site, groundwater is present at the Project site at a depth of about 20 feet.[4] The DSEIR states that Implementation of the proposed project will require excavation of the entire site to approximately 41 feet below the ground surface for construction of the underground parking structure (p. 26). The interception of the water table will result in the need to dewater the Project site for construction, an eventuality not contemplated in the DSEIR. A DSEIR should be prepared to include provisions for the proper disposal of contaminated groundwater, based on water-quality testing that should be required as described above. Contaminated groundwater that may be generated from the dewatering process needs to be handled and disposed in accordance with the San Francisco Bay Regional Water Quality Control Board's NPDES General Permit requirements.[5]

The presence of the TPH-d groundwater plume, located upgradient and adjacent to the Project site, is significant new information that needs to be evaluated in a revised DSEIR. The DSEIR should consider health impacts on the basis of site-specific information, from the collection and analysis of groundwater samples beneath the Project site. Any health or environmental impacts should be mitigated in a revised, DSEIR.

Air Quality

Unsubstantiated Input Parameters Used to Estimate Project Emissions

The DSEIR relies on emissions calculated from the California Emissions Estimator Model Version CalEEMod.2013.2.2 ("CalEEMod").[6] CalEEMod provides recommended default values based on site specific information, such as land use type, meteorological data, total lot acreage, project type and typical equipment associated with project type. If more specific project information is known, the user can change the default values and input project-specific values, but the California Environmental Quality Act (CEQA) requires that such changes be justified by substantial evidence.[7] Once all the values are inputted into the model, the Project's construction and operational emissions are calculated, and "output files" are generated. These output files, which can be found in Appendix C of the DSEIR, disclose

[4] Ibid., p. 8
[5] http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2012/R2-2012-0060.pdf
[6] CalEEMod website, *available at*: http://www.caleemod.com/
[7] CalEEMod User Guide, pp. 2, 9, *available at:* http://www.caleemod.com/

to the reader what parameters were utilized in calculating the Project's air pollutant emissions, and make known which default values were changed as well as provide a justification for the values selected.[8]

When we reviewed the Project's CalEEMod output files, we found that several of the values inputted into the model were not consistent with information disclosed in the DSEIR. When the Project's emissions are modeled using correct input parameters, we found that the Project will have a significant impact on regional air quality and global climate change. An updated DSEIR should be prepared to include an air quality analysis that adequately evaluates the impacts that the construction and operation of the Project will have.

Failure to Account for Total Parking Area

The proposed Project's CalEEMod output files utilized "Land Uses" inconsistent with information disclosed in the DSEIR, and as a result, the Project's construction and operational emissions are underestimated.

According to the DSEIR, the Project proposes to construct a total of 786 parking spaces in a multi-level parking garage (p. 5). In an effort to accurately estimate the Project's construction and operational emissions, this value should have been used within the air model. However, according to the Project's CalEEMod output files, located in Appendix C, Project emissions were estimated assuming that only 736 parking spaces would be constructed, underestimating the total number of parking spaces anticipated to be constructed by 50 spaces. (see excerpt below) (Appendix C, pp. 63, pp. 88).

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	736.00	Space	0.00	294,400.00	0
Apartments High Rise	785.00	Dwelling Unit	1.74	785,000.00	2245
Strip Mall	20.00	1000sqft	0.00	20,000.00	0

This discrepancy between the DSEIR and the air model provided in Appendix C presents a significant issue. As previously stated, the land use type and size features are used throughout CalEEMod in determining default variable and emission factors that go into the model's calculations. By underestimating the number of parking spaces within the model, the emissions that would be produced during construction and operation of the proposed parking structure are underestimated. Paving for the parking spaces involves laying concrete or asphalt, and architectural coating activities involve the use of paint and other coating materials to mark each parking space, both of which will result in air pollutant emissions during construction.[9] Furthermore, during operation, architectural coating activities and

[8] CalEEMod User Guide, pp. 7, 13, *available at:* http://www.caleemod.com/ (A key feature of the CalEEMod program is the "remarks" feature, where the user explains why a default setting was replaced by a "user defined" value. These remarks are included in the report.)
[9] CalEEMod User's Guide, pp. 25, *available at:* http://www.caleemod.com/

electricity usage from outdoor lighting, ventilation, and elevators in the proposed parking structures will also result in air pollutant emissions.[10] Therefore, by underestimating the total number of parking spaces, the Project construction and operational emissions are underestimated. An updated CalEEMod model must be prepared in an updated DSEIR in order to accurately estimate Project emissions.

Incorrectly Modeled Emissions Assuming Use of Alternatively Fueled Equipment

The DSEIR incorrectly assumes the use of off-road equipment fueled by compressed natural gas (CNG) and bio-diesel during construction, even though the DSEIR does not mention the use of alternatively fueled off-road equipment as a mitigation measure, nor does it make any sort of commitment to using alternatively fueled equipment once the Project is approved. As a result, the Project's construction and operational emissions are artificially reduced.

As previously stated, the DSEIR relies upon CalEEMod to model emissions. Review of the modeling output files provided in Appendix C of the DSEIR demonstrate that the Project's construction-related emissions were estimated assuming the use of off-road equipment fueled by CNG and bio-diesel (see excerpt below) (Appendix C, pp. 64).

tblConstEquipMitigation	FuelType	Diesel	CNG
tblConstEquipMitigation	FuelType	Diesel	Bio-diesel

The use of alternatively-fueled construction equipment, however, is incorrect, as nowhere in the DSEIR does it mention the use of non-diesel equipment, let alone propose it as mitigation. The only reference to the Project's use of non-diesel equipment during construction is in the Project's Air Quality Analysis, located in Appendix C, which states,

> "Other measures may be the use of added exhaust devices, alternatively- fueled equipment (i.e. non-diesel), or a combination of measures, provided that these measures are approved by the City and demonstrated to reduce community risk impacts to less than significant" (Appendix C, pp. 22).

As you can see in the excerpt above, Appendix C mentions that alternatively fueled equipment could be implemented as a mitigation measure; however, the DSEIR would have to first identify the use of non-diesel equipment as a mitigation measure, and then demonstrate a commitment to actually implementing this measure, and would have to obtain City approval prior to Project construction. Nothing in the DSEIR indicates that the required steps have been taken to adequately demonstrate a commitment to the use of alternatively fueled equipment. The DSEIR makes no mention of the use of alternatively fueled off-road equipment during construction, and does not include it as a mitigation measure or mandatory condition of approval. As a result, there is no way to ensure that the proposed measure will be implemented once the Project is approved.

[10] CalEEMod User's Guide, p. 3, *available at:* http://www.caleemod.com/

Because the DSEIR does not include details of how the alternatively-fueled equipment will be used, its inclusion within the Project's air model is unsubstantiated and results in an artificial reduction of the Project's construction emissions. Unless the Project Applicant can demonstrate how CNG or bio-diesel fuel will be used and implemented into Project activities, the Project cannot claim the emissions reductions from this mitigation measure.

Use of Incorrect Intensity Factor

The CalEEMod model relies upon an incorrect carbon dioxide (CO_2) intensity factor to estimate the Project's operational emissions. When Pacific Gas & Electric (PG&E) is chosen as the utility provider for the proposed Project, CalEEMod assumes a default CO_2 intensity factor of 641.35 pounds per megawatt-hour (lb/MWhr). This intensity factor is used to estimate the CO_2 emissions generated from electricity usage during Project operation. The intensity factor used in the Project's operational CalEEMod model, however, was adjusted from the default value to 429.6 lb/MWhr (see excerpt below) (Appendix C, pp. 66, pp. 91).

tblProjectCharacteristics	CO2IntensityFactor	641.35	429.6

The User Entered Comments & Non-Default Data section in the Project's CalEEMod output files fails to offer a reason for this reduction, only stating, "Revised Carbon Dioxide Emission Intensity" (Appendix C, pp. 63, pp. 88). Furthermore, there is no discussion anywhere in the DSEIR that supports the use of this other CO_2 intensity factor in place of the CalEEMod default value. As a result, the source of this 429.6 lb/MWhr value is unknown. CalEEMod allows users to change default values, but these changes are required to be justified by substantial evidence.[11] By failing to provide proper justification for changing this intensity factor, the accuracy of this value cannot be verified, and thus, should not be relied upon to determine Project significance.

Use of Incorrect Off-Road Equipment and Off-Road Equipment Usage Hours

The off-road construction equipment list and usage hours used to estimate the proposed Project's construction emissions are inconsistent with the off-road construction equipment list and duration disclosed in the DSEIR. As a result, the Project's construction emissions are incorrect and underestimated.

According to the Project's CalEEMod output files, the following equipment and usage hours were used to estimate the Project's construction emissions (see excerpt below) (Appendix C, pp. 69-70).

[11] CalEEMod User Guide, p. 2, 9, *available at:* http://www.caleemod.com/

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	2	1.90	162	0.38
Demolition	Rubber Tired Dozers	1	1.90	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	1.90	97	0.37
Site Preparation	Graders	0	8.00	174	0.41
Site Preparation	Rubber Tired Dozers	2	3.70	255	0.40
Site Preparation	Scrapers	0	8.00	361	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	3.70	97	0.37
Grading	Excavators	3	0.30	162	0.38
Grading	Graders	0	6.00	174	0.41
Grading	Rubber Tired Dozers	0	6.00	255	0.40
Grading	Rubber Tired Loaders	2	0.30	199	0.36
Grading	Scrapers	2	0.30	174	0.41
Grading	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building Construction	Cranes	2	0.30	226	0.29
Building Construction	Forklifts	2	0.20	89	0.20
Building Construction	Generator Sets	4	0.60	84	0.74
Building Construction	Graders	1	0.20	174	0.41
Building Construction	Pumps	2	0.20	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Architectural Coating	Air Compressors	0	6.00	78	0.48
Architectural Coating	Cranes	1	0.20	226	0.29
Architectural Coating	Forklifts	2	0.20	89	0.20
Architectural Coating	Generator Sets	2	0.20	84	0.74
Architectural Coating	Graders	1	0.20	174	0.41
Paving	Cement and Mortar Mixers	1	1.80	9	0.56
Paving	Concrete/Industrial Saws	1	1.80	81	0.73
Paving	Pavers	1	1.80	125	0.42
Paving	Paving Equipment	1	1.80	130	0.36
Paving	Rollers	1	1.80	80	0.38
Paving	Tractors/Loaders/Backhoes	0	1.80	97	0.37

As demonstrated above, the Project's construction emissions were modeled assuming that the majority of the off-road equipment to be used during construction would be operating for less than 8 hours a day, with several pieces of equipment operating for only a maximum of 20 or 30 minutes a day. According to CalEEMod model's User Entered Comments and Non-Default Data, the off-road equipment list and usage hours used to estimate emissions reflect the construction schedule and equipment list disclosed in the DSEIR (Appendix C, pp. 63, pp. 88). Review of the DSEIR, however, demonstrates that this is not the case. As you can see in the excerpt below, the equipment types and usage hours provided

within the DSEIR's construction list do not reflect the equipment and usage hours inputted into the air model (see excerpt below) (Appendix C, pp. 57).

Project Name: Greyhound Residential					
Construction Phase	Equipment (*See next page for example of commonly used equipment*)	Quantity	Average Hours Used Per Day	How Many Work Days	Fuel Type - if other than Diesel
Demolition	• Excavator	2	8	5	
	• Dump Truck	2	8	5	
	• Rubber Tire Dozer	1	8	5	
Start Date: 4/1/17	• Backhoe	1	8	5	
End Date: 5/1/17	•				
Site Preparation	• Rubber Tire Dozer	2	8	5	
	• Backhoe	1	8	5	
	• Water Truck	1	8	5	
Start Date: 5/1/17	•				
End Date: 5/15/17	•				
Grading/Excavation	• Excavator	3	8	5	
	• Grader/Scraper	2	8	5	
	• Dump Truck	6	8	5	
Start Date: 5/15/17	• Loader	2	8	5	
End Date: 12/1/17	• Water Truck	1	8	5	
Trenching	• Backhoe	1	8	5	
	• Dump Truck	1	8	5	
	•				
Start Date: 12/1/17	•				
End Date: _2/1/17	•				
Building – Exterior	• Crane	2	12	5	
	• Forklift	2	8	5	Propane
	• Grader all	1	8	5	
Start Date: 12/1/17	• Generators	4	24	6	Bio
End Date: 12/1/18	• Concrete Pumps	2	8	5	
Building – Interior/ Architectural Coating	• Crane	1	8	5	
	• Forklift	2	8	5	Propane
	• Grader all	1	8	5	
	• Generators	2	8	5	Bio
Start Date: 6/1/17					
End Date: 4/1/19	•				
Paving	• Cement and Mortar Mixers	1	8	5	
	• Pavers	1	8	5	
	• Paving Equipment	1	8	5	
Start Date: 3/1/19_	• Rollers	1	8	5	
End Date: 4/1/19	• Concrete Saw	1	8	5	

While the CalEEMod model assumes that the majority of the Project's construction equipment will be used for 30 minutes to 2 hours every day, the equipment list provided in the DSEIR proposes to use every piece of off-road construction equipment for a minimum of 8 hours a day, approximately 40 times more than the minimum usage hours utilized in the CalEEMod model. By failing to use the correct usage hours within the CalEEMod model, the Project's construction emissions are greatly underestimated.

Not only did the CalEEMod model fail to rely upon the correct usage hours to model the Project's construction emissions, but it also failed to include all of the proposed construction equipment. When we compared the DSEIR's equipment list to the list used in the air model, we found that several pieces of equipment provided in the DSEIR's equipment list were omitted from the CalEEMod model. Specifically, we found that the CalEEMod model failed to include the off-road dump and water trucks needed throughout the entire construction period (see table below).

Missing Pieces of Off-Road Construction Equipment in CalEEMod Model		
Phase	**Equipment Type**	**Amount**
Demolition	Dump Trucks	2
Site Preparation	Water Trucks	1
Grading	Dump Trucks	6
	Water Trucks	1
Trenching	Dump Trucks	1

By failing to use the correct usage hours and include all of the pieces of off-road equipment anticipated for use during Project construction, emissions from Project construction are greatly underestimated. An updated air quality analysis should be prepared to adequately evaluate the Project's construction emissions.

Failure to Demonstrate Feasibility of Obtaining Tier 4 Construction Fleet

According to the DSEIR, "all diesel-powered off-road equipment larger than 25 horsepower and operating at the site for more than two days continuously shall meet U.S. EPA particulate matter emissions standards for Tier 4 engines or equivalent" (MM AIR-1.1, p. ix). In order to determine the emission reductions that this mitigation measure will result in, the Project's construction emissions were calculated with the assumption that every piece of heavy-duty machinery greater than 25 hp used during construction will be equipped with Tier 4 Final engines (Appendix C, pp. 64-65). This assumption, however, is unsubstantiated and unrealistic, as the DSEIR fails to evaluate the feasibility of actually obtaining a construction fleet composed entirely of Tier 4 Final equipment. As a result, we find the Project's air quality analysis and DSEIR to be inadequate and require that an updated DSEIR be prepared to assess the feasibility of obtaining an entirely Tier 4 Final construction fleet.

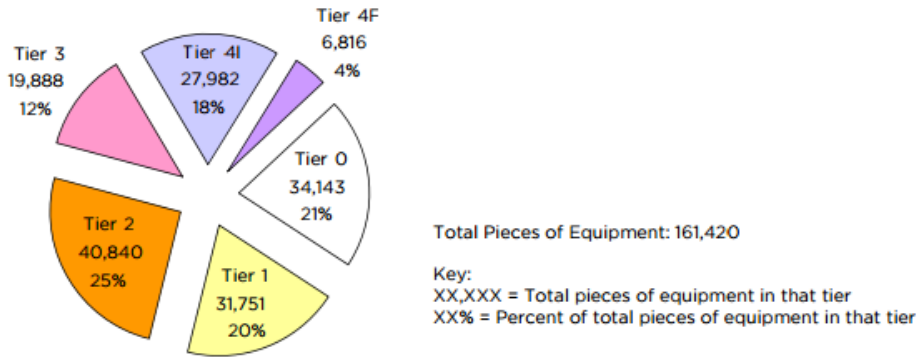
The United States Environmental Protection Agency's (USEPA) 1998 nonroad engine emission standards were structured as a three-tiered progression. Tier 1 standards were phased-in from 1996 to 2000 and Tier 2 emission standards were phased in from 2001 to 2006. Tier 3 standards, which applied to engines from 37-560 kilowatts (kW) only, were phased in from 2006 to 2008. The Tier 4 emission standards were introduced in 2004, and were phased in from 2008 to 2015.[12] These tiered emission standards, however, are only applicable to newly manufactured nonroad equipment. According to the United

[12] Emission Standards, Nonroad Diesel Engines, *available at:* https://www.dieselnet.com/standards/us/nonroad.php#tier3

States Environmental Protection Agency (USEPA) "if products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements."[13] Therefore, pieces of equipment manufactured prior to 2000 are not required to adhere to Tier 2 emission standards, and pieces of equipment manufactured prior to 2006 are not required to adhere to Tier 3 emission standards. As previously mentioned, construction equipment often lasts more than 30 years; as a result, Tier 1 equipment and non-certified equipment are currently still in use.[14]

Although Tier 4 Final engines are currently being produced and installed in new off-road construction equipment, the majority of existing diesel off-road construction equipment in California is not currently equipped with Tier 4 Final engines.[15] According to the *San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects*, in 2014, 25% of all off-road equipment in the state of California were equipped with Tier 2 engines, approximately 12% were equipped with Tier 3 engines, approximately 18% were equipped with Tier 4 Interim engines, and only 4% were equipped with Tier 4 Final engines (see excerpt below).[16]

Figure 4: 2014 Statewide All Fleet Sizes (Pieces of Equipment)



As demonstrated in the figure above, Tier 4 Final equipment only accounts for 4% of all off-road equipment currently available in the state of California. Thus, by stating that the Project proposes to use Tier 4 Final equipment during construction, the DSEIR is relying on a fleet of construction equipment that only accounts for 4% of all off-road equipment currently available in the state of California.

It should be noted that there are several construction equipment regulations that apply to construction companies. For example, CARB currently prohibits smaller construction companies from adding

[13] "Frequently Asked Questions from Owners and Operators of Nonroad Engines, Vehicles, and Equipment Certified to EPA Standards." United States Environmental Protection Agency, August 2012. *Available at:* http://www.epa.gov/oms/highway-diesel/regs/420f12053.pdf

[14] "Best Practices for Clean Diesel Construction." Northeast Diesel Collaborative, August 2012. *Available at:* http://northeastdiesel.org/pdf/BestPractices4CleanDieselConstructionAug2012.pdf

[15] California Industry Air Quality Coalition White Paper, p. 3, *available at:* http://www.agc-ca.org/uploadedFiles/Member_Services/Regulatory-Advocacy-Page-PDFs/White_Paper_CARB_OffRoad.pdf

[16] "San Francisco Clean Construction Ordinance Implementation Guide for San Francisco Public Projects." August 2015, *available at:* https://www.sfdph.org/dph/files/EHSdocs/AirQuality/San_Francisco_Clean_Construction_Ordinance_2015.pdf, p. 6

construction equipment with Tier 0 engines to their fleets, and prohibits medium and large construction companies from adding equipment with Tier 1 engines to their fleets.[17] However, it is not required that off-road construction fleets be comprised solely of Tier 4 Final engines. According to CARB, regulations requiring that new additions to off-road vehicle fleets be equipped with Tier 4 engines will not take effect for years. CARB states, "Beginning January 1, 2018, for large and medium fleets, and January 1, 2023, for small fleets, a fleet may not add vehicles with a Tier 2 engine to its fleet. The engine tier must be Tier 3 or higher." [18] Therefore, it is highly unrealistic to assume that the entire construction fleet used during Project construction will be made up of construction machinery equipped with Tier 4 Final engines, exclusively.

The presumption that the Project will use an entire fleet of off-road equipment with Tier 4 Final engines during the construction phase is incorrect and unsupported by substantial evidence, and results in an underestimation of emissions. Due to the unlikelihood that the Project will utilize an exclusively Tier 4 Final construction fleet, substantial evidence shows that the Project may result in potentially significant, unmitigated air quality impacts.

Updated Analysis Indicates Significant Pollutant Emissions

In an effort to accurately determine the Project's emissions, we prepared an updated CalEEMod model that includes more site-specific information and corrected input parameters. In the updated model, we inputted a total of 786 parking spaces, consistent with the DSEIR, and adjusted the off-road equipment list and usage hours to more accurately reflect the equipment identified in the DSEIR. We also assumed that Tier 4 Final and non-diesel equipment would not be used during Project construction, as nothing in the DSEIR indicates that the use of these cleaner burning equipment will actually occur once the Project is approved. Finally, we relied upon the default carbon dioxide intensity factor provided by CalEEMod, as the intensity factor used in the DSEIR is unsubstantiated, and its source is unknown.

When correct, site-specific input parameters are used to model emissions, we find that the Project's construction-related criteria air pollutant emissions increase significantly when compared to the DSEIR's model. Furthermore, we find that the Project's construction-related NO_x emissions exceed the 54 pounds per day construction threshold set forth by the Bay Area Air Quality Management District (BAAQMD) (see table below).

Average Daily Construction Emissions (lbs/day)				
Model	**ROG**	**NO_x**	**PM10 Exhaust**	**PM2.5 Exhaust**
DSEIR	30.5	27.1	0.50	0.50
SWAPE	38.9	103.5	4.50	4.30
Percent Increase	**28%**	**282%**	**800%**	**760%**
BAAQMD Regional Threshold	**54**	**54**	**82**	**54**
Threshold Exceeded?	*No*	***Yes***	*No*	*No*

[17] CARB Fact Sheet dated February 2014, p. 3, *available at:* http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf
[18] http://www.arb.ca.gov/msprog/ordiesel/faq/overview_fact_sheet_dec_2010-final.pdf

When correct input parameters are used to model emissions, ROG emissions increase by approximately 28%, NO_x emissions increase by approximately 282% and exceed the BAAQMD's established threshold, PM10 exhaust emissions increase by approximately 800%, and PM2.5 exhaust emissions increase by approximately 760%.

These updated emission estimates demonstrate that when the Project's construction emissions are estimated correctly, the Project would result in a significant impact that was not identified in the DSEIR. As a result, an updated DSEIR should be prepared that includes an updated model to adequately estimate the Project's construction-related emissions, and additional mitigation measures should be identified and incorporated to reduce these emissions to a less-than-significant level.

Diesel Particulate Matter Health Risk Emissions Inadequately Evaluated

The DSEIR concludes that exposure to diesel particulate matter (DPM) during operation is anticipated to be less than significant without actually conducting a health risk assessment (HRA) (Appendix C, p. 8). The DSEIR attempts to justify the omission of an operational HRA by stating,

> "Operation of the project is not expected to cause any localized emissions that could expose sensitive receptors to unhealthy air pollutant levels. No stationary sources of TACs, such as generators, are proposed as part of the project" (Appendix C, p. 8).

This justification, however, is incorrect, as the Project will, in fact, generate localized toxic air contaminant (TAC) emissions during operation that may have adverse health impacts on the surrounding sensitive receptors. As stated in the DSEIR, substantial sources of TACs include freeways, highways, and busy surface streets due to vehicle exhaust emissions, and stationary sources identified by the BAAQMD (Appendix C, p. 9). The Project will generate additional vehicle trips that would emit substantial amounts of DPM during operation, potentially exposing nearby sensitive receptors to substantial air pollutants. As such, the DSEIR should have conducted an operational HRA, as long term exposure to DPM and other TACs may result in a significant health risk impact.

While the DSEIR did not conduct an operational HRA, it did prepare a HRA to determine the Project's construction-related health risk impacts (Appendix C, p. 18). However, according to Appendix C of the DSEIR, the Project's construction HRA relies upon emission estimates from the DSEIR's CalEEMod model (Appendix C, p. 18). Appendix C of the DSEIR states,

> "Construction period emissions were computed using CalEEMod along with projected construction activity, as described above. The CalEEMod model provided total annual PM2.5 exhaust emissions (assumed to be DPM) for the off road construction equipment used for construction of the project and for the exhaust emissions from on-road vehicles (haul trucks, vendor trucks, and worker vehicles) of 0.0393 tons (80 pounds) over the construction period. A trip length of one-half mile was used to represent vehicle travel while at or near the

construction site. For modeling purposes, it was assumed that these emissions from on-road vehicles would occur at the construction site. Fugitive dust PM2.5 emissions were also computed and included in this analysis. The model predicts emissions of 0.0406 tons (80 pounds) of fugitive PM2.5 over the construction period" (Appendix C, p. 18).

As stated in the previous sections, the DSEIR's CalEEMod model relies upon incorrect input parameters that artificially reduce the Project's construction emissions. Therefore, an updated construction-related HRA should also be prepared in an effort to adequately determine the Project's health risk impact.

The DSEIR's omission of a quantified health risk is inconsistent with the most recent guidance published by the Office of Environmental Health Hazard Assessment (OEHHA), the organization responsible for providing recommendations and guidance on how to conduct health risk assessments in California. In February of 2015, OEHHA released its most recent *Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments*, which was formally adopted in March of 2015.[19] This guidance document describes the types of projects that warrant the preparation of a health risk assessment. Construction of the Project will produce emissions of DPM through exhaust stacks of construction equipment and on-road heavy duty trucks over a construction period of 528 days (Appendix C, p. 5). The OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors.[20] Once construction is complete, Project operation will generate truck trips, which will generate additional exhaust emissions, thus continuing to expose nearby sensitive receptors to DPM emissions. The OEHHA document recommends that exposure from projects lasting more than 6 months should be evaluated for the duration of the project, and recommends that an exposure duration of 30 years be used to estimate individual cancer risk for the maximally exposed individual resident (MEIR).[21] Even though we were not provided with the expected lifetime of the Project, we can reasonably assume that the Project will operate for at least 30 years, if not more. Therefore, health risks from Project operation should have also been evaluated by the DSEIR, as a 30-year exposure duration vastly exceeds the 6-month requirements set forth by OEHHA. These recommendations reflect the most recent health risk policy, and as such, an updated assessment of health risks to nearby sensitive receptors from construction and operation should be included in a revised CEQA analysis for the Project.

In an effort to demonstrate the potential risk posed by Project construction and operation to nearby sensitive receptors, we prepared a simple screening-level health risk assessment. The results of our assessment, as described below, provides substantial evidence that the Project's operational and construction-related DPM emissions may result in a potentially significant health risk impact that was not previously identified.

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[19] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/hotspots2015.html

[20] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf, p. 8-18

[21] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf, p. 8-6, 8-15

As of 2011, the Environmental Protection Agency (EPA) recommends AERSCREEN as the leading air dispersion model, due to improvements in simulating local meteorological conditions based on simple input parameters.[22] The model replaced SCREEN3, and AERSCREEN is included in the OEHHA[23] and the California Air Pollution Control Officers Associated (CAPCOA)[24] guidance as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site-specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

We prepared a preliminary health risk screening assessment of the Project's construction and operational impact to sensitive receptors using the annual PM10 exhaust estimates from the updated CalEEMod model prepared by SWAPE, which is attached to this letter for reference. According to Appendix A of the DSEIR, the closest sensitive receptors to the Project site are located within 250 feet, or approximately 76 meters away from the Project site (Appendix A, p. 26). Consistent with recommendations set forth by OEHHA, we used a residential exposure duration of 30 years, starting from the infantile stage of life. We also assumed that construction and operation of the Project would occur in quick succession, with no gaps between each Project phase. The CalEEMod model's annual emissions indicate that construction activities will generate approximately 2,373 pounds of DPM "over a period of approximately 24 months beginning in April 2017, or an estimated 528 construction workdays (assuming an average of 22 construction days per month)" (Appendix C, p. 5). The AERSCREEN model relies on a continuous average emission rate to simulate maximum downward concentrations from point, area, and volume emission sources. To account for the variability in equipment usage and truck trips over Project construction we calculated an average DPM emission rate by the following equation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{2{,}373\ lbs}{528\ days} \times \frac{453.6\ grams}{lb} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.0236\ g/s}$$

Using this equation, we estimated a construction emission rate of 0.0236 grams per second (g/s). Subtracting the approximately 528-day construction duration from the total residential exposure duration of 30 years, we can reasonably assume that after Project construction, the MEIR would be exposed to the Project's operational DPM emissions for an additional 28.5 years.

The CalEEMod model's annual emissions indicate that operational activities will generate approximately 488 pounds of DPM per year over a 28.5-year operational period. Applying the same equation used to

[22] "AERSCREEN Released as the EPA Recommended Screening Model," USEPA, April 11, 2011, *available at:* http://www.epa.gov/ttn/scram/guidance/clarification/20110411_AERSCREEN_Release_Memo.pdf
[23] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf
[24] "Health Risk Assessments for Proposed Land Use Projects," CAPCOA, July 2009, *available at:* http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA_HRA_LU_Guidelines_8-6-09.pdf

estimate the construction DPM emission rate, we estimated the following emission rate for Project operation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{488\ lbs}{365\ days} \times \frac{453.6\ grams}{lb} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds} = \mathbf{0.00701\ g/s}$$

Using this equation, we estimated an operational emission rate of 0.00701 g/s. Construction and operational activity was simulated as a 1.74-acre rectangular area source in AERSCREEN, with dimensions of 87 meters by 81 meters. A release height of three meters was selected to represent the height of exhaust stacks on operational equipment and other heavy duty vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. A urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

The AERSCREEN model generated maximum reasonable estimates of single hour DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant be estimated by multiplying the single-hour concentration by 10%.[25] There are residences located approximately 76 meters away from the Project boundary. The single-hour concentration estimated by AERSCREEN for Project construction is approximately 49.40 µg/m^3 DPM at approximately 75 meters downwind. Multiplying this single-hour concentration by 10%, we get an annualized average concentration of 4.94 µg/m^3 for construction. For Project operation, the single-hour concentration in AERSCREEN is approximately 14.68 µg/m^3 DPM at approximately 75 meters downwind. Again, multiplying this single-hour concentration by 10%, we get an annualized average concentration of 1.47 µg/m^3 for operation.

We calculated the excess cancer risk for each sensitive receptor for infant receptors using applicable HRA methodologies prescribed by OEHHA. Consistent with the construction schedule proposed by the DSEIR, the annualized average concentration for construction was used for 1.45 years of the infantile stage of life (0-2 years). The annualized average concentration for operation was used for the remainder of the 30-year exposure period, which makes up the rest of the infantile stage of life (0-2 years), as well as the child (2 to 16 years) and adult stages of life (16 to 30 years). OEHHA recommends the use of Age Sensitivity Factors (ASFs) to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution.[26] According to the revised guidance, quantified cancer risk should be multiplied by a factor of ten during the first two years of life (infant) and should be multiplied by a factor of three during the child stage of life (2 to 16 years). Furthermore, in accordance with guidance set forth by OEHHA, we used 95th percentile breathing rates for infants.[27] We used a cancer potency

[25] http://www.epa.gov/ttn/scram/guidance/guide/EPA-454R-92-019_OCR.pdf
[26] "Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf
[27] "Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics 'Hot Spots' Information and Assessment Act," June 5, 2015, *available at:* http://www.aqmd.gov/docs/default-source/planning/risk-assessment/ab2588-risk-assessment-guidelines.pdf?sfvrsn=6, p. 19

factor of 1.1 (mg/kg-day)$^{-1}$ and an averaging time of 25,550 days. The results of our calculations are shown below.

The Maximum Exposed Individual at an Existing Residential Receptor (MEIR)					
Activity	**Duration (years)**	**Concentration (ug/m^3)**	**Breathing Rate (L/kg-day)**	**ASF**	**Cancer Risk**
Construction	1.45	4.94	1090	10	1.2E-03
Operation	0.55	1.47	1090	10	1.3E-04
Infant Exposure Duration	***2.00***			***Infant Exposure***	***1.3E-03***
Operation	14.00	1.47	572	3	5.3E-04
Child Exposure Duration	***14.00***			***Child Exposure***	***5.3E-04***
Operation	14.00	1.47	261	1	8.1E-05
Adult Exposure Duration	***14.00***			***Adult Exposure***	***8.1E-05***
Lifetime Exposure Duration	**30.00**			**Lifetime Exposure**	**1.92E-03**

The excess cancer risk to adults, children, and infants at a sensitive receptor located 75 meters away, over the course of Project construction and operation are 81, 530, and 1,300 in one million, respectively. Furthermore, the excess cancer risk over the course of a residential lifetime (30 years) is approximately 1,922 in one million. Consistent with OEHHA guidance, exposure was assumed to begin in the infantile stage of life to provide the most conservative estimates of air quality hazards. The infantile, child, adult, and lifetime cancer risks all exceed the BAAQMD threshold of 10 in one million.

It should be noted that our analysis represents a screening-level health risk assessment, which is known to be more conservative, and tends to err on the side of health protection.[28] The purpose of a screening-level health risk assessment, however, is to determine if a more refined health risk assessment needs to be conducted. If the results of a screening-level health risk are above applicable thresholds, then the Project needs to conduct a more refined health risk assessment that is more representative of site specific concentrations. Our screening-level health risk assessment demonstrates that construction and operation of the Project could result in a potentially significant health risk impact. As a result, a refined health risk assessment must be prepared to examine air quality impacts generated by Project construction and operation using site-specific meteorology and specific equipment usage schedules. An updated DSEIR must be prepared to adequately evaluate the Project's health risk impact, and should include additional mitigation measures to reduce these impacts to a less-than-significant level.

"Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments." OEHHA, February 2015, *available at:* http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf

[28] http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf p. 1-5

Additional Mitigation Measures Available to Reduce Construction Emissions

Our updated air quality analysis and health risk assessment demonstrates that, when Project activities are modeled correctly, construction-related DPM and NOx emissions would result in significant air quality and health risk impacts. Therefore, additional mitigation measures must be identified and incorporated in an updated DSEIR to reduce these emissions to a less than significant level.

Additional mitigation measures can be found in CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures,* which attempt to reduce Greenhouse Gas (GHG) levels, as well as reduce Criteria Air Pollutants such as particulate matter and NOx.[29] Diesel particulate matter ("DPM") and NOx are a byproduct of diesel fuel combustion, and are emitted by on-road vehicles and by off-road construction equipment. Mitigation for criteria pollutant emissions should include consideration of the following measures in an effort to reduce construction emissions.

Limit Construction Equipment Idling Beyond Regulation Requirements

Heavy duty vehicles will idle during loading/unloading and during layovers or rest periods with the engine still on, which requires fuel use and results in emissions. The California Air Resources Board (CARB) Heavy-Duty Vehicle Idling Emissions Reduction Program limits idling of diesel-fueled commercial motor vehicles to five minutes. Reduction in idling time beyond the five minutes required under the regulation would further reduce fuel consumption and thus emissions. The Project applicant must develop an enforceable mechanism that monitors the idling time to ensure compliance with this mitigation measure.

Require Implementation of Diesel Control Measures

The Northeast Diesel Collaborative (NEDC) is a regionally coordinated initiative to reduce diesel emissions, improve public health, and promote clean diesel technology. The NEDC recommends that contracts for all construction projects require the following diesel control measures: [30]

- All diesel onroad vehicles on site for more than 10 total days must have either (1) engines that meet EPA 2007 onroad emissions standards or (2) emission control technology verified by EPA[31] or the California Air Resources Board (CARB)[32] to reduce PM emissions by a minimum of 85 percent.
- All diesel generators on site for more than 10 total days must be equipped with emission control technology verified by EPA or CARB to reduce PM emissions by a minimum of 85 percent.
- All diesel nonroad construction equipment on site for more than 10 total days must have either (1) engines meeting EPA Tier 4 nonroad emission standards or (2) emission control technology verified by EPA or CARB for use with nonroad engines to reduce PM emissions by a minimum of

[29] http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
[30] Diesel Emission Controls in Construction Projects, *available at:* http://www2.epa.gov/sites/production/files/2015-09/documents/nedc-model-contract-sepcification.pdf
[31] For EPA's list of verified technology: http://www3.epa.gov/otaq/diesel/verification/verif-list.htm
[32] For CARB's list of verified technology: http://www.arb.ca.gov/diesel/verdev/vt/cvt.htm

85 percent for engines 50 horse power (hp) and greater and by a minimum of 20 percent for engines less than 50 hp.

- All diesel vehicles, construction equipment, and generators on site shall be fueled with ultra-low sulfur diesel fuel (ULSD) or a biodiesel blend[33] approved by the original engine manufacturer with sulfur content of 15 parts per million (ppm) or less.

Repower or Replace Older Construction Equipment Engines

The NEDC recognizes that availability of equipment that meets the EPA's newer standards is limited.[34] Due to this limitation, the NEDC proposes actions that can be taken to reduce emissions from existing equipment in the *Best Practices for Clean Diesel Construction* report.[35] These actions include but are not limited to:

- Repowering equipment (i.e. replacing older engines with newer, cleaner engines and leaving the body of the equipment intact).

Engine repower may be a cost-effective emissions reduction strategy when a vehicle or machine has a long useful life and the cost of the engine does not approach the cost of the entire vehicle or machine. Examples of good potential replacement candidates include marine vessels, locomotives, and large construction machines.[36] Older diesel vehicles or machines can be repowered with newer diesel engines or in some cases with engines that operate on alternative fuels (see section "Use Alternative Fuels for Construction Equipment" for details). The original engine is taken out of service and a new engine with reduced emission characteristics is installed. Significant emission reductions can be achieved, depending on the newer engine and the vehicle or machine's ability to accept a more modern engine and emission control system. It should be noted, however, that newer engines or higher tier engines are not necessarily cleaner engines, so it is important that the Project Applicant check the actual emission standard level of the current (existing) and new engines to ensure the repower product is reducing emissions for DPM.[37]

- Replacement of older equipment with equipment meeting the latest emission standards.

Engine replacement can include substituting a cleaner highway engine for a nonroad engine. Diesel equipment may also be replaced with other technologies or fuels. Examples include hybrid switcher locomotives, electric cranes, LNG, CNG, LPG or propane yard tractors, forklifts or loaders.

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[33] Biodiesel lends are only to be used in conjunction with the technologies which have been verified for use with biodiesel blends and are subject to the following requirements: http://www.arb.ca.gov/diesel/verdev/reg/biodieselcompliance.pdf

[34] http://northeastdiesel.org/pdf/BestPractices4CleanDieselConstructionAug2012.pdf

[35] http://northeastdiesel.org/pdf/BestPractices4CleanDieselConstructionAug2012.pdf

[36] Repair, Rebuild, and Repower, EPA, *available at:* https://www.epa.gov/verified-diesel-tech/learn-about-verified-technologies-clean-diesel#repair

[37] Diesel Emissions Reduction Program (DERA): Technologies, Fleets and Projects Information, *available at:* http://www2.epa.gov/sites/production/files/2015-09/documents/420p11001.pdf

Replacements using natural gas may require changes to fueling infrastructure.[38] Replacements often require some re-engineering work due to differences in size and configuration. Typically, there are benefits in fuel efficiency, reliability, warranty, and maintenance costs.[39]

Install Retrofit Devices on Existing Construction Equipment

PM emissions from alternatively-fueled construction equipment can be further reduced by installing retrofit devices on existing and/or new equipment. The most common retrofit technologies are retrofit devices for engine exhaust after-treatment. These devices are installed in the exhaust system to reduce emissions and should not impact engine or vehicle operation. [40] Below is a table, prepared by the EPA, that summarizes the commonly used retrofit technologies and the typical cost and emission reductions associated with each technology.[41] It should be noted that actual emissions reductions and costs will depend on specific manufacturers, technologies and applications.

Technology	Typical Emissions Reductions (percent)				Typical Costs ($)
	PM	NOx	HC	CO	
Diesel Oxidation Catalyst (DOC)	20-40	-	40-70	40-60	Material: $600-$4,000 Installation: 1-3 hours
Diesel Particulate Filter (DPF)	85-95	-	85-95	50-90	Material: $8,000-$50,000 Installation: 6-8 hours
Partial Diesel Particulate Filter (pDPF)	up to 60	-	40-75	10-60	Material: $4,000-$6,000 Installation: 6-8 hours
Selective Catalyst Reduction (SCR)	-	up to 75	-	-	$10,000-$20,000; Urea $0.80/gal
Closed Crankcase Ventilation (CCV)	varies	-	-	-	-
Exhaust Gas Recirculation (EGR)	-	25-40	-	-	-
Lean NOx Catalyst (LNC)	-	5-40	-	-	$6,500-$10,000

Use Electric and Hybrid Construction Equipment

CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures*[42] report also proposes the use of electric and/or hybrid construction equipment as a way to mitigate DPM emissions. When construction equipment is powered by grid electricity rather than fossil fuel, direct emissions from fuel combustion

[38] Alternative Fuel Conversion, EPA, *available at:* https://www3.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm#fact

[39] Cleaner Fuels, EPA, *available at:*https://www.epa.gov/verified-diesel-tech/learn-about-verified-technologies-clean-diesel#cleaner

[40] Retrofit Technologies, EPA, *available at:*https://www.epa.gov/verified-diesel-tech/learn-about-verified-technologies-clean-diesel#retrofit

[41] Cleaner Diesels: Low Cost Ways to Reduce Emissions from Construction Equipment, March 2007, *available at:*https://www.epa.gov/sites/production/files/2015-09/documents/cleaner-diesels-low-cost-ways-to-reduce-emissions-from-construction-equipment.pdf, p. 26

[42]http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

are replaced with indirect emissions associated with the electricity used to power the equipment. Furthermore, when construction equipment is powered by hybrid-electric drives, emissions from fuel combustion are also greatly reduced. Electric construction equipment is available commercially from companies such as Peterson Pacific Corporation,[43] which specialize in the mechanical processing equipment like grinders and shredders. Construction equipment powered by hybrid-electric drives is also commercially available from companies such as Caterpillar[44]. For example, Caterpillar reports that during an 8-hour shift, its D7E hybrid dozer burns 19.5 percent fewer gallons of fuel than a conventional dozer while achieving a 10.3 percent increase in productivity. The D7E model burns 6.2 gallons per hour compared to a conventional dozer which burns 7.7 gallons per hour.[45] Fuel usage and savings are dependent on the make and model of the construction equipment used. The Project Applicant should calculate project-specific savings and provide manufacturer specifications indicating fuel burned per hour.

Implement a Construction Vehicle Inventory Tracking System

CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures*[46] report recommends that the Project Applicant provide a detailed plan that discusses a construction vehicle inventory tracking system to ensure compliances with construction mitigation measures. The system should include strategies such as requiring engine run time meters on equipment, documenting the serial number, horsepower, manufacture age, fuel, etc. of all onsite equipment and daily logging of the operating hours of the equipment. Specifically, for each onroad construction vehicle, nonroad construction equipment, or generator, the contractor should submit to the developer's representative a report prior to bringing said equipment on site that includes:[47]

- Equipment type, equipment manufacturer, equipment serial number, engine manufacturer, engine model year, engine certification (Tier rating), horsepower, and engine serial number.
- The type of emission control technology installed, serial number, make, model, manufacturer, and EPA/CARB verification number/level.
- The Certification Statement[48] signed and printed on the contractor's letterhead.

Furthermore, the contractor should submit to the developer's representative a monthly report that, for each onroad construction vehicle, nonroad construction equipment, or generator onsite, includes: [49]

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[43] Peterson Electric Grinders Brochure, *available at:*http://www.petersoncorp.com/wp-content/uploads/peterson_electric_grinders1.pdf

[44] Electric Power Products, *available at:*http://www.cat.com/en_US/products/new/power-systems/electric-power-generation.html

[45]http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

[46]http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

[47] Diesel Emission Controls in Construction Projects, *available at:*http://www2.epa.gov/sites/production/files/2015-09/documents/nedc-model-contract-sepcification.pdf

[48] Diesel Emission Controls in Construction Projects, *available at:*http://www2.epa.gov/sites/production/files/2015-09/documents/nedc-model-contract-sepcification.pdf The NEDC Model Certification Statement can be found in Appendix A.

[49] Diesel Emission Controls in Construction Projects, *available at:*http://www2.epa.gov/sites/production/files/2015-09/documents/nedc-model-contract-sepcification.pdf

- Hour-meter readings on arrival on-site, the first and last day of every month, and on off-site date.
- Any problems with the equipment or emission controls.
- Certified copies of fuel deliveries for the time period that identify:
    - Source of supply
    - Quantity of fuel
    - Quality of fuel, including sulfur content (percent by weight).

In addition to these measures, we also recommend that the Applicant implement the following mitigation measures, called "Enhanced Exhaust Control Practices,"[50] that are recommended by the Sacramento Metropolitan Air Quality Management District (SMAQMD):

1. The project representative shall submit to the lead agency a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the construction project.
    - The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment.
    - The project representative shall provide the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman.
    - This information shall be submitted at least 4 business days prior to the use of subject heavy-duty off-road equipment.
    - The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.
2. The project representative shall provide a plan for approval by the lead agency demonstrating that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NOX reduction and 45% particulate reduction compared to the most recent California Air Resources Board (ARB) fleet average.
    - This plan shall be submitted in conjunction with the equipment inventory.
    - Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.
    - The District's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction.
3. The project representative shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40% opacity for more than three minutes in any one hour.

[50] http://www.airquality.org/ceqa/Ch3EnhancedExhaustControl_10-2013.pdf

- Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. Non-compliant equipment will be documented and a summary provided to the lead agency monthly.
- A visual survey of all in-operation equipment shall be made at least weekly.
- A monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey.

4. The District and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this mitigation shall supersede other District, state or federal rules or regulations.

These measures are more stringent and prescriptive than those measures identified in the DSEIR. When combined, the measures that we recommend in these comments offer a cost-effective, feasible way to incorporate lower-emitting equipment into the Project's construction fleet, which subsequently reduces NOx, PM and DPM emissions released during Project construction. An updated DSEIR must be prepared to include additional mitigation measures, as well as include an updated air quality assessment to ensure that the necessary mitigation measures are implemented to reduce construction emissions. Furthermore, the Project Applicant needs to demonstrate commitment to the implementation of these measures prior to Project approval to ensure that the Project's construction-related emissions are reduced to the maximum extent possible.

Greenhouse Gas

Failure to Adequately Assess the Project's Greenhouse Gas Impacts

The DSEIR concludes that the Project's greenhouse gas (GHG) impacts would be less than significant, yet fails to provide proper justification to support this claim. As a result, the Project's GHG impacts are inadequately addressed. Until an updated analysis is conducted that correctly and thoroughly assesses the Project's GHG impacts, the conclusions made within the DSEIR and associated appendices should not be relied upon to determine Project significance.

The DSEIR fails to prepare an updated analysis to determine the GHG impact that Project construction and operation may have. Rather, the DSEIR relies upon the GHG analysis prepared within the Initial Study, which is included as Appendix A of the DSEIR, to determine Project significance. Appendix A concludes that the Project's GHG impact resulting from Project construction and operation would be less than significant, yet fails to compare the Project's GHG emissions to applicable thresholds. Appendix A attempts to justify how this significance determination was made, stating,

> "The proposed mixed-use development would result in temporary increases in GHG emissions associated with construction activities including operation of construction equipment and emissions from construction workers' personal vehicles traveling to and from the project site. Construction related GHG emissions vary depending on the level of activity, length of the construction period, specific construction operations, types of equipment, and number of

> personnel. Because construction would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32…Since the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy. Projects that are consistent with the GHG Reduction Strategy (such as the proposed project) would have a less than significant impact related to GHG emissions" (Appendix A, p. 59).

As you can see in the excerpt above, the DSEIR concludes that "because construction would be temporary and would not result in a permanent increase in emissions, the project would not interfere with the implementation of AB 32" (Appendix A, p. 59). Similarly, Appendix A concludes that Project operation "would have a less than significant impact related to GHG emissions" because "the project is consistent with the General Plan land use designation for the site and the land use assumptions of the GHG Reduction Strategy, compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy" and "projects that are consistent with the GHG Reduction Strategy would have a less than significant impact related to GHG emissions" (Appendix A, p. 59). This conclusion, as well as the justification provided in Appendix A of the DSEIR, however, are incorrect and inadequate for several reasons.

First, while the DSEIR states that the Project is consistent with the City's GHG Reduction Strategy and General Plan, the DSEIR fails to demonstrate compliance with all of the applicable Voluntary and Mandatory Criteria disclosed in the GHG Reduction Strategy. According to the City of San Jose, "Applicants can complete the 'Evaluation of Project Compliance with the City of San Jose Greenhouse Gas Reduction Strategy' worksheet to demonstrate conformance to the Greenhouse Gas Reduction Strategy".[51] While the Appendix A of the DSEIR demonstrates compliance with three of the applicable Mandatory Criteria included in the Evaluation of Project Compliance document, it fails to demonstrate compliance with the fourth Mandatory applicable criterion, and fails to demonstrate compliance with any of the Voluntary measures. As stated in the DSEIR, "compliance with the mandatory measures and voluntary measures required by the City would ensure its consistency with the City's GHG Reduction Strategy" (Appendix A, p. 59). Therefore, by not fully implementing all applicable Voluntary and Mandatory Criteria set forth in the GHG Reduction Strategy, the DSEIR cannot claim that it is consistent with the City's GHG Reduction Strategy, and thus, cannot claim that the Project would have a less than significant GHG impact.

Second, while a lead agency enjoys substantial discretion in its choice of methodology to determine Project significance, when the agency chooses to rely completely on a single method to justify a no-significance finding, CEQA demands the agency research and document the parameters essential to that method. According to Section 15064.4(b) of the CEQA Guidelines, a lead agency may consider the use of

[51] "Greenhouse Gas Reduction Strategy." *City of San Jose, available at:* http://www.sanjoseca.gov/index.aspx?NID=3687

a qualitative analysis that relies upon consistency with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions when assessing the significance of impacts from greenhouse gas emissions on the environment; however, such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions.[52] The DSEIR fails to provide substantial evidence to support the use of compliance with the City of San Jose's General Plan and GHG Reduction Strategy to determine Project significance, and as a result, the validity of this method is called into question. The BAAQMD's recommended GHG significance thresholds (as discussed below), on the other hand, have undergone a public review process as part of stakeholder working group meetings that are open to the public, and the BAAQMD's Guidance document provides the substantial evidence relative to the methodology for developing the interim GHG significance thresholds, consistent with requirements set forth by CEQA.[53] Therefore, reliance on the BAAQMD's quantitative thresholds, rather than the methods used in the DSEIR, should be considered, as the DSEIR's current method of evaluating the Project's GHG impact is flawed.

Finally, the use of the DSEIR's method as a significance threshold has not been established by any public or regulatory agency, so there is no way of determining whether compliance with this very limited list of regulations would allow the Project to remain consistent with the statewide goals set forth by AB 32. It's not enough to simply state that since the Project's emissions would be less than significant because it complies with these regulations. Rather, a thorough analysis where the lead agency researches and documents the parameters essential to that method must be conducted to determine the adequacy of this threshold, and it must be demonstrated by substantial evidence that compliance with this method would indeed result in a less than significant GHG impact and would not conflict with applicable regulations, plans, and policies set to reduce GHG emissions. By failing to provide substantial evidence to support the use of the DSEIR's threshold, the Project's GHG impact is inadequately addressed.

Updated Analysis Demonstrates Significant Greenhouse Gas Impact

In an effort to determine whether or not compliance with the City's GHG Reduction Strategy and General Plan would result in a less than significant impact, we conducted a simple analysis using the emission estimates provided in the DSEIR and the BAAQMD's Air Quality Guidelines. As stated in the City's GHG Reduction Strategy, the BAAQMD Air Quality Guidelines are intended to serve as a guide for those who prepare or evaluate air quality impact analyses for projects (Project-level) and plans (Plan-level) in the San Francisco Bay Area.[54] The Guidelines include information on legal requirements, BAAQMD rules, plans and procedures, methods of analyzing air quality impacts, thresholds of significance, mitigation measures, and background air quality information. In June 2010, the Air District's Board of Directors set forth new CEQA thresholds of significance and updated their CEQA Guidelines.

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[52] http://resources.ca.gov/ceqa/docs/FINAL_Text_of_Proposed_Amendemts.pdf

[53] Air Quality Guidelines, BAAQMD, June 2010, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en

[54] "Greenhouse Gas Reduction Strategy." City of San Jose*, available at:* http://www.sanjoseca.gov/documentcenter/view/9388, p. 12

According to the BAAQMD's updated Guidelines, it is recommended that the proposed Project quantify the Project's indirect and direct GHG emissions, and compare these emissions to the BAAQMD's screening threshold of 1,100 metric tons per year of carbon dioxide equivalents (MT CO_2e/year).[55] If a Project would generate GHG emissions greater than 1,100 MT CO_2e/year, it would make a cumulatively considerable contribution to greenhouse gas emissions and result in a cumulatively significant impact to global climate change. Consistent with BAAQMD Guidelines, in order to adequately determine the Project's GHG impact, we quantified the Project's construction and operational GHG emissions and compared the emissions to the BAAQMD recommended thresholds of 1,100 MT CO_2e/year. When the Project's GHG emissions are quantified and compared to these thresholds, we find that the Project could have a potentially significant impact on global climate change (see table below).

Estimated Annual Greenhouse Gas Emissions	
Emission Source	**Proposed Project (MT CO_2E)**
Construction (Amortized)	162
On-Road Mobile	3,772
Area	44
Electricity	1,243
Natural Gas	277
Water and Wastewater	182
Solid Waste	174
Total	**5,855**
BAAQMD Significance Threshold	**1,100**
Exceed?	***Yes***

The Project's total GHG emissions were estimated using CalEEMod, where construction emissions were amortized over 30 years then added to the Project's operational emissions. When correct input parameters are used, the Project's total GHG emissions clearly exceed the BAAQMD threshold of 1,100 MT CO_2e/year, thus resulting in a significant impact not previously assessed or identified in the DSEIR. As a result, an updated DSEIR should be prepared that includes an updated CalEEMod model with a more accurate assessment of the Project's construction-related criteria air pollutants and total GHG emissions, and additional mitigation should be identified to reduce the Project's air quality and GHG impacts to a less-than-significant level.

Additional Mitigation Measures Available to Reduce Greenhouse Gas Emissions

We identified several additional mitigation measures that the DSEIR failed to incorporate, which would further reduce the Project's operational GHG emissions. It should be noted that some of these

[55] Air Quality Guidelines, BAAQMD, June 2010, *available at:* http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/draft_baaqmd_ceqa_guidelines_may_2010_final.pdf?la=en, p. 2-2

mitigation measures would also reduce the Project's operational DPM emissions, which we found to be significant, as discussed in the sections above. Therefore, these measures should also be considered when mitigating the Project's operational DPM emissions. Additional mitigation measures that could be implemented to reduce GHG emissions include, but are not limited to, the following: [56]

- Use passive solar design, such as: [57,58]
    - Orient buildings and incorporate landscaping to maximize passive solar; heating during cool seasons, and minimize solar heat gain during hot seasons; and
    - Enhance natural ventilation by taking advantage of prevailing winds.
- Reduce unnecessary outdoor lighting by utilizing design features such as limiting the hours of operation of outdoor lighting.
- Develop and follow a "green streets guide" that requires:
    - Use of minimal amounts of concrete and asphalt;
    - Installation of permeable pavement to allow for storm water infiltration; and
    - Use of groundcovers rather than pavement to reduce heat reflection.[59]
- Implement Project design features such as:
    - Shade HVAC equipment from direct sunlight;
    - Install high-albedo white thermoplastic polyolefin roof membrane;
    - Install high-efficiency HVAC with hot-gas reheat;
    - Install formaldehyde-free insulation; and
    - Use recycled-content gypsum board.
- Provide education on energy efficiency to residents, customers, and/or tenants. Provide information on energy management services for large energy users.
- Meet "reach" goals for building energy efficiency and renewable energy use.
- Install solar, wind, and geothermal power systems and solar hot water heaters.
- Maximize use of solar energy including solar panels; installing the maximum possible number of solar energy arrays on all building roofs and/or on the Project site to generate solar energy for the facility.
- Include energy storage where appropriate to optimize renewable energy generation systems and avoid peak energy use.
- Plant low-VOC emitting shade trees, e.g., in parking lots to reduce evaporative emissions from parked vehicles.
- Use CARB-certified or electric landscaping equipment in project and tenant operations; and introduce electric lawn, and garden equipment exchange program.

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[56] http://ag.ca.gov/globalwarming/pdf/GW_mitigation_measures.pdf

[57] Santa Barbara Air Pollution Control District, Scope and Content of Air Quality Sections in Environmental Documents, September 1997.

[58] Butte County Air Quality Management District, Indirect Source Review Guidelines, March 1997.

[59] *See* Irvine Sustainable Travelways "Green Street" Guidelines; www.ci.irvine.ca.us/civica/filebank/blobdload.asp?BlobID=8934; and Cool Houston Plan; www.harc.edu/Projects/CoolHouston.

- Install an infiltration ditch to provide an opportunity for 100% of the storm water to infiltrate on-site.

In addition to the measures discussed above, the SCAQMD has previously recommended additional mitigation measures for operational NO_x emissions that result primarily from truck activity emissions for industrial and commercial projects. Since the Project includes the development of 20,000 square feet of ground floor retail, these measures would also effectively reduce the operational GHG emissions generated by the proposed commercial uses. Measures recommended for the Waterman Logistic Center that are also applicable for this Project's commercial land uses include[60]:

- Provide electric vehicle charging stations that are accessible for trucks.
- Provide electrical hookups at the onsite loading docks and at the truck stops for truckers to plug in any onboard auxiliary equipment
- Require the proposed warehouse to be constructed with the appropriate infrastructure to facilitate sufficient electric charging for trucks to plug-in.
- Provide minimum buffer zone of 300 meters (approximately 1,000 feet) between truck traffic and sensitive receptors.
- Limit the daily number of trucks allowed at the facility to levels analyzed in the DSEIR and associated appendices. If higher daily truck volumes are anticipated to visit the site, the Lead Agency should commit to re-evaluating the project through CEQA prior to allowing this higher activity level.
- Design the site such that any check-in point for trucks is well inside the facility to ensure that there are no trucks queuing outside of the facility.
- On-site equipment should be alternative fueled.
- Provide food options, fueling, truck repair and or convenience stores on-site to minimize the need for trucks to travel through residential neighborhoods.
- Improve traffic flow by signal synchronization.
- Have truck routes clearly marked with trailblazer signs, so that trucks will not enter residential areas.
- Should the proposed Project generate significant emissions, the Lead Agency should require mitigation that requires accelerated phase-in for non-diesel powered trucks. For example, natural gas trucks, including Class 8 HHD trucks, are commercially available today. Natural gas trucks can provide a substantial reduction in emissions, and may be more financially feasible today due to reduced fuel costs compared to diesel. In the Final CEQA document, the Lead Agency should require a phase-in schedule for these cleaner operating trucks to reduce project impacts.

When combined, these measures offer a cost-effective, feasible way to incorporate lower-emitting design features into the proposed Project, which subsequently, reduces GHG emissions released during

[60] SCAQMD Comment Letter in Response to MND for the Waterman Logistic Center, January 2018, *available at:* http://www.aqmd.gov/docs/default-source/ceqa/comment-letters/2015/january/mndwaterman.pdf

Project operation. An updated DSEIR must be prepared to include additional mitigation measures, as well as include an updated greenhouse gas analysis to ensure that the necessary mitigation measures are implemented to reduce operational emissions. Furthermore, the Project Applicant needs to demonstrate commitment to the implementation of these measures prior to Project approval, to ensure that the Project's operational emissions are reduced to the maximum extent possible.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Jessie Jaeger

```
Start date and time  02/06/17 16:19:49

                            AERSCREEN 15181


Greyhound Construction Final


            Greyhound Construction Final



         -----------------  DATA ENTRY VALIDATION  -----------------

                       METRIC              ENGLISH

 ** AREADATA **  ---------------     ----------------


 Emission Rate:       0.0236 g/s             0.187 lb/hr

 Area Height:           3.00 meters           9.84 feet

 Area Source Length:   87.17 meters         285.99 feet

 Area Source Width:    80.58 meters         264.37 feet

 Vertical Dimension:    1.50 meters           4.92 feet

 Model Mode:           URBAN

 Population:          998537

 Dist to Ambient Air:           1.0 meters             3. feet



 ** BUILDING DATA **
```

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

```
 Minimum Wind Speed:     0.5 m/s


 Anemometer Height:   10.000 meters


 Dominant Surface Profile: Urban

 Dominant Climate Type:    Average Moisture


DEBUG OPTION ON





 AERSCREEN output file:

 Greyhound_Construction_FINAL.out



 *** AERSCREEN Run is Ready to Begin





 No terrain used, AERMAP will not be run

**************************************************


SURFACE CHARACTERISTICS & MAKEMET
```

```
Obtaining surface characteristics...


Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season             Albedo     Bo       zo

Winter              0.35     1.50     1.000

Spring              0.14     1.00     1.000

Summer              0.16     2.00     1.000

Autumn              0.18     2.00     1.000


Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl


Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl


Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl


Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl


Buildings and/or terrain present or rectangular area source, skipping probe


FLOWSECTOR   started 02/06/17 16:21:18

 ******************************************


  Running AERMOD

 Processing Winter
```

```
Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *******************************************


  Running AERMOD

 Processing Spring


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector  10

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  45

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
 ******************************************


  Running AERMOD

 Processing Summer


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *******************************************


  Running AERMOD

 Processing Autumn


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


FLOWSECTOR   ended 02/06/17 16:21:36


REFINE       started 02/06/17 16:21:36


 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


REFINE       ended 02/06/17 16:21:37


 ***********************************************

 AERSCREEN Finished Successfully

 With no errors or warnings

 Check log file for details

 ************************************************


 Ending date and time  02/06/17 16:21:39
```

Concentration	Distance	Elevation	Diag	Season/Month	Zo	sector	Date	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	HT	REF TA	HT
0.54013E+02	1.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.66513E+02	25.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
* 0.76327E+02	50.00	0.00	30.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.49395E+02	75.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.30886E+02	100.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.22545E+02	125.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.17630E+02	150.00	0.00	35.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.14361E+02	175.00	0.00	35.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.12034E+02	200.00	0.00	30.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.10295E+02	225.00	0.00	25.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.89548E+01	250.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.78859E+01	275.00	0.00	5.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.70221E+01	300.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.63080E+01	325.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.57108E+01	350.00	0.00	20.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.52058E+01	375.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.47726E+01	400.00	0.00	5.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.43987E+01	425.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.40719E+01	450.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.37865E+01	475.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.35329E+01	500.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.33073E+01	525.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.31045E+01	550.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.29234E+01	575.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.27593E+01	600.00	0.00	15.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.26101E+01	625.00	0.00	25.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0								

```
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.24746E+01     649.99     0.00  10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.23509E+01     675.00     0.00   5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.22379E+01     700.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.21342E+01     725.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.20381E+01     750.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.19493E+01     775.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.18666E+01     800.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.17899E+01     825.00     0.00   5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.17187E+01     850.00     0.00  10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.16526E+01     875.01     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.15906E+01     900.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.15323E+01     925.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.14777E+01     950.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.14263E+01     975.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.13779E+01    1000.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.13323E+01    1025.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.12891E+01    1050.00     0.00  15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.12485E+01    1075.00     0.00  10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.12100E+01    1100.00     0.00  10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.11735E+01    1125.00     0.00  10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.11389E+01    1150.00     0.00   5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.11061E+01    1175.00     0.00   5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.10749E+01    1200.00     0.00   5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.10452E+01    1225.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.10170E+01    1250.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.99003E+00    1275.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.96432E+00    1300.00     0.00   0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
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1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.93965E+00     1325.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.91603E+00     1350.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.89332E+00     1375.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.87633E+00     1400.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.85532E+00     1425.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.83517E+00     1450.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.81584E+00     1475.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.79726E+00     1500.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.77942E+00     1525.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.76225E+00     1550.00     0.00  5.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.74570E+00     1575.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.72978E+00     1600.00     0.00  5.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.71443E+00     1625.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.69963E+00     1650.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.68535E+00     1675.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.67157E+00     1700.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.65827E+00     1725.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.64541E+00     1750.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.63298E+00     1775.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.62096E+00     1800.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.60934E+00     1824.99     0.00 15.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.59808E+00     1850.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.58718E+00     1875.00     0.00 10.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.57662E+00     1899.99     0.00 25.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.56638E+00     1924.99     0.00  5.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.55645E+00     1950.00     0.00  0.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.54682E+00     1975.00     0.00  5.0      Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
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1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.53748E+00 2000.00 0.00 35.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.52841E+00 2025.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51960E+00 2050.00 0.00 30.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51104E+00 2075.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.50272E+00 2100.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.49464E+00 2124.99 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.48678E+00 2150.00 0.00 30.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47913E+00 2175.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47168E+00 2200.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.46444E+00 2225.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.45739E+00 2250.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.45051E+00 2275.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.44382E+00 2300.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.43730E+00 2325.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.43094E+00 2350.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.42474E+00 2375.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.41869E+00 2399.99 0.00 35.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.41279E+00 2425.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.40703E+00 2449.99 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.40141E+00 2475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.39592E+00 2500.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.39057E+00 2525.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.38533E+00 2550.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.38022E+00 2575.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.37522E+00 2600.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.37034E+00 2625.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.36556E+00 2650.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.36089E+00 2675.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.35632E+00 2700.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.35186E+00 2725.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.34748E+00 2750.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.34320E+00 2775.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.33902E+00 2800.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.33491E+00 2825.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.33090E+00 2849.99 0.00 45.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.32697E+00 2875.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.32311E+00 2900.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.31934E+00 2925.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.31564E+00 2950.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.31201E+00 2975.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.30846E+00 2999.99 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.30498E+00 3025.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.30156E+00 3050.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.29821E+00 3075.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.29492E+00 3100.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.29169E+00 3125.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.28853E+00 3150.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.28543E+00 3174.99 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.28238E+00 3200.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27939E+00 3225.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27645E+00 3250.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27356E+00 3275.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27073E+00 3300.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.26795E+00 3325.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.26522E+00 3350.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.26253E+00 3375.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.25989E+00 3400.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.25730E+00 3425.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.25475E+00 3450.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.25225E+00 3475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24978E+00 3500.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24736E+00 3525.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24498E+00 3550.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24264E+00 3575.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24034E+00 3600.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23807E+00 3625.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23584E+00 3650.00 0.00 40.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23365E+00 3675.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23149E+00 3700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22937E+00 3725.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22728E+00 3750.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22522E+00 3775.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22320E+00 3800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22120E+00 3825.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21924E+00 3850.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21731E+00 3875.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21540E+00 3900.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21353E+00 3925.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21168E+00 3950.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20986E+00 3975.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20807E+00 4000.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20630E+00 4025.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20456E+00 4050.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20285E+00 4075.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20116E+00 4100.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19949E+00 4125.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19785E+00 4149.99 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19623E+00 4175.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19463E+00 4200.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19306E+00 4225.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19150E+00 4250.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18997E+00 4275.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18846E+00 4300.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18698E+00 4325.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18551E+00 4350.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18406E+00 4375.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18263E+00 4400.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18122E+00 4425.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17983E+00 4450.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17845E+00 4475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17710E+00 4500.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17576E+00 4525.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17444E+00 4550.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17314E+00 4575.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17185E+00 4600.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17058E+00 4625.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16933E+00 4650.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16809E+00 4675.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16687E+00 4700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16566E+00 4725.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16447E+00 4750.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16330E+00 4775.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16213E+00 4800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16098E+00 4825.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15985E+00 4850.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15873E+00 4875.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15762E+00 4900.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15653E+00 4925.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15545E+00 4950.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15438E+00 4975.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15333E+00 5000.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0

Greyhound_OPERATIONAL

Start date and time 02/06/17 16:06:36

AERSCREEN 15181

Greyhound OPERATION

Greyhound OPERATION

---------- DATA ENTRY VALIDATION ----------

	METRIC	ENGLISH
** AREADATA **	----------	----------
Emission Rate:	0.701E-02 g/s	0.557E-01 lb/hr
Area Height:	3.00 meters	9.84 feet
Area Source Length:	87.17 meters	285.99 feet
Area Source Width:	80.58 meters	264.37 feet
Vertical Dimension:	1.50 meters	4.92 feet
Model Mode:	URBAN	
Population:	998537	
Dist to Ambient Air:	1.0 meters	3. feet

** BUILDING DATA **

No Building Downwash Parameters

** TERRAIN DATA **

No Terrain Elevations

Source Base Elevation: 0.0 meters 0.0 feet

Probe distance: 5000. meters 16404. feet

No flagpole receptors

No discrete receptors used

** FUMIGATION DATA **

No fumigation requested

** METEOROLOGY DATA **

Min/Max Temperature: 250.0 / 310.0 K -9.7 / 98.3 Deg F

```
 Minimum Wind Speed:     0.5 m/s


 Anemometer Height:   10.000 meters


 Dominant Surface Profile: Urban

 Dominant Climate Type:    Average Moisture


DEBUG OPTION ON





 AERSCREEN output file:

 Greyhound_OPERATIONAL.out




 *** AERSCREEN Run is Ready to Begin




 No terrain used, AERMAP will not be run

**************************************************


SURFACE CHARACTERISTICS & MAKEMET
```

Obtaining surface characteristics...

Using AERMET seasonal surface characteristics for Urban with Average Moisture

Season	Albedo	Bo	zo
Winter	0.35	1.50	1.000
Spring	0.14	1.00	1.000
Summer	0.16	2.00	1.000
Autumn	0.18	2.00	1.000

Creating met files aerscreen_01_01.sfc & aerscreen_01_01.pfl

Creating met files aerscreen_02_01.sfc & aerscreen_02_01.pfl

Creating met files aerscreen_03_01.sfc & aerscreen_03_01.pfl

Creating met files aerscreen_04_01.sfc & aerscreen_04_01.pfl

Buildings and/or terrain present or rectangular area source, skipping probe

FLOWSECTOR started 02/06/17 16:07:57

****

Running AERMOD

Processing Winter

```
Processing surface roughness sector  1

****************************************************
Processing wind flow sector   1

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   0

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  10
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  25
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  40
```

```
    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Winter sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *****************************************


  Running AERMOD

 Processing Spring


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   2

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector   5

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   3

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  10

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   4

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  15

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   5

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  20

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   6

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  25

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   7

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  30

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
****************************************************
Processing wind flow sector   8

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  35

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector   9

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  40

    ********   WARNING MESSAGES   ********
               ***  NONE  ***

****************************************************
Processing wind flow sector  10

 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Spring sector  45

    ********   WARNING MESSAGES   ********
               ***  NONE  ***
```

```
 *******************************************


  Running AERMOD

 Processing Summer


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************
```

```
Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  40


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Summer sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***

 *******************************************


  Running AERMOD

 Processing Autumn


Processing surface roughness sector  1


****************************************************

Processing wind flow sector   1
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   2


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector   5


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   3


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  10


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   4
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  15


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   5


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  20


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   6


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  25


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   7
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  30


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   8


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  35


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector   9


 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  40


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


****************************************************

Processing wind flow sector  10
```

```
 AERMOD Finishes Successfully for FLOWSECTOR stage 2 Autumn sector  45


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


FLOWSECTOR   ended 02/06/17 16:08:15


REFINE       started 02/06/17 16:08:15


 AERMOD Finishes Successfully for REFINE stage 3 Winter sector   0


    ********   WARNING MESSAGES   ********

               ***  NONE  ***


REFINE       ended 02/06/17 16:08:16


 ***********************************************

 AERSCREEN Finished Successfully

 With no errors or warnings

 Check log file for details

 ************************************************


 Ending date and time  02/06/17 16:08:19
```

Concentration	Distance	Elevation	Diag	Season/Month	Zo	sector	Date	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	HT	REF TA	HT
0.16056E+02	1.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.19772E+02	25.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
* 0.22689E+02	50.00	0.00	30.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.14683E+02	75.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.91811E+01	100.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.67017E+01	125.00	0.00	40.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.52408E+01	150.00	0.00	35.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.42689E+01	175.00	0.00	35.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.35771E+01	200.00	0.00	30.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.30604E+01	225.00	0.00	25.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.26619E+01	250.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.23442E+01	275.00	0.00	5.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.20874E+01	300.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.18751E+01	325.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.16976E+01	350.00	0.00	20.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.15475E+01	375.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.14187E+01	400.00	0.00	5.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.13076E+01	425.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.12104E+01	450.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.11256E+01	475.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.10502E+01	500.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.98314E+00	525.00	0.00	0.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.92284E+00	550.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.86900E+00	575.00	0.00	10.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.82024E+00	600.00	0.00	15.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0	1.000	1.50	0.35	0.50	10.0	310.0	2.0	
0.77587E+00	625.00	0.00	25.0	Winter	0-360	10011001	-1.30	0.043	-9.000	0.020	-999.	21.	6.0								

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.73559E+00 649.99 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.69884E+00 675.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.66525E+00 700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.63441E+00 725.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.60585E+00 750.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.57945E+00 775.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.55485E+00 800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.53208E+00 825.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51091E+00 850.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.49124E+00 875.01 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47282E+00 900.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.45551E+00 925.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.43926E+00 950.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.42398E+00 975.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.40960E+00 1000.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.39603E+00 1025.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.38321E+00 1050.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.37112E+00 1075.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.35968E+00 1100.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.34884E+00 1125.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.33854E+00 1150.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.32880E+00 1175.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.31953E+00 1200.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.31070E+00 1225.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.30231E+00 1250.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.29430E+00 1275.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.28665E+00 1300.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27932E+00 1325.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.27230E+00 1350.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.26555E+00 1375.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.26050E+00 1400.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.25425E+00 1425.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24826E+00 1450.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.24252E+00 1475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23699E+00 1500.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.23169E+00 1525.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22659E+00 1550.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.22167E+00 1575.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21693E+00 1600.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.21237E+00 1625.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20797E+00 1650.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.20373E+00 1675.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19963E+00 1700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19568E+00 1725.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.19185E+00 1750.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18816E+00 1775.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18459E+00 1800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.18113E+00 1825.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17778E+00 1850.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17455E+00 1875.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.17141E+00 1900.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16836E+00 1925.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16541E+00 1950.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.16255E+00 1975.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15977E+00 2000.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15708E+00 2025.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15446E+00 2050.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.15191E+00 2075.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.14944E+00 2100.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.14704E+00 2125.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.14470E+00 2150.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.14243E+00 2175.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.14021E+00 2200.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.13806E+00 2225.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.13596E+00 2250.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.13392E+00 2275.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.13193E+00 2300.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12999E+00 2325.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12810E+00 2350.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12626E+00 2375.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12446E+00 2400.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12271E+00 2425.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.12100E+00 2449.99 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11932E+00 2475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11769E+00 2500.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11610E+00 2525.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11454E+00 2550.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11302E+00 2575.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11154E+00 2600.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.11009E+00 2625.00 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10867E+00 2650.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10728E+00 2675.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10592E+00 2700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10459E+00 2725.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10329E+00 2750.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10202E+00 2775.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.10078E+00 2800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.99557E-01 2824.99 0.00 35.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.98363E-01 2849.99 0.00 45.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.97194E-01 2875.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.96049E-01 2900.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.94927E-01 2925.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.93827E-01 2950.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.92749E-01 2975.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.91693E-01 3000.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.90657E-01 3025.00 0.00 40.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.89641E-01 3050.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.88645E-01 3074.99 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.87668E-01 3100.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.86710E-01 3125.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.85769E-01 3150.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.84846E-01 3174.99 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.83940E-01 3199.99 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.83050E-01 3225.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.82177E-01 3250.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.81320E-01 3274.99 0.00 45.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.80478E-01 3300.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.79651E-01 3325.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

```
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.78838E-01    3350.00     0.00  5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.78040E-01    3375.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.77256E-01    3400.00     0.00 20.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.76485E-01    3425.00     0.00 25.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.75728E-01    3450.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.74983E-01    3475.00     0.00 15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.74251E-01    3500.00     0.00 20.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.73531E-01    3525.00     0.00 25.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.72823E-01    3550.00     0.00 25.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.72127E-01    3575.00     0.00 15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.71443E-01    3600.00     0.00 20.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.70769E-01    3625.00     0.00 30.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.70107E-01    3650.00     0.00 25.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.69455E-01    3674.99     0.00 35.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.68814E-01    3700.00     0.00 20.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.68182E-01    3724.99     0.00 20.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.67561E-01    3750.00     0.00 25.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.66950E-01    3775.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.66348E-01    3800.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.65755E-01    3825.00     0.00  5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.65171E-01    3849.99     0.00 15.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.64597E-01    3875.00     0.00  5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.64031E-01    3900.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.63473E-01    3925.00     0.00  5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.62924E-01    3950.00     0.00  0.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.62383E-01    3975.00     0.00  5.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
1.000  1.50  0.35   0.50  10.0  310.0   2.0
  0.61850E-01    4000.00     0.00 10.0     Winter     0-360  10011001  -1.30  0.043 -9.000  0.020 -999.  21.     6.0
```

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.61325E-01 4025.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.60808E-01 4050.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.60298E-01 4075.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.59796E-01 4100.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.59300E-01 4125.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.58812E-01 4149.99 0.00 20.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.58331E-01 4175.00 0.00 25.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.57856E-01 4200.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.57388E-01 4225.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.56927E-01 4250.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.56472E-01 4275.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.56023E-01 4300.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.55581E-01 4325.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.55144E-01 4349.99 0.00 45.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.54713E-01 4375.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.54288E-01 4400.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.53869E-01 4425.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.53456E-01 4449.99 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.53048E-01 4475.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.52645E-01 4500.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.52247E-01 4525.00 0.00 10.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51855E-01 4550.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51468E-01 4575.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.51085E-01 4600.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.50708E-01 4625.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.50335E-01 4650.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.49968E-01 4675.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0

1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.49604E-01 4700.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.49245E-01 4725.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.48891E-01 4750.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.48542E-01 4774.99 0.00 45.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.48196E-01 4800.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47855E-01 4825.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47518E-01 4850.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.47185E-01 4875.00 0.00 30.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.46856E-01 4900.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.46530E-01 4925.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.46209E-01 4950.00 0.00 0.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.45892E-01 4975.00 0.00 15.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0
0.45578E-01 5000.00 0.00 5.0 Winter 0-360 10011001 -1.30 0.043 -9.000 0.020 -999. 21. 6.0
1.000 1.50 0.35 0.50 10.0 310.0 2.0

Greyhound Residential Apartments Project

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Enclosed Parking with Elevator	786.00	Space	7.07	314,400.00	0
Apartments High Rise	785.00	Dwelling Unit	12.66	785,000.00	2245
Strip Mall	20.00	1000sqft	0.46	20,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2020
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 -

Construction Phase - Consistent with information disclosed in DSEIR.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Off-road Equipment - Consistent with MND.

Trips and VMT - Consistent with MND.

Demolition - Consistent with information disclosed in DSEIR and associated appendecies.

Grading - Consistent with information disclosed in the DSEIR and associated appendecies.

Vehicle Trips - Consistent with DSEIR.

Energy Use - Consistent with MND.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	217.00
tblConstructionPhase	NumDays	370.00	261.00
tblConstructionPhase	NumDays	20.00	21.00
tblConstructionPhase	NumDays	35.00	145.00
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	10.00	11.00
tblConstructionPhase	PhaseEndDate	10/1/2019	4/1/2019
tblConstructionPhase	PhaseEndDate	12/7/2018	12/1/2018
tblConstructionPhase	PhaseEndDate	12/4/2017	12/1/2017
tblConstructionPhase	PhaseEndDate	5/1/2019	4/1/2019
tblConstructionPhase	PhaseEndDate	5/16/2017	5/15/2017

tblConstructionPhase	PhaseEndDate	12/8/2017	12/7/2017
tblConstructionPhase	PhaseStartDate	12/2/2018	6/1/2018
tblConstructionPhase	PhaseStartDate	12/8/2017	12/1/2017
tblConstructionPhase	PhaseStartDate	5/16/2017	5/15/2017
tblConstructionPhase	PhaseStartDate	4/2/2019	3/1/2019
tblConstructionPhase	PhaseStartDate	5/2/2017	5/1/2017
tblConstructionPhase	PhaseStartDate	12/2/2017	12/1/2017
tblEnergyUse	LightingElect	741.44	556.08
tblEnergyUse	LightingElect	2.63	1.84
tblEnergyUse	LightingElect	5.64	3.95
tblEnergyUse	T24E	226.57	169.93
tblEnergyUse	T24E	3.92	2.74
tblEnergyUse	T24E	3.37	2.36
tblEnergyUse	T24NG	6,391.64	4,793.73
tblEnergyUse	T24NG	2.49	1.74
tblGrading	AcresOfGrading	10.88	11.00
tblGrading	MaterialExported	0.00	118,331.00
tblOffRoadEquipment	LoadFactor	0.38	0.73
tblOffRoadEquipment	OffRoadEquipmentType	Concrete/Industrial Saws	Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType	Rubber Tired Dozers	Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType	Tractors/Loaders/Backhoes	Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType	Welders	Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Architectural Coating

tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Architectural Coating
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Architectural Coating
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Architectural Coating
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Building Construction
tblOffRoadEquipment	PhaseName		Grading
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Paving
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	UsageHours	7.00	12.00
tblOffRoadEquipment	UsageHours	8.00	24.00
tblOffRoadEquipment	UsageHours	8.00	0.30
tblProjectCharacteristics	OperationalYear	2014	2020
tblTripsAndVMT	HaulingTripNumber	0.00	14,791.00
tblTripsAndVMT	HaulingTripNumber	0.00	21,240.00
tblVehicleTrips	ST_TR	7.16	5.94
tblVehicleTrips	ST_TR	42.04	32.37
tblVehicleTrips	SU_TR	6.07	5.04
tblVehicleTrips	SU_TR	20.43	15.73

tblVehicleTrips	WD_TR	6.59	5.46
tblVehicleTrips	WD_TR	44.32	34.00

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	0.8695	9.5857	6.9301	0.0179	0.5251	0.3256	0.8507	0.1433	0.3038	0.4471	0.0000	1,596.5269	1,596.5269	0.1514	0.0000	1,599.7060
2018	7.1215	16.8312	17.2242	0.0376	1.1503	0.8097	1.9599	0.3094	0.7836	1.0929	0.0000	3,127.9249	3,127.9249	0.2386	0.0000	3,132.9349
2019	2.2846	0.9197	0.8455	1.6200e-003	0.0466	0.0512	0.0978	0.0123	0.0485	0.0608	0.0000	132.5825	132.5825	0.0217	0.0000	133.0380
Total	**10.2756**	**27.3366**	**24.9998**	**0.0571**	**1.7220**	**1.1864**	**2.9084**	**0.4650**	**1.1359**	**1.6009**	**0.0000**	**4,857.0343**	**4,857.0343**	**0.4117**	**0.0000**	**4,865.6788**

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	0.8695	8.5913	6.9301	0.0179	0.5251	0.3256	0.8507	0.1433	0.3038	0.4471	0.0000	1,596.5262	1,596.5262	0.1514	0.0000	1,599.7054
2018	7.1215	16.8312	17.2242	0.0376	1.1503	0.8097	1.9599	0.3094	0.7836	1.0929	0.0000	3,127.9232	3,127.9232	0.2386	0.0000	3,132.9332
2019	2.2846	0.9197	0.8455	1.6200e-003	0.0466	0.0512	0.0978	0.0123	0.0485	0.0608	0.0000	132.5824	132.5824	0.0217	0.0000	133.0378
Total	**10.2756**	**26.3421**	**24.9998**	**0.0571**	**1.7220**	**1.1864**	**2.9084**	**0.4650**	**1.1359**	**1.6009**	**0.0000**	**4,857.0318**	**4,857.0318**	**0.4117**	**0.0000**	**4,865.6764**

	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**	**3.64**	**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**

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	5.8863	0.0781	6.7264	1.0600e-003		0.1589	0.1589		0.1589	0.1589	12.8421	30.2921	43.1341	0.0332	1.0700e-003	44.1624
Energy	0.0278	0.2379	0.1019	1.5200e-003		0.0192	0.0192		0.0192	0.0192	0.0000	1,514.0530	1,514.0530	0.0613	0.0166	1,520.4974
Mobile	2.2402	4.3914	21.1700	0.0543	3.9128	0.0656	3.9785	1.0461	0.0606	1.1066	0.0000	3,769.3493	3,769.3493	0.1399	0.0000	3,772.2862
Waste						0.0000	0.0000		0.0000	0.0000	77.5629	0.0000	77.5629	4.5838	0.0000	173.8233
Water						0.0000	0.0000		0.0000	0.0000	16.6962	116.5971	133.2933	1.7201	0.0416	182.3067
Total	**8.1543**	**4.7074**	**27.9983**	**0.0569**	**3.9128**	**0.2438**	**4.1566**	**1.0461**	**0.2387**	**1.2848**	**107.1011**	**5,430.2914**	**5,537.3926**	**6.5383**	**0.0593**	**5,693.0761**

2.2 Overall Operational

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	5.8863	0.0781	6.7264	1.0600e-003		0.1589	0.1589		0.1589	0.1589	12.8421	30.2921	43.1341	0.0332	1.0700e-003	44.1624
Energy	0.0278	0.2379	0.1019	1.5200e-003		0.0192	0.0192		0.0192	0.0192	0.0000	1,514.0530	1,514.0530	0.0613	0.0166	1,520.4974
Mobile	2.2402	4.3914	21.1700	0.0543	3.9128	0.0656	3.9785	1.0461	0.0606	1.1066	0.0000	3,769.3493	3,769.3493	0.1399	0.0000	3,772.2862
Waste						0.0000	0.0000		0.0000	0.0000	77.5629	0.0000	77.5629	4.5838	0.0000	173.8233
Water						0.0000	0.0000		0.0000	0.0000	16.6962	116.5971	133.2933	1.7198	0.0415	182.2801
Total	**8.1543**	**4.7074**	**27.9983**	**0.0569**	**3.9128**	**0.2438**	**4.1566**	**1.0461**	**0.2387**	**1.2848**	**107.1011**	**5,430.2914**	**5,537.3926**	**6.5379**	**0.0592**	**5,693.0494**

	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**	**0.10**	**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	4/1/2017	5/1/2017	5	21	
2	Site Preparation	Site Preparation	5/1/2017	5/15/2017	5	11	
3	Grading	Grading	5/15/2017	12/1/2017	5	145	
4	Trenching	Trenching	12/1/2017	12/7/2017	5	5	
5	Building Construction	Building Construction	12/1/2017	12/1/2018	5	261	
6	Architectural Coating	Architectural Coating	6/1/2018	4/1/2019	5	217	
7	Paving	Paving	3/1/2019	4/1/2019	5	22	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 11

Acres of Paving: 0

Residential Indoor: 1,589,625; Residential Outdoor: 529,875; Non-Residential Indoor: 501,600; Non-Residential Outdoor: 167,200 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Dumpers/Tenders	2	8.00	16	0.73
Demolition	Excavators	2	8.00	162	0.38
Demolition	Rubber Tired Dozers	1	8.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Excavators	3	8.00	162	0.38
Grading	Graders	2	8.00	174	0.41
Grading	Dumpers/Tenders	6	8.00	16	0.38
Grading	Rubber Tired Loaders	2	8.00	199	0.36

Grading	Scrapers	0	0.30	361	0.48
Grading	Off-Highway Trucks	1	8.00	400	0.38
Trenching	Cranes	0		226	0.29
Trenching	Forklifts	0		89	0.20
Trenching	Generator Sets	0		84	0.74
Trenching	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Trenching	Dumpers/Tenders	1	8.00	16	0.38
Building Construction	Cranes	2	12.00	226	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Building Construction	Generator Sets	4	24.00	84	0.74
Building Construction	Graders	1	8.00	174	0.41
Building Construction	Pumps	2	8.00	84	0.74
Building Construction	Rollers	0	8.00	80	0.38
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Architectural Coating	Air Compressors	0	6.00	78	0.48
Architectural Coating	Cranes	1	8.00	226	0.29
Architectural Coating	Forklifts	2	8.00	89	0.20
Architectural Coating	Generator Sets	2	8.00	84	0.74
Architectural Coating	Graders	1	8.00	174	0.41
Paving	Air Compressors	0		78	0.48
Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Paving	Concrete/Industrial Saws	1	8.00	81	0.73
Paving	Cranes	0		226	0.29
Paving	Forklifts	0		89	0.20
Paving	Generator Sets	0		84	0.74
Paving	Graders	0		174	0.41
Paving	Pavers	1	8.00	125	0.42

Paving	Paving Equipment	1	8.00	130	0.36
Paving	Rollers	1	8.00	80	0.38
Paving	Tractors/Loaders/Backhoes	0		97	0.37
Site Preparation	Off-Highway Trucks	1	8.00	400	0.38

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	312.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	14,791.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	7	18.00	0.00	11,700.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	1	3.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	11	704.00	139.00	21,240.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	6	141.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	12.40	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	12.40	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					0.0338	0.0000	0.0338	5.1100e-003	0.0000	5.1100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0264	0.2737	0.2115	2.7000e-004		0.0137	0.0137		0.0127	0.0127	0.0000	24.2416	24.2416	6.9900e-003	0.0000	24.3884
Total	**0.0264**	**0.2737**	**0.2115**	**2.7000e-004**	**0.0338**	**0.0137**	**0.0475**	**5.1100e-003**	**0.0127**	**0.0178**	**0.0000**	**24.2416**	**24.2416**	**6.9900e-003**	**0.0000**	**24.3884**

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	3.0400e-003	0.0417	0.0340	1.2000e-004	2.6400e-003	5.3000e-004	3.1700e-003	7.2000e-004	4.9000e-004	1.2200e-003	0.0000	10.5056	10.5056	8.0000e-005	0.0000	10.5072
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	3.5000e-004	4.9000e-004	4.7700e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8101	0.8101	4.0000e-005	0.0000	0.8110
Total	**3.3900e-003**	**0.0422**	**0.0387**	**1.3000e-004**	**3.6000e-003**	**5.4000e-004**	**4.1300e-003**	**9.7000e-004**	**5.0000e-004**	**1.4800e-003**	**0.0000**	**11.3158**	**11.3158**	**1.2000e-004**	**0.0000**	**11.3182**

3.2 Demolition - 2017

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					0.0338	0.0000	0.0338	5.1100e-003	0.0000	5.1100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0264	0.2548	0.2115	2.7000e-004		0.0137	0.0137		0.0127	0.0127	0.0000	24.2416	24.2416	6.9900e-003	0.0000	24.3884
Total	**0.0264**	**0.2548**	**0.2115**	**2.7000e-004**	**0.0338**	**0.0137**	**0.0475**	**5.1100e-003**	**0.0127**	**0.0178**	**0.0000**	**24.2416**	**24.2416**	**6.9900e-003**	**0.0000**	**24.3884**

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	3.0400e-003	0.0417	0.0340	1.2000e-004	2.6400e-003	5.3000e-004	3.1700e-003	7.2000e-004	4.9000e-004	1.2200e-003	0.0000	10.5056	10.5056	8.0000e-005	0.0000	10.5072
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	3.5000e-004	4.9000e-004	4.7700e-003	1.0000e-005	9.6000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8101	0.8101	4.0000e-005	0.0000	0.8110
Total	**3.3900e-003**	**0.0422**	**0.0387**	**1.3000e-004**	**3.6000e-003**	**5.4000e-004**	**4.1300e-003**	**9.7000e-004**	**5.0000e-004**	**1.4800e-003**	**0.0000**	**11.3158**	**11.3158**	**1.2000e-004**	**0.0000**	**11.3182**

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					0.0306	0.0000	0.0306	0.0168	0.0000	0.0168	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0197	0.2162	0.1484	1.9000e-004		0.0100	0.0100		9.2200e-003	9.2200e-003	0.0000	17.4098	17.4098	5.3300e-003	0.0000	17.5218
Total	**0.0197**	**0.2162**	**0.1484**	**1.9000e-004**	**0.0306**	**0.0100**	**0.0407**	**0.0168**	**9.2200e-003**	**0.0261**	**0.0000**	**17.4098**	**17.4098**	**5.3300e-003**	**0.0000**	**17.5218**

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	0.1441	1.9778	1.6102	5.5400e-003	0.1249	0.0253	0.1503	0.0343	0.0233	0.0576	0.0000	498.0403	498.0403	3.6200e-003	0.0000	498.1163
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	1.5000e-004	2.1000e-004	2.0000e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3395	0.3395	2.0000e-005	0.0000	0.3399
Total	**0.1443**	**1.9781**	**1.6122**	**5.5400e-003**	**0.1253**	**0.0253**	**0.1507**	**0.0344**	**0.0233**	**0.0577**	**0.0000**	**498.3798**	**498.3798**	**3.6400e-003**	**0.0000**	**498.4562**

3.3 Site Preparation - 2017

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					0.0306	0.0000	0.0306	0.0168	0.0000	0.0168	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0197	0.1619	0.1484	1.9000e-004		0.0100	0.0100		9.2200e-003	9.2200e-003	0.0000	17.4097	17.4097	5.3300e-003	0.0000	17.5218
Total	**0.0197**	**0.1619**	**0.1484**	**1.9000e-004**	**0.0306**	**0.0100**	**0.0407**	**0.0168**	**9.2200e-003**	**0.0261**	**0.0000**	**17.4097**	**17.4097**	**5.3300e-003**	**0.0000**	**17.5218**

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	0.1441	1.9778	1.6102	5.5400e-003	0.1249	0.0253	0.1503	0.0343	0.0233	0.0576	0.0000	498.0403	498.0403	3.6200e-003	0.0000	498.1163
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	1.5000e-004	2.1000e-004	2.0000e-003	0.0000	4.0000e-004	0.0000	4.0000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3395	0.3395	2.0000e-005	0.0000	0.3399
Total	**0.1443**	**1.9781**	**1.6122**	**5.5400e-003**	**0.1253**	**0.0253**	**0.1507**	**0.0344**	**0.0233**	**0.0577**	**0.0000**	**498.3798**	**498.3798**	**3.6400e-003**	**0.0000**	**498.4562**

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					5.8300e-003	0.0000	5.8300e-003	6.3000e-004	0.0000	6.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3808	4.0628	2.1558	4.2300e-003		0.1858	0.1858		0.1715	0.1715	0.0000	386.0023	386.0023	0.1135	0.0000	388.3863
Total	**0.3808**	**4.0628**	**2.1558**	**4.2300e-003**	**5.8300e-003**	**0.1858**	**0.1916**	**6.3000e-004**	**0.1715**	**0.1722**	**0.0000**	**386.0023**	**386.0023**	**0.1135**	**0.0000**	**388.3863**

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	0.1140	1.5645	1.2737	4.3800e-003	0.0988	0.0201	0.1189	0.0272	0.0184	0.0456	0.0000	393.9606	393.9606	2.8600e-003	0.0000	394.0207
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	4.3500e-003	6.1200e-003	0.0593	1.4000e-004	0.0119	9.0000e-005	0.0120	3.1600e-003	8.0000e-005	3.2400e-003	0.0000	10.0689	10.0689	5.1000e-004	0.0000	10.0797
Total	**0.1183**	**1.5706**	**1.3330**	**4.5200e-003**	**0.1107**	**0.0201**	**0.1309**	**0.0303**	**0.0185**	**0.0488**	**0.0000**	**404.0295**	**404.0295**	**3.3700e-003**	**0.0000**	**404.1004**

3.4 Grading - 2017

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					5.8300e-003	0.0000	5.8300e-003	6.3000e-004	0.0000	6.3000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3808	3.1428	2.1558	4.2300e-003		0.1858	0.1858		0.1715	0.1715	0.0000	386.0018	386.0018	0.1135	0.0000	388.3859
Total	**0.3808**	**3.1428**	**2.1558**	**4.2300e-003**	**5.8300e-003**	**0.1858**	**0.1916**	**6.3000e-004**	**0.1715**	**0.1722**	**0.0000**	**386.0018**	**386.0018**	**0.1135**	**0.0000**	**388.3859**

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	0.1140	1.5645	1.2737	4.3800e-003	0.0988	0.0201	0.1189	0.0272	0.0184	0.0456	0.0000	393.9606	393.9606	2.8600e-003	0.0000	394.0207
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	4.3500e-003	6.1200e-003	0.0593	1.4000e-004	0.0119	9.0000e-005	0.0120	3.1600e-003	8.0000e-005	3.2400e-003	0.0000	10.0689	10.0689	5.1000e-004	0.0000	10.0797
Total	**0.1183**	**1.5706**	**1.3330**	**4.5200e-003**	**0.1107**	**0.0201**	**0.1309**	**0.0303**	**0.0185**	**0.0488**	**0.0000**	**404.0295**	**404.0295**	**3.3700e-003**	**0.0000**	**404.1004**

3.5 Trenching - 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	9.8000e-004	8.7800e-003	6.6100e-003	1.0000e-005		6.2000e-004	6.2000e-004		5.7000e-004	5.7000e-004	0.0000	0.8600	0.8600	2.4000e-004	0.0000	0.8650
Total	**9.8000e-004**	**8.7800e-003**	**6.6100e-003**	**1.0000e-005**		**6.2000e-004**	**6.2000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.8600**	**0.8600**	**2.4000e-004**	**0.0000**	**0.8650**

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-005	4.0000e-005	3.4000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0579	0.0579	0.0000	0.0000	0.0579
Total	**2.0000e-005**	**4.0000e-005**	**3.4000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0579**	**0.0579**	**0.0000**	**0.0000**	**0.0579**

3.5 Trenching - 2017

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	9.8000e-004	7.6100e-003	6.6100e-003	1.0000e-005		6.2000e-004	6.2000e-004		5.7000e-004	5.7000e-004	0.0000	0.8600	0.8600	2.4000e-004	0.0000	0.8650
Total	**9.8000e-004**	**7.6100e-003**	**6.6100e-003**	**1.0000e-005**		**6.2000e-004**	**6.2000e-004**		**5.7000e-004**	**5.7000e-004**	**0.0000**	**0.8600**	**0.8600**	**2.4000e-004**	**0.0000**	**0.8650**

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-005	4.0000e-005	3.4000e-004	0.0000	7.0000e-005	0.0000	7.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0579	0.0579	0.0000	0.0000	0.0579
Total	**2.0000e-005**	**4.0000e-005**	**3.4000e-004**	**0.0000**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0579**	**0.0579**	**0.0000**	**0.0000**	**0.0579**

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	0.1192	1.0396	0.7198	1.2400e-003		0.0641	0.0641		0.0625	0.0625	0.0000	108.6311	108.6311	0.0146	0.0000	108.9380
Total	**0.1192**	**1.0396**	**0.7198**	**1.2400e-003**		**0.0641**	**0.0641**		**0.0625**	**0.0625**	**0.0000**	**108.6311**	**108.6311**	**0.0146**	**0.0000**	**108.9380**

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	0.0167	0.2285	0.1861	6.4000e-004	0.1384	2.9300e-003	0.1414	0.0344	2.6900e-003	0.0371	0.0000	57.5440	57.5440	4.2000e-004	0.0000	57.5528
Vendor	0.0152	0.1305	0.1818	3.5000e-004	9.4300e-003	1.8900e-003	0.0113	2.7000e-003	1.7400e-003	4.4400e-003	0.0000	31.0210	31.0210	2.4000e-004	0.0000	31.0261
Worker	0.0246	0.0347	0.3359	7.8000e-004	0.0673	5.1000e-004	0.0678	0.0179	4.7000e-004	0.0184	0.0000	57.0342	57.0342	2.9000e-003	0.0000	57.0950
Total	**0.0565**	**0.3937**	**0.7038**	**1.7700e-003**	**0.2152**	**5.3300e-003**	**0.2205**	**0.0550**	**4.9000e-003**	**0.0599**	**0.0000**	**145.5992**	**145.5992**	**3.5600e-003**	**0.0000**	**145.6739**

3.6 Building Construction - 2017

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	0.1192	1.0396	0.7198	1.2400e-003		0.0641	0.0641		0.0625	0.0625	0.0000	108.6309	108.6309	0.0146	0.0000	108.9378
Total	**0.1192**	**1.0396**	**0.7198**	**1.2400e-003**		**0.0641**	**0.0641**		**0.0625**	**0.0625**	**0.0000**	**108.6309**	**108.6309**	**0.0146**	**0.0000**	**108.9378**

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	0.0167	0.2285	0.1861	6.4000e-004	0.1384	2.9300e-003	0.1414	0.0344	2.6900e-003	0.0371	0.0000	57.5440	57.5440	4.2000e-004	0.0000	57.5528
Vendor	0.0152	0.1305	0.1818	3.5000e-004	9.4300e-003	1.8900e-003	0.0113	2.7000e-003	1.7400e-003	4.4400e-003	0.0000	31.0210	31.0210	2.4000e-004	0.0000	31.0261
Worker	0.0246	0.0347	0.3359	7.8000e-004	0.0673	5.1000e-004	0.0678	0.0179	4.7000e-004	0.0184	0.0000	57.0342	57.0342	2.9000e-003	0.0000	57.0950
Total	**0.0565**	**0.3937**	**0.7038**	**1.7700e-003**	**0.2152**	**5.3300e-003**	**0.2205**	**0.0550**	**4.9000e-003**	**0.0599**	**0.0000**	**145.5992**	**145.5992**	**3.5600e-003**	**0.0000**	**145.6739**

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	1.1990	10.7026	8.0483	0.0142		0.6338	0.6338		0.6186	0.6186	0.0000	1,236.6701	1,236.6701	0.1584	0.0000	1,239.9958
Total	**1.1990**	**10.7026**	**8.0483**	**0.0142**		**0.6338**	**0.6338**		**0.6186**	**0.6186**	**0.0000**	**1,236.6701**	**1,236.6701**	**0.1584**	**0.0000**	**1,239.9958**

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	0.1789	2.3734	2.0425	7.3000e-003	0.1758	0.0331	0.2089	0.0480	0.0305	0.0784	0.0000	646.3445	646.3445	4.8100e-003	0.0000	646.4455
Vendor	0.1570	1.3499	1.9572	3.9500e-003	0.1077	0.0200	0.1277	0.0309	0.0184	0.0493	0.0000	348.3300	348.3300	2.7000e-003	0.0000	348.3867
Worker	0.2529	0.3567	3.4435	8.9000e-003	0.7692	5.6800e-003	0.7748	0.2046	5.2500e-003	0.2098	0.0000	627.5495	627.5495	0.0304	0.0000	628.1882
Total	**0.5888**	**4.0800**	**7.4432**	**0.0202**	**1.0527**	**0.0588**	**1.1115**	**0.2834**	**0.0541**	**0.3375**	**0.0000**	**1,622.2240**	**1,622.2240**	**0.0379**	**0.0000**	**1,623.0204**

3.6 Building Construction - 2018

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	1.1990	10.7026	8.0482	0.0142		0.6338	0.6338		0.6186	0.6186	0.0000	1,236.6686	1,236.6686	0.1584	0.0000	1,239.9944
Total	**1.1990**	**10.7026**	**8.0482**	**0.0142**		**0.6338**	**0.6338**		**0.6186**	**0.6186**	**0.0000**	**1,236.6686**	**1,236.6686**	**0.1584**	**0.0000**	**1,239.9944**

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	0.1789	2.3734	2.0425	7.3000e-003	0.1758	0.0331	0.2089	0.0480	0.0305	0.0784	0.0000	646.3445	646.3445	4.8100e-003	0.0000	646.4455
Vendor	0.1570	1.3499	1.9572	3.9500e-003	0.1077	0.0200	0.1277	0.0309	0.0184	0.0493	0.0000	348.3300	348.3300	2.7000e-003	0.0000	348.3867
Worker	0.2529	0.3567	3.4435	8.9000e-003	0.7692	5.6800e-003	0.7748	0.2046	5.2500e-003	0.2098	0.0000	627.5495	627.5495	0.0304	0.0000	628.1882
Total	**0.5888**	**4.0800**	**7.4432**	**0.0202**	**1.0527**	**0.0588**	**1.1115**	**0.2834**	**0.0541**	**0.3375**	**0.0000**	**1,622.2240**	**1,622.2240**	**0.0379**	**0.0000**	**1,623.0204**

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	5.0921					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2096	2.0033	1.2959	2.1300e-003		0.1164	0.1164		0.1103	0.1103	0.0000	189.4283	189.4283	0.0384	0.0000	190.2352
Total	**5.3017**	**2.0033**	**1.2959**	**2.1300e-003**		**0.1164**	**0.1164**		**0.1103**	**0.1103**	**0.0000**	**189.4283**	**189.4283**	**0.0384**	**0.0000**	**190.2352**

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	0.0321	0.0453	0.4368	1.1300e-003	0.0976	7.2000e-004	0.0983	0.0260	6.7000e-004	0.0266	0.0000	79.6025	79.6025	3.8600e-003	0.0000	79.6835
Total	**0.0321**	**0.0453**	**0.4368**	**1.1300e-003**	**0.0976**	**7.2000e-004**	**0.0983**	**0.0260**	**6.7000e-004**	**0.0266**	**0.0000**	**79.6025**	**79.6025**	**3.8600e-003**	**0.0000**	**79.6835**

3.7 Architectural Coating - 2018

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	5.0921					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2096	2.0033	1.2959	2.1300e-003		0.1164	0.1164		0.1103	0.1103	0.0000	189.4280	189.4280	0.0384	0.0000	190.2349
Total	**5.3017**	**2.0033**	**1.2959**	**2.1300e-003**		**0.1164**	**0.1164**		**0.1103**	**0.1103**	**0.0000**	**189.4280**	**189.4280**	**0.0384**	**0.0000**	**190.2349**

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	0.0321	0.0453	0.4368	1.1300e-003	0.0976	7.2000e-004	0.0983	0.0260	6.7000e-004	0.0266	0.0000	79.6025	79.6025	3.8600e-003	0.0000	79.6835
Total	**0.0321**	**0.0453**	**0.4368**	**1.1300e-003**	**0.0976**	**7.2000e-004**	**0.0983**	**0.0260**	**6.7000e-004**	**0.0266**	**0.0000**	**79.6025**	**79.6025**	**3.8600e-003**	**0.0000**	**79.6835**

3.7 Architectural Coating - 2019

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	2.1775					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0802	0.7753	0.5420	9.1000e-004		0.0437	0.0437		0.0414	0.0414	0.0000	80.2801	80.2801	0.0161	0.0000	80.6182
Total	**2.2577**	**0.7753**	**0.5420**	**9.1000e-004**		**0.0437**	**0.0437**		**0.0414**	**0.0414**	**0.0000**	**80.2801**	**80.2801**	**0.0161**	**0.0000**	**80.6182**

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	0.0125	0.0176	0.1698	4.8000e-004	0.0417	3.0000e-004	0.0420	0.0111	2.8000e-004	0.0114	0.0000	32.8144	32.8144	1.5300e-003	0.0000	32.8466
Total	**0.0125**	**0.0176**	**0.1698**	**4.8000e-004**	**0.0417**	**3.0000e-004**	**0.0420**	**0.0111**	**2.8000e-004**	**0.0114**	**0.0000**	**32.8144**	**32.8144**	**1.5300e-003**	**0.0000**	**32.8466**

3.7 Architectural Coating - 2019

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	2.1775					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0802	0.7753	0.5420	9.1000e-004		0.0437	0.0437		0.0414	0.0414	0.0000	80.2800	80.2800	0.0161	0.0000	80.6181
Total	**2.2577**	**0.7753**	**0.5420**	**9.1000e-004**		**0.0437**	**0.0437**		**0.0414**	**0.0414**	**0.0000**	**80.2800**	**80.2800**	**0.0161**	**0.0000**	**80.6181**

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	0.0125	0.0176	0.1698	4.8000e-004	0.0417	3.0000e-004	0.0420	0.0111	2.8000e-004	0.0114	0.0000	32.8144	32.8144	1.5300e-003	0.0000	32.8466
Total	**0.0125**	**0.0176**	**0.1698**	**4.8000e-004**	**0.0417**	**3.0000e-004**	**0.0420**	**0.0111**	**2.8000e-004**	**0.0114**	**0.0000**	**32.8144**	**32.8144**	**1.5300e-003**	**0.0000**	**32.8466**

3.8 Paving - 2019

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	0.0136	0.1257	0.1231	2.0000e-004		7.1300e-003	7.1300e-003		6.7800e-003	6.7800e-003	0.0000	17.4400	17.4400	3.9600e-003	0.0000	17.5231
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0136**	**0.1257**	**0.1231**	**2.0000e-004**		**7.1300e-003**	**7.1300e-003**		**6.7800e-003**	**6.7800e-003**	**0.0000**	**17.4400**	**17.4400**	**3.9600e-003**	**0.0000**	**17.5231**

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	7.8000e-004	1.1000e-003	0.0106	3.0000e-005	4.8600e-003	2.0000e-005	4.8700e-003	1.2500e-003	2.0000e-005	1.2600e-003	0.0000	2.0480	2.0480	1.0000e-004	0.0000	2.0500
Total	**7.8000e-004**	**1.1000e-003**	**0.0106**	**3.0000e-005**	**4.8600e-003**	**2.0000e-005**	**4.8700e-003**	**1.2500e-003**	**2.0000e-005**	**1.2600e-003**	**0.0000**	**2.0480**	**2.0480**	**1.0000e-004**	**0.0000**	**2.0500**

3.8 Paving - 2019

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	0.0136	0.1257	0.1231	2.0000e-004		7.1300e-003	7.1300e-003		6.7800e-003	6.7800e-003	0.0000	17.4400	17.4400	3.9600e-003	0.0000	17.5231
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0136**	**0.1257**	**0.1231**	**2.0000e-004**		**7.1300e-003**	**7.1300e-003**		**6.7800e-003**	**6.7800e-003**	**0.0000**	**17.4400**	**17.4400**	**3.9600e-003**	**0.0000**	**17.5231**

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	7.8000e-004	1.1000e-003	0.0106	3.0000e-005	4.8600e-003	2.0000e-005	4.8700e-003	1.2500e-003	2.0000e-005	1.2600e-003	0.0000	2.0480	2.0480	1.0000e-004	0.0000	2.0500
Total	**7.8000e-004**	**1.1000e-003**	**0.0106**	**3.0000e-005**	**4.8600e-003**	**2.0000e-005**	**4.8700e-003**	**1.2500e-003**	**2.0000e-005**	**1.2600e-003**	**0.0000**	**2.0480**	**2.0480**	**1.0000e-004**	**0.0000**	**2.0500**

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	2.2402	4.3914	21.1700	0.0543	3.9128	0.0656	3.9785	1.0461	0.0606	1.1066	0.0000	3,769.3493	3,769.3493	0.1399	0.0000	3,772.2862
Unmitigated	2.2402	4.3914	21.1700	0.0543	3.9128	0.0656	3.9785	1.0461	0.0606	1.1066	0.0000	3,769.3493	3,769.3493	0.1399	0.0000	3,772.2862

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments High Rise	4,286.10	4,662.90	3956.40	9,583,165	9,583,165
Enclosed Parking with Elevator	0.00	0.00	0.00		
Strip Mall	680.00	647.40	314.60	959,661	959,661
Total	4,966.10	5,310.30	4,271.00	10,542,825	10,542,825

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
Apartments High Rise	12.40	4.30	5.40	26.10	29.10	44.80	86	11	3
Enclosed Parking with Elevator	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Strip Mall	9.50	7.30	7.30	16.60	64.40	19.00	45	40	15

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.551785	0.058740	0.185183	0.122735	0.029388	0.004432	0.012603	0.023662	0.001776	0.001268	0.006159	0.000502	0.001767

5.0 Energy Detail

4.4 Fleet Mix

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	1,238.6625	1,238.6625	0.0560	0.0116	1,243.4310
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	1,238.6625	1,238.6625	0.0560	0.0116	1,243.4310
NaturalGas Mitigated	0.0278	0.2379	0.1019	1.5200e-003		0.0192	0.0192		0.0192	0.0192	0.0000	275.3905	275.3905	5.2800e-003	5.0500e-003	277.0664
NaturalGas Unmitigated	0.0278	0.2379	0.1019	1.5200e-003		0.0192	0.0192		0.0192	0.0192	0.0000	275.3905	275.3905	5.2800e-003	5.0500e-003	277.0664

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					
Apartments High Rise	5.12582e+006	0.0276	0.2362	0.1005	1.5100e-003		0.0191	0.0191		0.0191	0.0191	0.0000	273.5334	273.5334	5.2400e-003	5.0100e-003	275.1981
Enclosed Parking with Elevator	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
Strip Mall	34800	1.9000e-004	1.7100e-003	1.4300e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8571	1.8571	4.0000e-005	3.0000e-005	1.8684
Total		**0.0278**	**0.2379**	**0.1019**	**1.5200e-003**		**0.0192**	**0.0192**		**0.0192**	**0.0192**	**0.0000**	**275.3905**	**275.3905**	**5.2800e-003**	**5.0400e-003**	**277.0664**

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					
Enclosed Parking with Elevator	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
Strip Mall	34800	1.9000e-004	1.7100e-003	1.4300e-003	1.0000e-005		1.3000e-004	1.3000e-004		1.3000e-004	1.3000e-004	0.0000	1.8571	1.8571	4.0000e-005	3.0000e-005	1.8684
Apartments High Rise	5.12582e+006	0.0276	0.2362	0.1005	1.5100e-003		0.0191	0.0191		0.0191	0.0191	0.0000	273.5334	273.5334	5.2400e-003	5.0100e-003	275.1981
Total		**0.0278**	**0.2379**	**0.1019**	**1.5200e-003**		**0.0192**	**0.0192**		**0.0192**	**0.0192**	**0.0000**	**275.3905**	**275.3905**	**5.2800e-003**	**5.0400e-003**	**277.0664**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.57838e+006	750.0802	0.0339	7.0200e-003	752.9678
Enclosed Parking with Elevator	1.49969e+006	436.2764	0.0197	4.0800e-003	437.9560
Strip Mall	179800	52.3059	2.3700e-003	4.9000e-004	52.5072
Total		**1,238.6625**	**0.0560**	**0.0116**	**1,243.4310**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments High Rise	2.57838e+006	750.0802	0.0339	7.0200e-003	752.9678
Enclosed Parking with Elevator	1.49969e+006	436.2764	0.0197	4.0800e-003	437.9560
Strip Mall	179800	52.3059	2.3700e-003	4.9000e-004	52.5072
Total		**1,238.6625**	**0.0560**	**0.0116**	**1,243.4310**

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	5.8863	0.0781	6.7264	1.0600e-003		0.1589	0.1589		0.1589	0.1589	12.8421	30.2921	43.1341	0.0332	1.0700e-003	44.1624
Unmitigated	5.8863	0.0781	6.7264	1.0600e-003		0.1589	0.1589		0.1589	0.1589	12.8421	30.2921	43.1341	0.0332	1.0700e-003	44.1624

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	0.7270					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.3718					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.6087	0.0103	0.8708	7.5000e-004		0.1267	0.1267		0.1267	0.1267	12.8421	20.7566	33.5986	0.0238	1.0700e-003	34.4311
Landscaping	0.1788	0.0677	5.8555	3.1000e-004		0.0322	0.0322		0.0322	0.0322	0.0000	9.5355	9.5355	9.3200e-003	0.0000	9.7313
Total	**5.8863**	**0.0781**	**6.7264**	**1.0600e-003**		**0.1589**	**0.1589**		**0.1589**	**0.1589**	**12.8421**	**30.2921**	**43.1341**	**0.0332**	**1.0700e-003**	**44.1624**

6.2 Area by SubCategory

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	0.7270					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.3718					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.6087	0.0103	0.8708	7.5000e-004		0.1267	0.1267		0.1267	0.1267	12.8421	20.7566	33.5986	0.0238	1.0700e-003	34.4311
Landscaping	0.1788	0.0677	5.8555	3.1000e-004		0.0322	0.0322		0.0322	0.0322	0.0000	9.5355	9.5355	9.3200e-003	0.0000	9.7313
Total	**5.8863**	**0.0781**	**6.7264**	**1.0600e-003**		**0.1589**	**0.1589**		**0.1589**	**0.1589**	**12.8421**	**30.2921**	**43.1341**	**0.0332**	**1.0700e-003**	**44.1624**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	133.2933	1.7198	0.0415	182.2801
Unmitigated	133.2933	1.7201	0.0416	182.3067

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	51.1459 / 32.2442	129.5668	1.6717	0.0404	177.2006
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	1.48145 / 0.907986	3.7265	0.0484	1.1700e-003	5.1061
Total		**133.2933**	**1.7201**	**0.0416**	**182.3067**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments High Rise	51.1459 / 32.2442	129.5668	1.6714	0.0404	177.1747
Enclosed Parking with Elevator	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	1.48145 / 0.907986	3.7265	0.0484	1.1700e-003	5.1054
Total		**133.2933**	**1.7198**	**0.0415**	**182.2801**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	77.5629	4.5838	0.0000	173.8233
Unmitigated	77.5629	4.5838	0.0000	173.8233

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	361.1	73.3000	4.3319	0.0000	164.2701
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	21	4.2628	0.2519	0.0000	9.5532
Total		**77.5629**	**4.5838**	**0.0000**	**173.8233**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments High Rise	361.1	73.3000	4.3319	0.0000	164.2701
Enclosed Parking with Elevator	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	21	4.2628	0.2519	0.0000	9.5532
Total		**77.5629**	**4.5838**	**0.0000**	**173.8233**

9.0 Operational Offroad

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

10.0 Vegetation

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2014;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 100 environmental impact reports since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, Valley Fever, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Manager of a project to provide technical assistance to a community adjacent to a former Naval shipyard under a grant from the U.S. EPA.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.

- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt taught physical geology (lecture and lab and introductory geology at Golden West College in Huntington Beach, California from 2010 to 2014.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

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SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

EDUCATION

UNIVERSITY OF CALIFORNIA, LOS ANGELES **B.S. CONSERVATION BIOLOGY & ENVIRONMENTAL SCIENCES** *JUNE 2014*

PROJECT EXPERIENCE

SOIL WATER AIR PROTECTION ENTERPRISE ***SANTA MONICA, CA***

AIR QUALITY SPECIALIST

SENIOR ANALYST: CEQA ANALYSIS & MODELING

- Calculated roadway, stationary source, and cumulative impacts for risk and hazard analyses at proposed land use projects.
- Quantified criteria air pollutant and greenhouse gas emissions released during construction and operational activities of proposed land use projects using CalEEMod and EMFAC2011 emission factors.
- Utilized AERSCREEN, a screening dispersion model, to determine the ambient air concentrations at sensitive receptor locations.
- Organized presentations containing figures and tables comparing results of particulate matter analyses to CEQA thresholds.
- Prepared reports that discuss results of the health risk analyses conducted for several land use redevelopment projects.

SENIOR ANALYST: GREENHOUSE GAS MODELING AND DETERMINATION OF SIGNIFICANCE

- Quantified greenhouse gas (GHG) emissions of a "business as usual" scenario for proposed land use projects using CalEEMod.
- Determined compliance of proposed projects with AB 32 GHG reduction targets, with measures described in CARB's Scoping Plan for each land use sector, and with GHG significance thresholds recommended by various Air Quality Management Districts in California.
- Produced tables and figures that compare the results of the GHG analyses to applicable CEQA thresholds and reduction targets.

PROJECT MANAGER: OFF-GASSING OF FORMALDEHYDE FROM FLOORING PRODUCTS

- Determined the appropriate standard test methods to effectively measure formaldehyde emissions from flooring products.
- Compiled and analyzed laboratory testing data. Produced tables, charts, and graphs to exhibit emission levels.
- Compared finalized testing data to Proposition 65 No Significant Risk Level (NSRL) and to CARB's Phase 2 Standard.
- Prepared a final analytical report and organized supporting data for use as Expert testimony in environmental litigation.
- Participated in meetings with clients to discuss project strategy and identify solutions to achieve short and long term goals.

PROJECT ANALYST: EXPOSURE ASSESSMENT OF CONTAMINANTS EMITTED BY INCINERATOR

- Reviewed and organized sampling data, and determined the maximum levels of arsenic, dioxin, and lead in soil samples.
- Determined cumulative and hourly particulate deposition of incinerator and modeled particle dispersion locations using GIS and AERMOD.
- Conducted risk assessment using guidance set forth by the Office of Environmental Health Hazard Assessment (OEHHA).
- Utilized LeadSpread8 to evaluate exposure, and the potential adverse health effects from exposure, to lead in the environment.
- Compared final results of assessment to the Environmental Protection Agency's (EPA) Regional Screening Levels (RSLs).

ACCOMPLISHMENTS

- **Recipient**, Bruins Advantage Scholarship, University of California, Los Angeles ***SEPT 2010 – JUNE 2014***
- **Academic Honoree,** Dean's List, University of California, Los Angeles ***SEPT 2013 – JUNE 2014***
- **Academic Wellness Director**, UCLA Undergraduate Students Associated Council ***SEPT 2013 – JUNE 2014***
- **Student Groups Support Committee Member**, UCLA Undergraduate Students Associated Council ***SEPT 2012 – JUNE 2013***

Santa Clara Valley Audubon Society

February 24, 2017

Krinjal Mathur
Environmental Project Manager
City of San Jose Planning Division
krinjal.mathur@sanjoseca.gov

RE: Greyhound Residential Project Draft Supplemental Environmental Impact Report
File No. SP16-021 & T16-017

Dear Ms. Mathur,

The Santa Clara Valley Audubon Society (SCVAS) appreciates the opportunity to submit the following comments on the Draft Supplemental Environmental Impact Report (SEIR) for the proposed Greyhound Residential Project in San Jose. SCVAS was founded in 1926 and is one of the largest Audubon chapters in California with over 3,000 members in Santa Clara County. Our members share a passion for the protection of birds and their habitats, and are especially concerned with the increasing risks to resident and migratory birds in our region.

Impacts of Bird Collision are potentially significant and should be evaluated and mitigated

As demonstrated by architectural renderings, the proposed Project incorporates a large amount of glass material into the design of the building. For this reason, we are concerned with the potential for birds to collide with the glass façade. The SEIR prepared for this project does not provide discussion, evaluation or mitigation of potential bird collision.

Recent studies estimate that between 365 and 988 million birds are killed annually from colliding with buildings in the United States, leading to local, regional, and national declines in bird populations (Loss et al., see attached). Project related bird collisions might contribute directly and cumulatively to population decline of migratory and resident bird populations. This potential should be discussed and mitigated in the SEIR.

Mitigation measures may include a reduction in the amount of glass material used in the buildings design, avoidance of materials that reflect the sky and surrounding vegetation, and incorporation of visual cues to alert birds of the structure. Additional mitigations may be achieved by following San Jose's Bird-Friendly Building design guidelines (see attached).

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

We thank you for your time and consideration. Please do not hesitate to call on us if we can be of help.

Sincerely,

Mackenzie Mossing
Environmental Advocate
Santa Clara Valley Audubon Society

22221 McClellan Road, Cupertino, CA 95014 Phone: (408) 252-3748 * Fax: (408) 252-2850
email: scvas@scvas.org * www.scvas.org

BioOne RESEARCH EVOLVED

Bird–building collisions in the United States: Estimates of annual mortality and species vulnerability

Author(s): Scott R. Loss, Tom Will, Sara S. Loss ,and Peter P. Marra
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RESEARCH ARTICLE

Bird–building collisions in the United States: Estimates of annual mortality and species vulnerability

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[2] U.S. Fish and Wildlife Service, Division of Migratory Birds, Midwest Regional Office, Bloomington, Minnesota, USA
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ABSTRACT

Building collisions, and particularly collisions with windows, are a major anthropogenic threat to birds, with rough estimates of between 100 million and 1 billion birds killed annually in the United States. However, no current U.S. estimates are based on systematic analysis of multiple data sources. We reviewed the published literature and acquired unpublished datasets to systematically quantify bird–building collision mortality and species-specific vulnerability. Based on 23 studies, we estimate that between 365 and 988 million birds (median = 599 million) are killed annually by building collisions in the U.S., with roughly 56% of mortality at low-rises, 44% at residences, and <1% at high-rises. Based on >92,000 fatality records, and after controlling for population abundance and range overlap with study sites, we identified several species that are disproportionately vulnerable to collisions at all building types. In addition, several species listed as national Birds of Conservation Concern due to their declining populations were identified to be highly vulnerable to building collisions, including Golden-winged Warbler (*Vermivora chrysoptera*), Painted Bunting (*Passerina ciris*), Canada Warbler (*Cardellina canadensis*), Wood Thrush (*Hylocichla mustelina)*, Kentucky Warbler (*Geothlypis formosa)*, and Worm-eating Warbler (*Helmitheros vermivorum)*. The identification of these five migratory species with geographic ranges limited to eastern and central North America reflects seasonal and regional biases in the currently available building-collision data. Most sampling has occurred during migration and in the eastern U.S. Further research across seasons and in underrepresented regions is needed to reduce this bias. Nonetheless, we provide quantitative evidence to support the conclusion that building collisions are second only to feral and free-ranging pet cats, which are estimated to kill roughly four times as many birds each year, as the largest source of direct human-caused mortality for U.S. birds.

Keywords: anthropogenic mortality, Birds of Conservation Concern, individual residence, low-rise, high-rise, systematic review, window collision

Colisiones entre aves y edificios en los Estados Unidos: Estimaciones de mortalidad anual y vulnerabilidad de especies

RESUMEN

Colisones con edificios, en particular contra ventanas, presentan una amenaza antropogénica importante para las aves, y se estima que causan la muerte de entre 100 millón a mil millones de aves anualmente. Sin embargo, no existen estimaciones para los Estados Unidos que estén basadas en un análisis sistemático de datos provenientes de multiples fuentes. Revisamos datos publicados y tambien adquirimos bases de datos inéditos para cuantificar de una manera sistemática la mortalidad causada por colisones entre aves y edificios, y la vulnerabilidad de diferentes especies. Basado en 23 estudios, estimamos que entre 365 y 988 millones de aves (promedio = 599 millones) mueren anualmente como consecuencia de colisiones con edificios en los Estados Unidos, con aproximadamente 56% de la mortalidad en edificios de baja altura, 44% en residencias, y <1% en edificios de muchos pisos. Basado en >92,000 fatalidades registradas, y luego do controlar por abundancia poblacional y solapamiento de rango con area de estudio, identificamos varias especies que son desproporcionalmente vulnerables a colisiones con todos los tipos de edificio. Además, varias especies listadas nacionalmente como Aves de Interés para la Conservación debido a sus poblaciones en declive fueron identificadas como altamente vulnerables a colisiones, incluyendo *Vermivora chrysoptera*, *Passerina ciris*, *Cardellina canadensis*, *Hylocichla mustelina*, *Geothlypis formosa*, y *Helmitheros vermivorum*. La identificación de estas cinco especies migratorias con rangos geográficos restringidos a Norteamérica oriental y central refleja sesgos estacionales y regionales en la disponibilidad de datos actuales disponibles de colisiones con edificios. La mayoría del muestreo ha ocurrido durante la época de migración y en el este de los Estados Unidos. Hacen falta investigaciones adicionales a través de estaciones y en regiones poco representadas par reducir este sesgo. Sin embargo, presentamos

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evidencia cuantitativa que apoya la conclusión que, como causa de mortalidad ligada derectamente a los humanos en los Estados Unidos, las colisiones con edificios son superados solamente por los gatos mascotas libres, los cuales matan aproximadamente cuatro veces la cantidad de aves anualmente.

Palabras clave: mortalidad antropogénica, Aves de Interés para la Conservación, residencia particular, edificio de baja altura, edificio de muchos pisos, revisión sistemática, colisión con ventana

INTRODUCTION

Collisions between birds and man-made structures, including communication towers, wind turbines, power lines, and buildings, collectively result in a tremendous amount of bird mortality. Buildings are a globally ubiquitous obstacle to avian flight, and collisions with buildings, especially their glass windows (Figure 1), are thought to be a major anthropogenic threat to North American birds (Klem 1990a, 2009, Machtans et al. 2013). Estimates of annual mortality from building collisions range from 100 million to 1 billion birds in the United States (Klem 1990a, Dunn 1993) and from 16 to 42 million birds in Canada (Machtans et al. 2013). This magnitude of mortality would place buildings behind only free-ranging domestic cats among sources of direct human-caused mortality of birds (Blancher 2013, Loss et al. 2013).

Research on bird–building collisions typically occurs at individual sites with little synthesis of data across studies. Conclusions about correlates of mortality and the total magnitude of mortality caused by collisions are therefore spatially limited. Within studies, mortality rates have been found to increase with the percentage and surface area of buildings covered by glass (Collins and Horn 2008, Hager et al. 2008, 2013, Klem et al. 2009, Borden et al. 2010), the presence and height of vegetation (Klem et al. 2009, Borden et al. 2010), and the amount of light emitted from windows (Evans Ogden 2002, Zink and Eckles 2010). In the most extensive building-collision study to date, per-building mortality rates at individual residences were higher in rural than urban areas and at residences with bird feeders than those without feeders (Bayne et al. 2012). However, compared with larger buildings in urban areas (e.g., skyscrapers and low-rise buildings on office and university campuses), detached residences appear to cause lower overall mortality rates and relatively high amounts of mortality during non-migratory periods (Klem 1989, Dunn 1993, O'Connell 2001, Klem et al. 2009, Borden et al. 2010, Machtans et al. 2013).

FIGURE 1. A Swainson's Thrush killed by colliding with the window of a low-rise office building on the Cleveland State University campus in downtown Cleveland, Ohio. Photo credit: Scott Loss

Despite the apparently large magnitude of bird–building collision mortality and the associated conservation threat posed to bird populations, there currently exist no U.S. estimates of building-collision mortality that are based on systematic analysis of multiple data sources. The most widely cited estimate (100 million to 1 billion fatalities per year) was first presented as a rough figure along with qualifications (Klem 1990a) but is now often cited as fact (Best 2008). Assessment of species-specific vulnerability to collisions is also critical for setting conservation priorities and understanding population impacts; however, existing estimates of species vulnerability are limited in spatial scope. In the most systematic U.S. assessment of building collisions to date, species vulnerability was calculated using data from only three sites in eastern North America, but vulnerability values from this limited sample were used to conclude that building collisions have no impact on bird populations continent-wide (Arnold and Zink 2011, but see Schaub et al. 2011, Klem et al. 2012).

We reviewed the published literature on bird–building collisions and also accessed numerous unpublished datasets from North American building-collision monitoring programs. We extracted >92,000 fatality records—by far the largest building collision dataset collected to date—and (1) systematically quantified total bird collision mortality along with uncertainty estimates by combining probability distributions of mortality rates with estimates of numbers of U.S. buildings and carcass-detection and scavenger-removal rates; (2) generated estimates of mortality for different classes of buildings (including residences 1–3 stories tall, low-rise non-residential buildings and residential buildings 4–11 stories tall, and high-rise buildings ≥12 stories tall); (3) conducted sensitivity analyses to identify which model parameters contributed the greatest uncertainty to our estimates; and (4) quantified species-specific

vulnerability to collisions across all buildings and for each building type.

METHODS

Literature Search

We searched Google Scholar and the Web of Science database (using the Web of Knowledge search engine) to locate peer-reviewed publications about bird–building collisions. We used the search terms "bird window collision" and "bird building collision" and both terms with "bird" replaced by "avian." We checked reference lists and an annotated bibliography (Seewagen and Sheppard 2012) to identify additional studies. Data from collision-monitoring programs were located using a Google search with the term "window collision monitoring program" and by contacting program coordinators listed on project websites. We cross-checked the datasets we found with a comprehensive list of "Lights Out" programs provided by C. Sheppard. Additional unpublished datasets were located based on our knowledge of ongoing studies presented at professional conferences or in published abstracts. Finally, we learned of unpublished datasets when contacting first authors of published studies; these additional datasets were either more extensive versions of authors' published datasets, completely new datasets, or in one case, a dataset from an independent citizen scientist.

Inclusion Criteria and Definition of Fatality

Different studies employed different sampling designs and data collection protocols. To reduce this variability, to ensure a baseline for the rigor of studies we used, and to minimize bias in our analyses, we implemented inclusion criteria to filter data at both the study and record levels. Inclusion criteria were different for the analyses of total mortality and species vulnerability. As a first step, we only included studies for in-depth review if they were conducted in the U.S. or Canada and provided original data on bird–building collisions. We implemented study-level inclusion criteria for the estimate of total mortality as follows. We excluded studies that were based on sampling at a single structure; these studies often focus only on unique building types with non-representative mortality rates (e.g., museums, convention centers, or exceptionally tall high-rises). We included datasets that were based on systematic carcass surveys or systematic surveys of home-owners, but we excluded those that were based on sampling in response to predicted building kills, incidental observations, opportunistically sampled collections, or undocumented methods. Because estimating per-building mortality rates was a major component of the mortality estimate, we also excluded studies if they did not record numbers of buildings monitored or provide street addresses of buildings that would have allowed us to estimate numbers of buildings.

Because the species vulnerability analysis was based on count proportions rather than on per-building mortality rates, we implemented a different set of inclusion criteria than that used for the total mortality estimate. This resulted in the use of some studies that were excluded from the total mortality estimate. Studies were only included in the species analysis if they identified carcasses to species. We excluded studies documenting fewer than 100 collision records because proportions based on small samples are more likely to be abnormally high or low. As with the total mortality estimate, we excluded data that were based on incidental or opportunistic sampling or undocumented methods. However, we did include studies even if data were based on sampling of a single structure or if we could not determine the number of buildings sampled. Thus, we assume that species composition within a site is independent of the number of buildings sampled. The study-level inclusion criteria resulted in 23 and 26 datasets used for the total mortality and species vulnerability estimates, respectively (Table 1). Seven studies were excluded from all analyses (Table S1 in Supplemental Material Appendix A).

Many datasets include some collision records that were collected during standardized surveys and others found incidentally. In addition, definitions of fatalities differ among studies. We therefore applied inclusion criteria to filter individual records and set our own definition of what constitutes a fatality. The record-level inclusion criteria were the same for all of our analyses. We excluded records clearly denoted as incidental finds (i.e. not collected during surveys), records with a disposition of "alive" or "survived," and records of released birds. We also excluded records of blood and/or feather spots on windows with no carcass found. From the remaining records, we defined fatalities to include any record with a disposition including "dead," "collected," or any disposition indicating severe injury (e.g., "disabled," "squashed," "fracture," or "injured"). All other records were considered to have unknown disposition (e.g., "stunned," "exhausted," "weak," "dis-oriented," or any disposition indicating a bird was sent to rehabilitation) and were excluded from all analyses. The record-level criteria resulted in 92,869 records that we used to generate total mortality and species vulnerability estimates. It was not possible to confirm whether fatalities were caused by collisions with windows or with other non-reflective portions of buildings; therefore, for the purposes of this study, we treated all records as building–collision fatalities. Nonetheless, the majority of bird mortality at buildings likely occurs due to collision with windows or other reflective surfaces (Klem 2009).

TABLE 1. Sampling coverage, number of buildings sampled, and mortality rates documented in studies meeting inclusion criteria for estimation of total annual U.S. mortality from bird–building collisions and/or calculation of species-specific collision vulnerability.

Building class	Location	Year-round sampling?	Used for mortality estimate?	Used for vulnerability analysis?	Buildings sampled	Mortality per building		Study
						Average	Range	
Residences (1–3 stories)	Alberta	Yes	Yes	No[c]	1,747	0.7	0–43	Bayne et al. 2012
	U.S. & Canada	No	Yes	Yes	1,165	0.85	0–21	Dunn 1993
	Duluth, MN	No	Yes	Yes	42	2.3[f]	?	Bracey 2011
	Illinois	Yes	Yes	No[c]	242	1.5	?	Weiss & Horn 2008
	Carbondale, IL	Yes	No[a]	Yes[h]	1	33.0	NA	Klem 1979
	Purchase, NY	Yes	No[a]	Yes[h]	1	26.0	NA	Klem 1979
Low-rises	Richmond, VA	Yes	Yes	Yes	4	29.0	21–38	O'Connell 2001
	Cleveland, OH	Yes	Yes	Yes	18	15.1	?	Borden et al. 2010
	Elsah, IL	Yes	Yes	Yes	4	24.0	?	Hager et al. 2008
	Decatur, IL	Yes	Yes	Yes	11	7.5[f]	?	Collins & Horn 2008
	Washington, DC	No	Yes	Yes	21–38[e]	4.0	1–30	Lights Out DC 2010–2012
	Rock Island, IL	No	Yes	No[d]	20	2.6	0.3–52.1	Hager et al. 2013
	Decatur, IL	No	Yes	No[d]	11	4.8	?	Horn personal communication
	Murray, KY	No	Yes	No[d]	13	1.6	0–7	Somerlot 2003
	Stillwater, OK	Yes	No[a]	Yes	1	32.0	NA	O'Connell personal communication
	Rock Island, IL	Yes	No[a]	Yes	1	54.8	NA	Hager et al. 2008
	Chicago, IL	No	No[a]	Yes	1	1,028.0[g]	NA	McCormick Place 1978–2012
	Rochester, MN	No	No[b]	Yes	?	?	?	Project Birdsafe Minnesota 2010–2011
	San Francisco, CA	Yes	No[a]	Yes	1	47.2[g]	NA	California Academy of Sciences 2008–2012
High-rises	Indianapolis, IN	No	Yes	Yes	48	3.3	1–14	Lights Out Indy 2009–2010
	Atlanta, GA	No	Yes	Yes	53	8.4	0–40	Sexton 2006
	Calgary, AB	No	Yes	Yes	15–36	5.5[g]	1–89	Collister et al. 1996, 1997, Booth & Collister 1998
	Baltimore, MD	No	Yes	Yes	16–48[e]	7.1[g]	1–81	Lights Out Baltimore 2008–2012
	Twin Cities, MN	No	Yes	Yes	118	3.0[g]	?	Project Birdsafe Minnesota 2007–2012
	New York, NY	No	Yes	Yes	17–31[e]	5.5[g]	1–52	Project Safe Flight New York 2009–2011
	Philadelphia, PA	No	Yes	Yes	10	13.2[g]	?	Pennsylvania Audubon 2008–2011
	Columbus, OH	No	Yes	No[d]	20[e]	1.4	0–5	Lights Out Columbus 2012
	Portland, OR	No	Yes	No[d]	21–44	1.0[g]	?	Bird Safe Portland 2009–2011
	Toronto, ON	No	Yes	Yes	74–194[e]	17.4[g]	1–535	Fatal Light Awareness Program 2000–2010
	Winston-Salem, NC	No	Yes	Yes	16	3.6[g]	0–10	Lights Out Winston-Salem 2011–2012
	Toronto, ON	No	No[a]	Yes	1	157.0	NA	Ranford & Mason 1969
	Chicago, IL	No	No[b]	Yes	?	?	?	Chicago Bird Collision Monitors 2002–2012
	Milwaukee, WI	No	No[b]	Yes	?	?	?	Wisconsin Night Guardians 2007–2011
	Toronto, ON	No	No[b]	Yes	?	?	?	Fatal Light Awareness Prog. 2007, 2011
	New York, NY	No	No[b]	Yes	?	?	?	Klem 2009

[a] Study excluded from total mortality estimate because sampling conducted at a single building.
[b] Study excluded from total mortality estimate because number of buildings sampled not recorded and no information provided to calculate this number.
[c] Study excluded from species estimates because species data not provided.
[d] Study excluded from species estimates because sample size <100.
[e] Number of buildings is an estimate based on the average of potential minimum and maximum (see text); range indicates year-to-year variation in number of buildings sampled.
[f] Mortality rate is corrected for scavenger removal and searcher detection rates.
[g] Mortality rate is an average per-building rate across all years of the study/monitoring program.
[h] Study used for species risk assessment for building class but not assessment across all building classes (sample size <100).

Data Extraction

We classified studies into three building classes thought to cause different mortality rates (Machtans et al. 2013) and for which data on the number of U.S. buildings is available. These classes include residences 1–3 stories tall (detached houses and multi-unit residences; hereafter, "residences"), low-rise non-residential buildings and residential buildings 4–11 stories tall (hereafter, "low-rises"), and high-rise buildings ≥12 stories tall (hereafter, "high-rises"). For unpublished data from downtown areas of major cities, we assumed that all data came from high-rises because it was not possible to determine building height without visiting each site. For all other data sources, we were able to confirm the building type from which data were collected. Published studies that met our inclusion criteria either reported an annual mortality rate per building (averaged across buildings) or presented both the number of dead birds found and the number of buildings sampled, thus allowing us to calculate this rate. For published studies, we extracted a single annual mortality rate for each study unless the study included data from more than one non-adjacent site, in which case we extracted a separate rate for each site (e.g., Klem 1979). For unpublished datasets that included the number of buildings sampled, we always extracted a single mortality rate. This value was generated by first calculating a single-year per-building mortality rate (averaged across buildings) for each year of the study and then averaging these rates across years. In some cases, we determined that two or more sources presented duplicate data when we observed that the data were collected at the same study sites and during the same range of dates. In these instances, we extracted the data from the source that provided more detailed methods or more extensive fatality data, and we excluded the duplicated data when extracting from the other source.

Data from collision-monitoring programs often include the street address or intersection where a carcass was found but not the number of buildings sampled. Single buildings can have more than one address, and a single address can include more than one building. In addition, some monitoring programs have no systematic protocol for recording addresses, resulting in multiple similar entries for an address (e.g., 1 Main, 1 Main St., and 1 Main—Smith Tower). To account for these issues, we entered addresses into Google Maps and used satellite view to determine if addresses referred to one or more buildings. If it was still unclear from mapping whether an address referred to one or more buildings, we assumed it referred to one. Likewise if we could not confirm that two or more similar addresses referred to one building, we assumed they were separate buildings. If addresses with different cardinal directions were possible (e.g., 1 Main E and 1 Main W), we assumed they referred to separate buildings, but if they were not possible (i.e. only 1 Main exists), we assumed data entry error and combined addresses.

Recognizing that these methods could not account for all duplicate addresses and data entry errors, we estimated a minimum and maximum number of buildings sampled in each year. We estimated a maximum number based on the number of unique addresses remaining after following the above steps and the assumption that intersections referred to a number of buildings equal to the number of carcasses found up to four (i.e. four or more carcasses may result from collision with four separate buildings, one at each intersection corner). We estimated a minimum number by combining similar addresses that may have been from one building, even if we could not confirm this with mapping, and assuming that all intersections referred to one building. We used the average of the minimum and maximum number to estimate per-building mortality rates.

Quantification of Annual Mortality from Building Collisions

The studies we used cover varying portions of the year, but most focus all or most of sampling effort on migration periods. Using raw per-building mortality rates would therefore result in a national estimate that is only relevant to spring and fall migration periods. We sought to account for partial-year sampling and to generate estimates that reflected the entire year, because several studies have indicated that building collision mortality can be substantial during summer and winter (Dunn 1993, Klem 2009, Bayne et al. 2012, Hager et al. 2013). Given enough year-round studies, partial-year mortality rates can be standardized to year-round estimates using year-round studies as a baseline (Longcore et al. 2012, Loss et al. 2013). However, there were few year-round studies that met inclusion criteria (Table 1), so we could not adjust individual studies to year-round estimates. Instead, we accounted for this limitation in our estimation model (details below) by only using a year-round study for residences, repeating estimation using a subset of studies that sampled year-round for low-rises, or incorporating a correction factor to account for mortality during periods other than migration for high-rises, a building type for which little data exists for summer and winter (see definition of and rationale for this correction factor in Supplemental Material Appendix B). Despite the limitation of applying a post hoc correction factor to the high-rise estimate, we argue that this approach is preferable to assuming that no mortality occurs during the summer and winter.

We estimated mortality in each building class by multiplying data-derived probability distributions of per-building mortality rates by distributions of numbers of buildings. For residences, we followed Machtans et al.

(2013), which based mortality rates on the only year-round building collision survey to date that sampled across a large number of residences, a study of 1,458 Alberta residents in single and multi-unit residences (Bayne et al. 2012). This study documented higher mortality rates at rural residences compared with urban residences and at residences with bird feeders compared with those without feeders. The study also documented increasing mortality with increasing age of urban residences. We incorporated these elements into our residence sub-model:

$$\text{Mortality}_{\text{rural with feeder}}(M_{\text{RF}}) = N_{\text{residence}} \times R \times F \times K_{\text{rural with feeder}} \times D_{\text{residence}} \quad (1)$$

$$\text{Mortality}_{\text{rural no feeder}}(M_{\text{RNF}}) = N_{\text{residence}} \times R \times (1-F) \times K_{\text{rural no feeder}} \times D_{\text{residence}} \quad (2)$$

$$\text{Mortality}_{\text{urban with feeder}}(M_{\text{UF}}) = N_{\text{residence(age)}} \times (1-R) \times F \times K_{\text{urban with feeder(age)}} \times D_{\text{residence}} \quad (3)$$

$$\text{Mortality}_{\text{urban no feeder}}(M_{\text{UNF}}) = N_{\text{residence(age)}} \times (1-R) \times (1-F) \times K_{\text{urban no feeder(age)}} \times D_{\text{residence}} \quad (4)$$

$$\text{Mortality}_{\text{residences}}(M_{\text{R}}) = M_{\text{RF}} + M_{\text{RNF}} + M_{\text{UF}} + M_{\text{UNF}} \quad (5)$$

where N is the number of residences in the U.S., R is the percentage of residences in rural areas, F is the percentage of residences with bird feeders, K is the annual per-building mortality rate, and D is a correction factor to account for two biases that lead to underestimation of mortality (Hager et al. 2013): removal of carcasses by scavengers prior to fatality surveys and imperfect detection of the carcasses remaining at the time of surveys. For Equations (3) and (4), we calculated mortality by building age classes (0–8, 9–18, and 19–28 years, and all ages $\geq$29 years), and summed estimates across age classes. These age classes correspond closely to those in Machtans et al. (2013), but we shifted classes slightly (e.g., 9–18 years instead of 10–20 years) to match housing age data from the U.S. Census Bureau.

For low-rises, we generated two separate estimates of collision mortality, one using mortality rates based on all eight studies meeting our inclusion criteria and one based only on four year-round studies. We used the following sub-model for both estimates:

$$\text{Mortality}_{\text{low-rise}}(M_{\text{L}}) = N_{\text{low-rise}} \times K_{\text{low-rise}} \times D_{\text{low-rise}} \quad (6)$$

For high-rises, there are no datasets based on year-round systematic sampling. We incorporated a correction factor (Y) into the mortality estimation sub-model to account for additional fatalities occurring outside of migration periods:

$$\text{Mortality}_{\text{high-rise}}(M_{\text{H}}) = N_{\text{high-rise}} \times K_{\text{high-rise}} \times Y \times D_{\text{high-rise}} \quad (7)$$

We estimated total annual building collision mortality by summing estimates for individual building classes; we conducted estimation twice, once using each of the low-rise estimates:

$$\text{Mortality}_{\text{total}} = M_{\text{R}} + M_L + M_{\text{H}} \quad (8)$$

All of the above parameters were treated as probability distributions. From the probability distribution of each parameter (see Table 2 for specific distributions, Supplemental Material Appendix B for rationale for all distributions, and Table S2 in Supplemental Material Appendix C for numbers of buildings), we randomly drew one value and used the above formulas. We used "runif" and "rnbinom" commands (for uniform and negative binomial distributions, respectively) in Program R and conducted 10,000 iterations to generate a range of estimate uncertainty.

Sensitivity Analysis

We used multiple linear regression analyses assuming a normal error distribution (function "lm" in Program R) to investigate the percentage of uncertainty in mortality estimate ranges explained by each model parameter (Blancher 2013, Loss et al. 2013). We treated the 10,000 mortality-estimate replicates as the values of the dependent variable and randomly drawn values of each parameter as values of predictor variables. We used partial R^2 values to interpret the percentage of variance in the estimate range explained by each parameter. We repeated this regression analysis four times: once for the total mortality estimate (including all parameters) and once for each of the three building class estimates (with each regression model only including the parameters relevant to that building class).

Quantification of Species Vulnerability

In addition to estimating total annual mortality, we calculated vulnerability for species and taxonomic groups. We followed Arnold and Zink (2011), who identified "super-collider" and "super-avoider" species using collision records from three unpublished datasets. We greatly expanded upon the earlier study by using 26 datasets from across North America (Table 1). All analyses described below were conducted across all datasets to estimate overall building collision vulnerability, as well as separately

TABLE 2. Probability distributions used to estimate total annual U.S. mortality from bird–building collisions. We defined uniform distributions for most parameters because not enough data exist to ascribe higher probability to particular values in the defined range. We defined negative binomial distributions for the low-rise and high-rise mortality rate distributions because they allowed the majority of probability density to match the confidence intervals indicated by the data while also allowing for a small probability of higher collision mortality rates, reflecting the exceptionally high mortality rates that have been documented at some low-rises and high-rises (see mortality rates in Table 1).

Parameter	Distribution type	Distribution parameters	Source
Residences (1–3 stories)			
Number of residences	Uniform	Varies by age (Supplemental Material Appendix C)	U.S. Census Bureau 2011
Percentage in urban areas	Uniform	Min = 72.6%; Max = 88.8%	U.S. Census Bureau 2012
Percentage with bird feeders	Uniform	Min = 15%; Max = 25%	Dunn 1993
Mortality rate			
Rural with feeders (all ages)	Uniform	Min = 2.17; Min = 4.03	Bayne et al. 2012, Machtans et al. 2013
Rural without feeders (all ages)	Uniform	Min = 0.98; Max = 1.82	Bayne et al. 2012, Machtans et al. 2013
Urban with feeders			
Age 0–8	Uniform	Min = 0.28; Max = 0.52	Bayne et al. 2012, Machtans et al. 2013
Age 9–18	Uniform	Min = 0.42; Max = 0.78	Bayne et al. 2012, Machtans et al. 2013
Age 19–28	Uniform	Min = 0.56; Max = 1.04	Bayne et al. 2012, Machtans et al. 2013
Age 29+	Uniform	Min = 0.63; Max = 1.17	Bayne et al. 2012, Machtans et al. 2013
Rural without feeders			
Age 0–8	Uniform	Min = 0.11; Max = 0.20	Bayne et al. 2012, Machtans et al. 2013
Age 9–18	Uniform	Min = 0.18; Max = 0.33	Bayne et al. 2012, Machtans et al. 2013
Age 19–28	Uniform	Min = 0.25; Max = 0.46	Bayne et al. 2012, Machtans et al. 2013
Age 29+	Uniform	Min = 0.28; Max = 0.52	Bayne et al. 2012, Machtans et al. 2013
Scavenging/detectability correction	Uniform	Min = 2; Max = 4	Dunn 1993
Low-rises			
Number of low-rises	Uniform	Min = 14.0 million; Max = 16.2 million	Multiple sources (see Supplemental Material Appendix C)
Mortality rate (all studies)	Neg. bin.	$n = 4.6$; $p = 0.35$	95% of distribution prob. density = 4–18[a]
Mortality rate (year-round studies)	Neg. bin.	$n = 5.1$; $p = 0.26$	95% of distribution prob. density = 5–28[b]
Scavenging/detectability correction	Uniform	Min = 1.28; Max = 2.56	Hager et al. 2012, 2013
High-rises			
Number of high-rises	Uniform	Min = 19,854; Max = 21,944	Sky Scraper Source Media 2013
Mortality rate	Neg. bin.	$n = 4.0$; $p = 0.37$	70% of distribution prob. density = 4–11[b]
Partial-year sampling correction	Uniform	Min = 1.05; Max = 1.20	Additional 5–20% mortality outside of migration
Scavenging/detectability correction	Uniform	Min = 1.37; Max = 5.19	Ward et al. 2006, Hager 2012, 2013

[a] Range represents 95% confidence interval of mortality rates calculated across all eight studies of low-rises meeting inclusion criteria.
[b] Range represents 95% confidence interval of mortality rates calculated from four year-round studies of low-rises meeting inclusion criteria.
[c] Range represents 95% confidence interval of mortality rates calculated from 11 studies of tall buildings meeting inclusion criteria.

for each building class to estimate class-specific vulnerability. As described previously, we only included datasets with more than 100 records for the overall vulnerability analysis. However, because there were only two datasets for residences that had more than 100 records, we also included two smaller datasets to calculate collision vulnerability for this building class.

Numbers of fatalities can vary among species due to population abundance and the degree of range overlap with study locations (Arnold and Zink 2011). To account for population abundance, we extracted national population size estimates from the Partners in Flight Population Estimates Database (Rich et al. 2004), which includes North American population estimates generated using U.S. Breeding Bird Survey data (Sauer et al. 2012). We used North American abundance rather than regional abundance because it is difficult to link study sites where mortality occurs to the affected regional subsets of bird populations, especially for species that are killed primarily during migration (Loss et al. 2012). To account for range overlap with study sites, we counted the number of sites overlapping with each species' breeding, wintering, and/or migration range (Sibley 2000). We followed Arnold and Zink's (2011) approach for calculating species vulnerability. To give each site equal weighting, we first standardized each dataset to 36,000, the largest single-site total

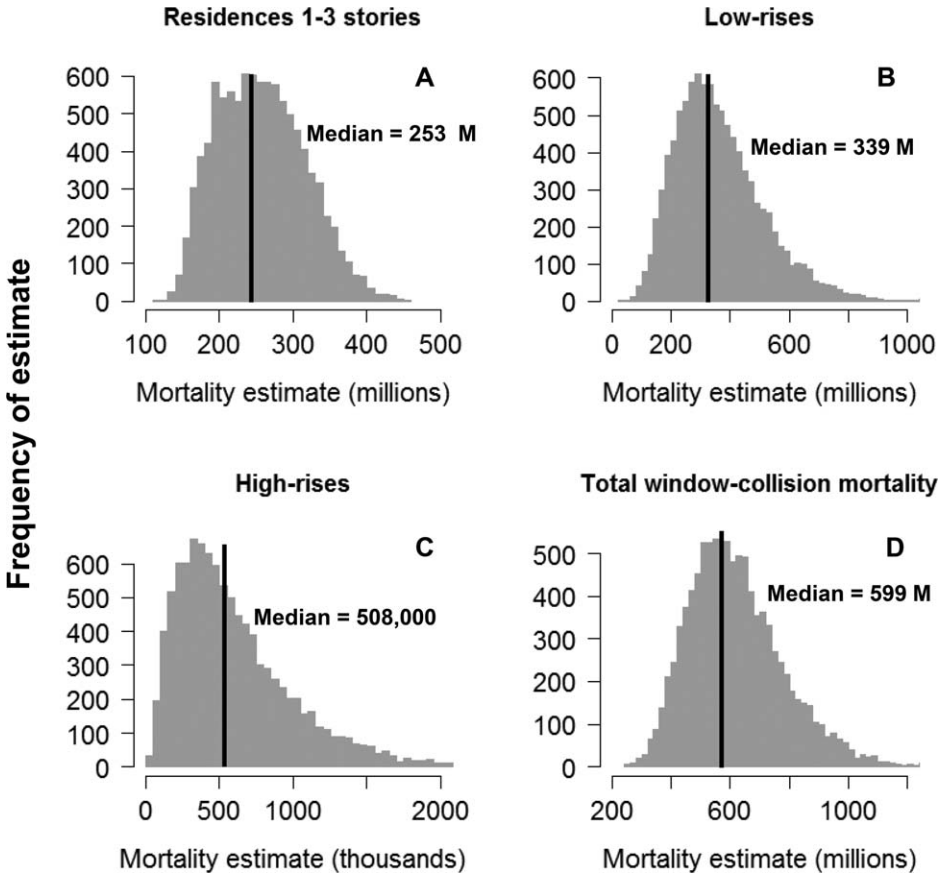

FIGURE 2. Frequency histograms for estimates of annual U.S. bird mortality caused by collisions with (**A**) residences 1–3 stories tall, (**B**) low-rises (residences 4–11 stories tall and all non-residential buildings $\leq$11 stories tall), (**C**) high-rises (all buildings $\geq$12 stories tall), and (**D**) all buildings. Estimates for low-rises and for all buildings are based on the average of two estimates: one calculated with all eight low-rise studies meeting inclusion criteria and one calculated with a subset of four low-rise studies that conducted year-round sampling.

number of fatalities, and then summed standardized counts across studies for each species. We regressed $\log_{10}(X+1)$ species counts ($X + 1$ transformation to account for zero counts for some species at some sites) on $\log_{10}$ population size and $\log_{10}$ range overlap. Vulnerability was estimated by fixing coefficients for population size and range overlap to 1.0 (this assumes that, for example, a 10-fold increase in abundance is associated with a 10-fold increase in collision mortality, all else being equal; Arnold and Zink 2011), calculating residuals, and raising 10 to the power of the absolute value of residuals. This approach of fixing model coefficients was taken because there was an unknown level of error in both the dependent and independent variables and, therefore, standard regression models could not produce unbiased slope estimates (Warton et al. 2006, Arnold and Zink 2011). Calculated vulnerability values indicate the factor by which a species has a greater chance (positive residuals) or smaller chance (negative residuals) of experiencing building collision mortality compared with a species with average vulnerability. We estimated vulnerability for taxonomic groups by averaging residuals across species occurring in at least two studies.

RESULTS

Estimates of Bird–Building Collision Mortality

The 95% confidence interval of annual bird mortality at residences was estimated to be between 159 and 378 million (median = 253 million) (Figure 2A and Table 3) after correcting for scavenger removal and imperfect detection. This equates to a median annual mortality rate of 2.1 birds per building (95% CI = 1.3–3.1). Reflecting the large number of residences in urban areas and residences without bird feeders, we estimate that urban residences without feeders cumulatively account for 33% of mortality at residences, followed by rural residences without feeders (31%), urban residences with feeders (19%), and rural residences with feeders (17%).

TABLE 3. Estimates of annual bird mortality caused by building collisions at U.S buildings. For low-rises (and therefore, for the total mortality estimate), we generated two separate estimates of collision mortality, one using mortality rates based on all eight low-rise studies meeting our inclusion criteria and one based on a subset of four low-rise studies that sampled mortality year-round.

		Point estimate		95% CI	
Building class	Mean no. of buildings in U.S.	Total	Per building	Total	Per building
Residences (1–3 stories)	122.9 million	253.2 million	2.1	159.1–378.1 million	1.3–3.1
Low-rises	15.1 million	245.5 million[a]	16.3[a]	62.2–664.4 million[a]	4.1–44.0[a]
		409.4 million[b]	27.1[b]	114.7–1,028.6 million[b]	7.6–68.1[b]
High-rises	20,900	508,000	24.3	104,000–1.6 million	5.0–76.6
Total	138.0 million	507.6 million[a]	3.7[a]	280.6–933.6 million[a]	2.0–6.8[a]
		667.1 million[b]	4.8[b]	349.9–1,296 million[b]	2.5–9.4[b]

[a] Estimate based on low-rise estimate using all eight studies meeting inclusion criteria.
[b] Estimate based on low-rise estimate using subset of four year-round studies meeting inclusion criteria.

The 95% confidence interval of annual low-rise mortality based on all studies meeting inclusion criteria was estimated to be between 62 and 664 million birds (median = 246 million). The 95% confidence interval based on the four year-round low-rise studies was estimated to be between 115 million and 1.0 billion birds (median = 409 million). The average of the two median figures is 339 million (95% CI = 136–715 million) (Figure 2B), equating to a median annual rate of 21.7 birds per building (95% CI = 5.9–55).

The 95% confidence interval of high-rise mortality was estimated to be between 104,000 and 1.6 million birds (median = 508,000) (Table 3 and Figure 2C) after correcting for scavenger removal, imperfect carcass detection, and mortality during periods other than migration. Despite causing the lowest total mortality, high-rises had the highest median annual mortality rate: 24.3 birds per building (95% CI = 5–76). Combining estimates from all building classes (using the average of the two low-rise estimates) results in an estimate of 599 million birds killed annually across all U.S. buildings (95% C.I. = 365–988 million) (Figure 2D).

Factors Explaining Estimate Uncertainty

Due to the large number of low-rises and uncertainty about low-rise mortality rates, sensitivity analyses indicated that the low-rise mortality rate explained a large amount of uncertainty for the estimates of both low-rise mortality (85%) and total mortality (75%). Other parameters explaining substantial uncertainty for the total estimate included the correction factors for scavenger removal and carcass detection at low-rises (10%) and residences (9%). For residences, 70% of uncertainty was explained by the correction factor for scavenging and detection and 15% was explained by the proportion of residences in urban areas. For the high-rise estimate, the greatest uncertainty was explained by the mortality rate (67%), followed by the correction factor for scavenging and detection (25%).

Species Vulnerability to Building Collisions

Of 92,869 records used for analysis, the species most commonly reported as building kills (collectively representing 35% of all records) were White-throated Sparrow (*Zonotrichia albicollis*), Dark-eyed Junco (*Junco hyemalis*), Ovenbird (*Seiurus aurocapilla*), and Song Sparrow (*Melospiza melodia*). However, as expected, there was a highly significant correlation between fatality counts and population size ($r = 0.53$, $P < 0.001$, df =213) and between counts and range overlap with study sites ($r = 0.25$, $P < 0.001$, df = 223). After accounting for these factors, estimated vulnerability across all buildings was highly variable, ranging from 1,066 times more likely to collide than average to 273 times less likely to collide than average (high vulnerability species in Table 4; all values in Tables S3–S6 in Supplemental Material Appendix D).

Several species exhibit disproportionately high vulnerability to collisions regardless of building type, including Ruby-throated Hummingbird (*Archilochus colubris*), Brown Creeper (*Certhia americana*), Ovenbird, Yellow-bellied Sapsucker (*Sphyrapicus varius*), Gray Catbird (*Dumetella carolinensis*), and Black-and-white Warbler (*Mniotilta varia*). Seven species that are disproportionately vulnerable to building collisions are national Birds of Conservation Concern and 10 are listed regionally (Table 4; U.S. Fish and Wildlife Service 2008). Species in the former group include Golden-winged Warbler (*Vermivora chrysoptera)* and Canada Warbler (*Cardellina canadensis*) at low-rises, high-rises, and overall, Painted Bunting (*Passerina ciris*) at low-rises and overall, Kentucky Warbler (*Geothlypis formosa*) at low-rises and high-rises, Worm-eating Warbler (*Helmitheros vermivorum*) at high-rises, and Wood Thrush (*Hylocichla mustelina*) at residences. For species with vulnerability indices calculated from a

TABLE 4. Estimates of species vulnerability to building collisions. Risk values indicate the factor by which species are at a greater risk of collision compared with a species with average risk. Species in boldface italics are Birds of Conservation Concern at the national level and species in boldface are Birds of Conservation Concern in at least one U.S. region (U.S. Fish and Wildlife Service 2008). Scientific names are in Supplemental Material Appendix D.

All buildings		Residences (1–3 stories)		Low-rises		High-rises	
Species	Risk	Species	Risk	Species	Risk	Species	Risk
Anna's Hummingbird[a]	1,066.4	**Purple Finch**	257.2	***Golden-winged Warbler***	141.7	Townsend's Solitaire	167.4
Black-throated Blue Warbler	45.5	Ruby-throated Hummingbird	174.7	***Painted Bunting***	129.3	Black-throated Blue Warbler	78.5
Ruby-throated Hummingbird	37.0	Ovenbird	112.1	Ruby-throated Hummingbird	103.7	Connecticut Warbler	52.0
Townsend's Solitaire	36.3	Brown Creeper	81.1	Black-throated Blue Warbler	86.4	Brown Creeper	44.3
Golden-winged Warbler	35.3	House Finch	80.1	Swamp Sparrow	50.6	Ovenbird	43.7
Painted Bunting	32.1	Black-and-white Warbler	68.7	***Canada Warbler***	46.7	Ruby-throated Hummingbird	43.4
Brown Creeper	26.2	Cedar Waxwing	50.5	**Louisiana Waterthrush**	46.4	***Worm-eating Warbler***	26.5
Connecticut Warbler	22.9	**Field Sparrow**	48.3	Brown Creeper	44.8	***Canada Warbler***	25.8
Ovenbird	21.8	***Wood Thrush***	41.0	**Yellow-bellied Sapsucker**	38.3	Gray Catbird	23.9
Canada Warbler	17.9	Swainson's Thrush	34.7	Connecticut Warbler	35.7	**Yellow-bellied Sapsucker**	23.7
Swamp Sparrow	16.7	Northern Cardinal	27.5	Ovenbird	30.4	***Golden-winged Warbler***	23.1
Yellow-bellied Sapsucker	16.2	Blue Jay	26.5	Sharp-shinned Hawk	27.8	American Woodcock	22.1
Louisiana Waterthrush	14.3	White-breasted Nuthatch	25.0	Rose-breasted Grosbeak	24.1	Common Yellowthroat	20.4
Gray Catbird	12.8	**Yellow-bellied Sapsucker**	22.6	Gray Catbird	23.2	Scarlet Tanager	18.5
Pine Grosbeak[a]	12.4	Northern Waterthrush	22.5	Black-and-white Warbler	22.7	Black-and-white Warbler	18.3
American Woodcock	11.7	Nashville Warbler	22.2	American Woodcock	21.1	Swamp Sparrow	18.1
Pygmy Nuthatch[a]	11.4	Gray Catbird	20.7	***Kentucky Warbler***	20.2	Rose-breasted Grosbeak	16.2
Black-and-white Warbler	11.1	**Northern Flicker**	20.2	Mourning Warbler	19.3	***Kentucky Warbler***	14.0
Pied-billed Grebe[a]	11.0	Downy Woodpecker	18.7	Common Yellowthroat	18.4	**Northern Goshawk**	13.6
Common Yellowthroat	10.9	Black-capped Chickadee	14.9	Cape May Warbler	16.7	**Eastern Whip-poor-will**	13.4

[a] Species is ranked for all buildings but not individual classes because it occurs in $\geq$2 total studies, but $<$2 studies within building class.

relatively small sample of studies (e.g., those noted with a superscript in Table 4), vulnerability indices may be biased. For example, the exceptionally high vulnerability value for Anna's Hummingbird (*Calypte anna*) likely results from this species occurring in only two studies and experiencing exceptionally high mortality in one of these studies.

Vulnerability estimates for taxonomic groups are in Table 5. Several high-risk bird groups are represented in our dataset by only one or two species (e.g., grebes, shorebirds, kingfishers, and gulls and terns); average risk values for these groups may not represent the entire taxonomic family. Other taxa, particularly the hummingbirds and swifts and the warblers, appear especially vulnerable to building collisions, with more than one species ranking in the overall high-vulnerability list. In particular, warblers experience disproportionately high collision risk, with 10 species ranking among the 25 most vulnerable species overall and 12 and 14 species ranking among the 25 most vulnerable species for low-rises and high-rises, respectively. Taxonomic groups with particularly low collision risk include ducks and geese, swallows, herons, upland game birds, and blackbirds, meadowlarks, and orioles.

TABLE 5. Average vulnerability of bird groups to building collisions across all building types. Risk values indicate the factor by which a species has a greater chance (for positive residuals) or a smaller chance (for negative residuals) of mortality compared with a species with average risk.

Group	Residual	Risk
Hummingbirds and swifts	1.52	33.2
Grebes	1.04	11.0
Shorebirds	0.68	4.7
Kingfishers[a]	0.56	3.6
Waxwings	0.55	3.6
Warblers	0.54	3.4
Gulls and terns[a]	0.52	3.3
Nuthatches, tits, and creeper	0.50	3.1
Cuckoos	0.46	2.9
Mimic thrushes	0.41	2.6
Diurnal raptors	0.40	2.5
Cardinaline finches	0.36	2.3
Kinglets	0.36	2.3
Thrushes	0.25	1.8
Cardueline finches	0.23	1.7
Nightjars	0.16	1.4
Woodpeckers	0.15	1.4
Owls	0.10	1.3
Doves and pigeons	0.08	1.2
Sparrows	0.08	1.2
House Sparrow[a]	−0.15	1.4
Wrens	−0.20	1.6
Coots and rails	−0.24	1.7
Flycatchers	−0.41	2.6
Vireos	−0.55	3.6
Starling[a]	−0.56	3.6
Corvids	−0.61	4.1
Blackbirds, meadowlarks, and orioles	−0.64	4.4
Upland game birds	−0.77	5.9
Herons	−1.05	11.3
Swallows	−1.07	11.6
Ducks and geese	−1.25	17.9
Gnatcatchers[a]	−1.68	48.1

[a] Values based on data from a single species.

DISCUSSION

Comparison of Mortality Estimate to Previous Estimates

Our estimate of 365–988 million birds killed annually by building collisions is within the often-cited range of 100 million to 1 billion (Klem 1990a). Other estimates are either outdated (3.5 million, Banks 1979) or are simply a mid-point of the above range (550 million, Erickson et al. 2005). Our larger estimate of low-rise mortality based only on year-round studies suggests that total annual building collision mortality could exceed one billion birds, as suggested by Klem (2009). Using the year-round low-rise estimate results in an annual mortality estimate of up to 1.3 billion birds. Regardless of which figure is interpreted, our results support the conclusion that building collision mortality is one of the top sources of direct anthropogenic mortality of birds in the U.S. Among other national estimates that are data-driven and systematically derived, only predation by free-ranging domestic cats is estimated to cause a greater amount of mortality (Loss et al. 2013). A similar ranking has been made for anthropogenic threats in Canada (Blancher et al. 2013, Machtans et al. 2013). Major sources of direct anthropogenic bird mortality currently lacking systematically derived estimates include collisions with automobiles and other vehicles, collisions and electrocution at power lines, and poisoning caused by agricultural chemicals, lead, and other toxins. Additional systematic quantification of mortality is needed to allow rigorous comparisons among all mortality sources.

A general pattern across and within building classes is that a large proportion of all mortality occurs at structures that kill small numbers of birds on a per-building basis but collectively constitute a high percentage of all buildings (e.g., residences compared to low-rises and high-rises; urban compared to rural residences; residences without feeders compared to those with feeders). This finding suggests that achieving a large overall reduction in mortality will require mitigation measures to be applied across a large number of structures (e.g., urban residences). Our conclusion about the relative importance of residences for causing U.S. mortality is similar to that made for Canada by Machtans et al. (2013). This similarity arises because residences are estimated to comprise a similar proportion of all buildings in both countries (87.5% in the U.S and 95.3% in Canada). Even assuming the low-end mortality estimate for residences (159 million), total

mortality at high-rises would have to be 100 times greater than our high-end estimate for that building class (1.6 million) for the two building classes to cause equivalent mortality. On a per-building basis, if each residence killed one bird per year, each high-rise would have to kill >5,800 birds per year to cause equivalent mortality. No evidence exists that high-rises kill this large number of birds.

The species composition of window collision mortality also differs by building class. While the high risk group for individual residences includes several non-migratory resident species—including Downy Woodpecker (*Picoides pubescens*), Black-capped Chickadee (*Poecile atricapillus*), and Northern Cardinal (*Cardinalis cardinalis*)—nearly all high-risk species for low-rise and high-rise buildings are migratory. Compared with resident species, migratory species traverse longer distances, use a greater diversity of habitat types, and encounter more building types and total buildings during the annual cycle. Additionally, migratory species are attracted to large lighted buildings during their nocturnal migration; this attraction causes a large amount of mortality at low-rises and high-rises as birds either immediately collide with lighted buildings or become entrapped before later dying of collision or exhaustion (Evans Ogden 1996). The greater representation of resident species in the high-risk group for residences may be due to the propensity for many of these species to congregate at bird feeders, a behavior that may place them at a greater risk of colliding with windows (Dunn 1993, Klem et al. 2004, Bayne et al. 2012).

Despite the critical importance of reducing mortality at residences, mitigation measures targeted at a relatively small number of buildings with high per-building mortality rates (e.g., some high-rises and low-rises) will likely result in large per-building reductions in mortality and therefore may represent a cost-efficient starting point for reducing mortality. The mortality proportions that we attribute to different residence types are similar to those estimated by Machtans et al. (2013). This result arises from both the previous study and ours basing analysis on Bayne et al. (2012), a Canadian study that provides a reasonable approximation of U.S. mortality rates as evidenced by rates documented in U.S. studies (Dunn 1993, Weiss and Horn 2008, Bracey 2011).

Species Vulnerability to Building Collisions

Our vulnerability analysis indicates that several species experience a disproportionately high risk of building collision mortality. Of particular concern within the list of high-risk species (Table 4) are those identified as national Birds of Conservation Concern (species likely to become candidates for listing under the U.S. Endangered Species Act without further action based on population trends, threats to populations, distribution, abundance, and relative density; U.S. Fish and Wildlife Service 2008). For species that are vulnerable to collisions at more than one building class or overall, including Golden-winged Warbler, Painted Bunting, Kentucky Warbler, and Canada Warbler, building collision mortality appears substantial and may contribute to or exacerbate population declines. For species identified as highly vulnerable to collision for one building class but not across building types (Wood Thrush at residences, Worm-eating Warbler at high-rises), building collisions may still represent a threat. However, risk rankings for these species are more likely to be inflated by high mortality rates at a few sites, and further research is required to clarify the degree to which populations of these species are threatened by collision mortality.

Inferences about population impacts of a mortality source should ideally be based on incorporating mortality estimates into demographic models (Loss et al. 2012) or comparing estimates to population abundance (Longcore et al. 2013). Data limitations preclude intensive population modeling of building collision impacts. Sampling bias toward densely populated areas east of the Mississippi River, and therefore toward certain bird species, prevented us from estimating species-specific annual mortality. We initially attempted to apply average species proportions to the overall mortality estimate following Longcore et al. (2013), but this method returned unrealistically high estimates for species that comprised a high percentage of counts in many studies (e.g., 140% of the total population of Ovenbirds estimated to be killed each year by building collisions). Our vulnerability estimates controlled for abundance and range overlap with study sites and therefore provide a less biased approximation of species-specific collision risk.

Our vulnerability analysis expanded upon the analysis of Arnold and Zink (2011), which was based on three sites in the northeastern U.S. and adjacent Canada. Nonetheless, we documented some of the same vulnerable species, including Brown Creeper, Black-throated Blue Warbler (*Setophaga caerulescens*), and Swamp Sparrow (*Melospiza georgiana*), and similar high- and low-risk taxonomic groups (e.g., warblers and swallows, respectively). As in the previous study, the vast majority of highly vulnerable species were long-distance migrants. Unlike the previous study, we did not assess whether population trends were correlated with building collision vulnerability. This approach has received criticism (Schaub et al. 2011, Klem et al. 2012) and shifts focus away from identifying which individual species of conservation concern face a high risk of colliding with buildings.

Research Needs and Protocol Improvements

Sensitivity analyses indicated that more research of mortality rates at low-rises will contribute greatly to improving mortality estimates. Future research should sample a variety of low-rise types, including residential,

commercial, and industrial buildings. Research at low-rises has occurred mostly at buildings that are known to cause large numbers of fatalities (e.g., office or university campus buildings with many windows and/or near favorable bird habitat). Random selection of buildings for monitoring (for all building classes) allows for less-biased conclusions about local mortality rates and more reliable extension of results within study areas and across regions. Mortality data specific to different low-rise building types will allow improvement upon the current approach of assuming that all low-rise buildings have similar mortality rates. Because we based our low-rise estimate on the number of U.S. "establishments," and because the relationship between numbers of establishments and numbers of buildings is unknown, we suggest that improved data be collected and made available for the number of U.S. low-rise buildings. Non-residential low-rises are not currently included in assessments by the U.S. Census Bureau.

Sensitivity analyses also indicate that mortality estimates will benefit from quantification of searcher efficiency and scavenger removal rates. Recent research has resulted in major advancements in understanding these biases, including studies that estimate carcass detection and/or scavenger removal rates (Collins and Horn 2008, Hager et al. 2012, 2013) or apply methods to simultaneously account for both biases (Bracey 2011, Etterson 2013). In the future, studies should account for these biases when possible and investigate how these rates are affected by size and species of carcasses, abundance and community composition of scavengers, and characteristics of vegetation and habitat near buildings.

A large portion of the unpublished data we used were collected by volunteer-led collision-monitoring programs in major cities. These citizen-science programs have contributed greatly to the understanding of bird–building collisions; however, standardization of data collection and recording procedures is necessary to make these data more comparable across programs and across years within programs. As a first step, all monitoring programs should record sampling effort, including (1) a record of all surveys conducted, even those with zero fatalities found; (2) the number of person-hours of sampling in every survey; (3) the number of buildings and building facades sampled; (4) street addresses of buildings (with attention to avoiding multiple addresses referring to one building and clarifying when one address includes >1 building); and (5) separate records of fatalities found during surveys on official routes and those found incidentally outside of survey periods and/or off of routes. This information will allow increased comparability of data among regions, improved understanding of seasonal and regional mortality patterns, and reduced bias in estimates of per-building mortality rates and overall mortality. Combining effort-corrected mortality data with information about buildings (e.g., height in stories and meters; orientation and area of building facades; glass area, type, extent, and reflectivity; vegetation presence, type, density, and height; and amount of light emitted), will allow identification of mortality rate correlates, prediction of mortality rates from building characteristics, and implementation of techniques to reduce mortality. Monitoring programs could also expand to incorporate sampling at multiple building types, including individual residences and additional types of low-rises and high-rises. A national reporting system and database for bird mortality data would facilitate standardization of data collection for building collisions and other mortality sources (Loss et al. 2012). Until this type of comprehensive system is developed and launched, window collision monitoring programs can use simple user-defined data entry portals that will increase standardization of data recording, formatting, and compilation (see example at https://docs.google.com/spreadsheet/viewform?usp=drive_web&formkey=dDA1dDVTSVUzS1NfX0NxWmZxTEctbHc6MQ#gid=0), and therefore benefit research that synthesizes multiple datasets.

Model Limitations

Because data collection methods varied greatly among studies, we could not account for all differences among the datasets we synthesized. How this limitation influenced our estimates is unclear. Nonetheless, our inclusion criteria removed studies that lacked a systematic component to sampling, and we accounted for partial-year sampling by either estimating mortality using only year-round studies or applying correction factors to mortality estimates. We also accounted for sample size differences when estimating species vulnerability. However, the data we analyzed overrepresented the eastern U.S. and underrepresented the Great Plains, Interior West, and West Coast. Because of this data limitation, the mortality rate distributions that we applied to all U.S. buildings were primarily based on data from the eastern U.S. This could have biased our estimates if mortality rates in the West differ consistently from those documented in the East; however, the lack of western data prevents conclusions about such regional variation. In addition, our species vulnerability estimates do not cover species with a large proportion of their range in the West. Further research of bird–building collisions in areas west of the Mississippi River is needed to document whether per-building mortality rates differ consistently from those in well-studied regions of the east and to assess building collision vulnerabilities for western bird species. Our mortality estimates are limited by the assumption that all non-residential establishments listed by the U.S. Census Bureau are ≤11 stories tall and that all buildings sampled by monitoring programs in major downtown areas are >12 stories tall. These assumptions were unavoidable because U.S. low-rise building data are not available and

building height information was not recorded in most studies.

Our mortality estimates may be conservative because data from buildings that cause exceptionally high annual rates of collision were removed from our analysis before extending average rates to the scale of the entire U.S. Hundreds to greater than one thousand birds per year have been found at intensively monitored buildings in or near areas with a high concentration of birds during migration (e.g., Taylor and Kershner 1986, M. Mesure and D. Willard personal communication). Other factors that may have contributed to underestimation include crippling bias (e.g., an uncertain percentage of birds fly away from sampling areas before dying) and sub-lethal effects that may influence social interactions and migration behavior even if not causing eventual death (Klem 1990b). Further research to quantify crippling bias and sub-lethal effects is crucial for continued improvement in the accuracy of mortality and species vulnerability estimates.

Finally, we were unable to quantify seasonal patterns of mortality due to a limited sample of studies that surveyed throughout the year. Additionally, several studies employed varying sampling effort across seasons and did not record effort data that could be used to account for this variation. Among records meeting our inclusion criteria, 60.0% were found during fall migration (August–November) and 37.0% were found during spring migration (March–May). These figures are likely inflated relative to non-migratory periods because most studies sampled only during spring and fall. Despite varying sampling effort among seasons, mortality during fall migration appears to be consistently greater than during spring migration; this pattern was seen in most of the datasets and could be related to larger populations of birds in the fall due to presence of young-of-the-year birds. Notably, several studies have indicated substantial building collision mortality during periods outside of migration, including in winter at individual residences (Dunn 1993, Klem 2009) and in summer at low-rise buildings (Bayne et al. 2012, Hager et al. 2013). Our methods accounted for partial-year sampling by either using only year-round studies (for residences and low-rises) or applying a correction factor that assumed additional mortality during summer and winter (for high-rises, a building type for which little data exists for non-migration periods). Species vulnerability estimates were also likely to be influenced by seasonal sampling biases, with in-transit migratory species likely overrepresented compared with summer and winter residents. Additional year-round studies are needed at all building types to clarify how mortality rates and species composition of fatalities vary by season.

Conclusions

As human populations and numbers of buildings increase in the U.S. and globally, actions to reduce bird mortality from building collisions will be necessary at all types of buildings. For residences, mitigation techniques could include reducing vegetation near windows, angling windows to reduce reflection, and installing netting, closely spaced decals, or UV light-reflecting glass (Klem et al. 2004, Klem 2006, 2009). For low-rises and high-rises, mortality can be reduced by minimizing light emission at night (Evans Ogden 1996, 2002) and incorporating bird friendly design elements into new and existing buildings (e.g., Brown and Caputo 2007, Sheppard 2011). A long-term approach to reducing mortality is the continued adaptation of Green Building certification standards to include bird collision risks (Klem 2009).

We provide quantitative evidence of the large amount of bird mortality caused by building collisions in the U.S. Our estimates represent roughly 2–9% of all North American birds based on a rough estimate of 10–20 billion total birds in North America (U.S. Fish and Wildlife Service 2002). However, because our results illustrate that not all species are equally vulnerable to building collisions, and because considerable uncertainty remains regarding species-specific mortality and population abundance, the actual impacts of collisions on population abundance are uncertain. Despite this uncertainty, our analysis indicates that building collisions are among the top anthropogenic threats to birds and, furthermore, that the several bird species that are disproportionately vulnerable to building collisions may be experiencing significant population impacts from this anthropogenic threat.

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LITERATURE CITED

Arnold, T. W., and R. M. Zink (2011). Collision mortality has no discernible effect on population trends of North American birds. PLoS One 6:e24708.

Banks, R. C. (1979). Human related mortality of birds in the United States. U.S. Department of the Interior, Fish and Wildlife Service. Special Scientific Report–Wildlife No. 215. Washington, DC, USA.

Bayne, E. M., C. A. Scobie, and M. Rawson-Clark (2012). Factors influencing the annual risk of bird–window collisions at residential structures in Alberta, Canada. Wildlife Research 39: 583–592.

Best, J. (2008). Birds—Dead and deadly: Why numeracy needs to address social construction. Numeracy 1(1):article 6.

Blancher, P. J. (2013). Estimated number of birds killed by house cats (*Felis catus*) in Canada. Avian Conservation and Ecology 8(2):3.

Booth, G., and D. Collister (1998). Calgary Bird Banding Society 1997 Annual Technical Report. Calgary Bird Banding Society, Calgary, AB, Canada.

Borden, W. C., O. M. Lockhart, A. W. Jones, and M. S. Lyons (2010). Seasonal, taxonomic, and local habitat components of bird–window collisions on an urban university campus in Cleveland, OH. The Ohio Journal of Science 110:44–52.

Bracey, A. M. (2011). Window related avian mortality at a migration corridor. M.S. thesis, University of Minnesota-Duluth, USA.

Broughman, S. P., N. L. Swaim, and C. A. Hryczaniuk (2011). Characteristics of Private Schools in the United States. Results from the 2009–10 Private School Universe Survey (NCES 2011-339). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC, USA.

Brown, H., and H. Caputo (2007). Bird-Safe Building Guidelines. New York City Audubon Society, New York, NY, USA.

Codoner, N. A. (1995). Mortality of Connecticut birds on roads and at buildings. The Connecticut Warbler 15:89–98.

Collins, K. A., and D. J. Horn (2008). Bird-window collisions and factors influencing their frequency at Millikin University in Decatur, Illinois. Abstract. Transactions of the Illinois State Academy of Science 101(Supplement).

Collister, D., G. Booth, and B. Couronne (1997). Calgary Bird Banding Society 1996 Annual Technical Report. Calgary Bird Banding Society, Calgary, AB, Canada.

Collister, D., G. Booth, G. Meyer, and B. Couronne (1996). Calgary Bird Banding Society 1995 Annual Technical Report. Calgary Bird Banding Society, Calgary, AB, Canada.

Dunn, E. H. (1993). Bird mortality from striking residential windows in winter. Journal of Field Ornithology 64:302–309.

Erickson, W. P., G. D. Johnson, and D. P. Young, Jr. (2005). A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions. In Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference (C. J. Ralph and T. D. Rich, Editors). USDA Forest Service General Technical Report PSW-GTR-191, pp. 1029–1042.

Etterson, M. A. (2013). Hidden Markov models for estimating animal mortality from anthropogenic causes. Ecological Applications. doi:10.1890/12–1166.1

Evans Ogden, L. J. (1996). Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds. World Wildlife Fund Canada and the Fatal Light Awareness Program, Toronto, ON, Canada.

Evans Ogden, L. J. (2002). Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collision of Migratory Birds. Fatal Light Awareness Program, Toronto, ON, Canada.

Fink, L. C. (1971). Birds in downtown Atlanta—Spring 1970. The Oriole 36:2–6.

Gelb, Y., and N. Delacretaz (2006). Avian window strike mortality at an urban office building. The Kingbird 56:190–198.

Hager, S. B., B. J. Cosentino, and K. J. McKay (2012). Scavenging affects persistence of avian carcasses resulting from window collisions in an urban landscape. Journal of Field Ornithology 83:203–211.

Hager, S. B., B. J. Cosentino, K. J. McKay, C. Monson, W. Zuurdeeg, and B. Blevins (2013). Window area and development drive spatial variation in bird–window collisions in an urban landscape. PLoS One 8:e53371.

Hager, S. B., H. Trudell, K. McKay, S. M. Crandall, and L. Mayer (2008). Bird density and mortality at windows. The Wilson Journal of Ornithology 120:550–564.

Johnson, R. E., and G. E. Hudson (1976). Bird mortality at a glassed-in walkway in Washington State. Western Birds 7:99–107.

Klem, D., Jr. (1979). Biology of collisions between birds and windows. Ph.D. dissertation, Southern Illinois University, Carbondale, IL, USA.

Klem, D., Jr. (1989). Bird–window collisions. The Wilson Bulletin 101:606–620.

Klem, D., Jr. (1990a). Collisions between birds and windows: Mortality and prevention. Journal of Field Ornithology 61: 120–128.

Klem, D., Jr. (1990b). Bird injuries, cause of death, and recuperation from collisions with windows. Journal of Field Ornithology 61:115–119.

Klem, D., Jr. (2006). Glass: A deadly conservation issue for birds. Bird Observer 34:73–81.

Klem, D., Jr. (2009). Avian mortality at windows: The second largest human source of bird mortality on earth. In Tundra to Tropics: Proceedings of the Fourth International Partners in Flight Conference (T. D. Rich, C. Arizmendi, D. Demarest, and C. Thompson, Editors). Partners in Flight, pp. 244–251.

Klem, D., Jr., K. L. DeGroot, E. A. Krebs, K. T. Fort, S. B. Elbin, and A. Prince (2012). A second critique of Arnold and Zink 2011 [PLoS One 6:e24708]. PLoS One Comment. http://www.plosone.org/annotation/listThread.action?root=49197

Klem, D., Jr., C. J. Farmer, N. Delacretaz, Y. Gelb, and P. G. Saenger (2009). Architectural and landscape risk factors associated with bird–glass collisions in an urban environment. The Wilson Journal of Ornithology 121:126–134.

Klem, D., Jr., D. C. Keck, K. L. Marty, A. J. Miller Ball, E. E. Niciu, and C. T. Platt (2004). Effects of window angling, feeder placement, and scavengers on avian mortality at plate glass. The Wilson Bulletin 116:69–73.

Longcore, T., C. Rich, P. Mineau, B. MacDonald, D. G. Bert, L. M. Sullivan, E. Mutrie, S. A. Gauthreaux, Jr., M. L. Avery, R. L. Crawford, A. M. Manville II, et al. (2012). An estimate of mortality at communication towers in the United States and Canada. PLoS ONE 7:e34025.

Longcore, T., C. Rich, P. Mineau, B. MacDonald, D. G. Bert, L. M. Sullivan, E. Mutrie, S. A. Gauthreaux, Jr., M. L. Avery, R. L. Crawford, A. M. Manville II, et al. (2013). Avian mortality at communication towers in North America: Which species, how many, and where? Biological Conservation 158:410–419.

Loss, S. R., T. Will, and P. P. Marra (2012). Direct human-caused mortality of birds: Improving quantification of magnitude and assessment of population impacts. Frontiers in Ecology and the Environment 10:357–364.

Loss, S. R., T. Will, and P. P. Marra (2013). The impact of free-ranging domestic cats on wildlife of the United States. Nature Communications 4:1396.

Machtans, C. S., C. H. R. Wedeles, and E. M. Bayne (2013). A first estimate for Canada of the number of birds killed by colliding with buildings. Avian Conservation and Ecology 8(2):6.

O'Connell, T.J. (2001). Avian window strike mortality at a suburban office park. The Raven 72:141–149.

Ranford, R. B., and J. E. Mason (1969). Nocturnal migrant mortalities at the Toronto-Dominion Center. The Ontario Field Biologist 23:26–29.

Rich, T. D., C. J. Beardmore, H. Berlanga, P. J. Blancher, M. S. W. Bradstreet, G. S. Butcher, D. W. Demarest, E. H. Dunn, W. C. Hunter, E. E. Iñigo-Elias, J. A. Kennedy, et al. (2004). Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology, Ithaca, NY, USA.

Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link (2012). The North American Breeding Bird Survey, Results and Analysis 1966–2011. Version 07.03.2013. USGS Patuxent Wildlife Research Center, Laurel, MD, USA.

Schaub, M., M. Kéry, P. Korner, and F. Korner-Nievergelt (2011). Critique of Arnold and Zink 2011 [PLoS One 6:e24708]. PLoS ONE Comment. http://www.plosone.org/annotation/listThread.action?root=9659

Seewagen, C. L., and C. Sheppard (2012). Bird Collisions with Windows: An Annotated Bibliography. American Bird Conservancy, The Plains, VA, USA.

Sexton, L. (2006). Bird strikes at commercial buildings in Atlanta. MS thesis. University of Glamorgan, Wales, UK.

Sheppard, C. (2011). Bird-Friendly Building Design. American Bird Conservancy, The Plains, VA, USA.

Sibley, D. A. (2000). National Audubon Society The Sibley Guide to Birds. Alfred A. Knopf, New York, NY, USA.

Sky Scraper Source Media (2013). Sky Scraper Page. http://www.skyscraperpage.com/cities

Smallwood, K. S., D. A. Bell, S. A. Snyder, and J. E. DiDonato (2010). Novel scavenger removal trials increase estimates of wind turbine–caused avian fatality rates. The Journal of Wildlife Management 74:1089–1097.

Somerlot, K. E. (2003). Survey of songbird mortality due to window collisions on the Murray State University campus. Journal of Service Learning in Conservation Biology 1:1–9.

Taylor, W. K., and M. A. Kershner (1986). Migrant birds killed at the vehicle assembly building (VAB), John F. Kennedy Space Center. Journal of Field Ornithology 57:142–154.

U.S. Census Bureau (2008). 2007 Economic Census. http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_00A1&prodType=table

U.S. Census Bureau (2011). American Housing Survey for the United States: 2009. Current Housing Reports, Series H150/09, U.S. Government Printing Office, Washington, DC, USA.

U.S. Census Bureau (2012). 2010 Census Urban Facts. http://www.census.gov/geo/reference/ua/uafacts.html

U.S. Fish and Wildlife Service (2002). Migratory Bird Mortality Fact Sheet. U.S. Department of the Interior, Fish and Wildlife Service, Arlington, VA, USA.

U.S. Fish and Wildlife Service (2008). Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA, USA.

Ward, M. R., D. E. Stallknecht, J. Willis, M. J. Conroy, and W. R. Davidson (2006). Wild bird mortality and West Nile virus surveillance: Biases associated with detection, reporting, and carcass persistence. Journal of Wildlife Diseases 42:92–106.

Warton, D. I., I. J. Wright, D. S. Falster, and M. Westoby (2006). Bivariate line-fitting methods for allometry. Biological Reviews 81:259–291.

Weiss, R., and D. J. Horn (2008). Project prevent collision: A study of bird-window collisions in residential neighborhoods in Illinois. Abstract. Transactions of the Illinois State Academy of Science 101(Supplement).

Zink, R. M., and J. Eckles (2010). Twin Cities bird–building collisions: A status update on "Project Birdsafe." The Loon 82:34–37.

City of San José Bird-Friendly Building Design

Designing a bird-friendly building does not have to add to the cost of construction. Retrofitting an existing building can often be done by simply targeting problem areas. Consider bird-friendly best practices early on in project development to meet your project budget and demonstrate environmental leadership.

THE IMPORTANCE OF BIRDS

Birds provide numerous benefits to our economy, environment, and well-being including:

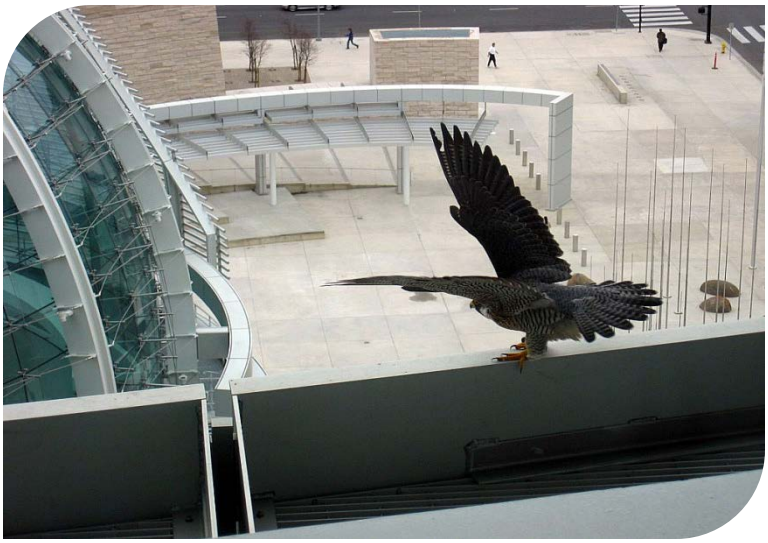
- over $13 billion in tax revenues
- rodent and harmful insect control
- human enjoyment

BIRDS AND BUILDINGS

Birds can accidentally collide with buildings, causing a decline in the bird population.

Common Causes of Collisions:

- Reflective/mirrored glass that birds perceive as actual landscaping, trees, the sky, or another bird
- Transparent glass which shows trees or sky
- Exterior spotlights which can cause birds to collide
- Interior lighting at night that can attract birds



Peregrine Falcon at San José City Hall

BIRD-FRIENDLY BUILDINGS

The following best practices can reduce bird collisions with buildings and are particularly important for buildings near bird habitat, such as open spaces and water:

- Reduce mirrors and large areas of reflective glass
- Avoid transparent glass skyways, walkways, or entryways, free-standing glass walls and transparent building corners
- Avoid funneling open space towards a building façade
- Strategically place landscaping to reduce reflection and views of foliage inside or through glass
- Eliminate up-lighting and spotlights
- Turn non-emergency lighting off at night, especially during bird migration season (February - May and August - November)

The City applies the above bird-friendly principles to projects north of Highway 237 per policy ER-7.1 in Chapter 3 of the Envision San José 2040 General Plan. The City encourages projects to utilize the checklist on the reverse side in order to incorporate bird-friendly building design.

RESOURCES:

- The American Bird Conservancy's Bird-friendly Building Design guidelines: www.abcbirds.org/newsandreports/BirdFriendlyBuildingDesign.pdf
- Report Injured/Dead Birds: Contact the Wildlife Center of Silicon Valley at (408) 929-9453 or www.wcsv.org

Planning, Building and Code Enforcement
www.sanjoseca.gov/planning| Main: (408) 535-3555

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

City of San José
Bird-Friendly Building Design Checklist

- ☐ Avoid transparent glass skyways, walkways, or entryways, free-standing glass walls and transparent building corners
- ☐ Ensure that at least 90% of the exposed façade material <u>from ground level to 40 feet</u> and 60% of the exposed façade material <u>above 40 feet</u> is not composed of transparent or reflective glass

  If the above cannot be met, implement one of the following measures:

  - ☐ Secondary facades, netting, screens, shutters, or exterior shades
  - ☐ Patterned glass that contains UV-reflective or contrasting patterns that are visible to birds
  - ☐ Patterned glass designed in accordance with the "2 x4 rule", which restricts glass areas to less than 2' high or less than 4' wide
- ☐ Reduce transparent glass at the top of buildings, especially when incorporating a green roof into the design
- ☐ Avoid the use of mirrored glass facades
- ☐ Avoid the funneling of open space towards a building façade
- ☐ Locate water features and other bird habitat away from building exteriors to reduce reflection
- ☐ Reduce or eliminate the visibility of landscaped areas behind glass
- ☐ Reduce or eliminate up-lighting and spotlights
- ☐ Ensure all site lighting uses shielded fixtures to cast light down onto the area to be illuminated
- ☐ Turn non-emergency lighting off at night, especially during bird migration season (February - May and August - November)