Appendix E

Air Quality Technical Report

Final
Air Quality Technical Report

Regional Groundwater Storage and Recovery Project

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Report Date:

July 25, 2012

Project: 08-139

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Introduction

Illingworth & Rodkin, Inc., under subcontract to GHD, has prepared this air quality emissions analysis and health risk assessment that evaluates the impacts associated with the San Francisco Public Utilities Commission's (SFPUC's) Regional Groundwater Storage and Recovery Project (the project), which includes installation and operation of up to 16 new groundwater production well facilities within the South Westside Groundwater Basin, consideration of three alternate sites for the well facilities, and a pump station upgrade. This analysis was prepared following the scope of work submitted to San Francisco Planning Department's Environmental Planning Division (EP), dated October 28, 2011, and included in this report as *Appendix 1*. The scope of work was developed in consideration of the Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines[1]. These guidelines include thresholds for construction emissions and community risk.

Based on a writ mandated by the Alameda Superior Court, these thresholds have currently been set aside and the BAAQMD has to cease dissemination of them until the BAAQMD complies with CEQA for the adoption of the thresholds. As a result, the BAAQMD is no longer recommending the 2011 thresholds be used to measure a project's significant air quality impacts. Instead, the BAAQMD suggests that lead agencies use the 1999 CEQA thresholds to make determinations regarding the significance of an individual project's air quality impacts. However, the Planning Department has determined that Appendix D of the 2011 BAAQMD CEQA Air Quality Guidelines, in combination with BAAQMD's Revised Draft Options and Justification Report, provide substantial evidence to support the BAAQMD recommended thresholds and, therefore, has determined they are appropriate for use in CEQA analyses[2].

In accordance with the 2011 BAAQMD CEQA Air Quality Guidelines and thresholds, this air quality technical report addresses the significance of:

- Construction-period emissions; and
- Construction-period health risk, including cumulative risk.

Operational emissions from the Project are considered to be negligible, since there would be no direct emissions expected from the facilities and maintenance or worker travel would be infrequent. Worker maintenance trips would produce very small emissions. Indirect emissions from use of electricity for the pumps would decrease, because existing Partner Agency wells would pump less over the long-term, and new wells would use green electricity from the SFPUC Power Enterprise.

Project Description

The proposed project would increase water supply reliability during dry years or in emergencies, by increasing water storage in the Westside Groundwater Basin during wet and normal years for subsequent recapture during dry years. The proposed Project is located in San Mateo County and is sponsored by the SFPUC in coordination with its partner agencies, which include the cities of Daly City and San Bruno, and the California Water Company (Cal Water) in its South San Francisco service area (collectively referred to as Partner Agencies).

The SFPUC currently supplies surface water to the Partner Agencies from its regional water system. The Partner Agencies supply potable water to their retail customers through a combination of groundwater from the South Westside Groundwater Basin and purchase of SFPUC surface water. The proposed project would provide supplemental SFPUC surface water to the Partner Agencies during normal and wet years. During these

[1] BAAQMD. *CEQA Air Quality Guidelines*. May, 2011.

[2] BAAQMD. *Revised Draft Options and Justification Report California Environmental Quality Act Thresholds of Significance*. October, 2009.

years, the Partner Agencies would reduce their groundwater pumping by a comparable amount to increase the amount of groundwater in storage through natural (in-lieu) recharge. During normal and wet years, the volume of groundwater in the South Westside Groundwater Basin would increase due to natural recharge and reduced groundwater pumping by the Partner Agencies. During dry years, the Partner Agencies and the SFPUC would pump the stored groundwater using 16 new well facilities, as needed to supplement other supplies. This new dry-year water supply would be blended with water from the SFPUC regional water system, and would thereby increase the available water supply to all regional water system customers.

The proposed project consists of the construction and operation of up to 16 new well facilities within the South Westside Groundwater Basin and an upgrade to the existing Westlake Pump Station. The EIR includes the evaluation of three additional well facilities (19 wells in total) in the instance where one of the 16 preferred well facilities cannot be successfully constructed or operated. The calculation of emissions is presented for both the preferred 16 well sites and an "alternate scenario" of 16 well sites that include the three alternate sites.

Each well facility would contain a well pump station, distribution piping, and utility connections. Most well facilities would also have disinfection units designed to eliminate bacteria in the groundwater using chlorine and ammonia. At certain sites, additional treatment (i.e., pH adjustment, fluoridation, and/or iron/manganese removal) has been incorporated into the design of the facility to meet both regulatory and water quality targets in the finished water for all agencies.

Site-specific well facility characteristics for the 19 potential well facility sites are listed in *Appendix 7*. These characteristics include the proposed well facility (i.e., building) type, pump type and pumping capacity, water distribution system connection point and alternate connection point (if any), groundwater disinfection location, and the method that would be used to achieve water quality goals. Water treatment may occur at the well site or at off-site treatment areas. For the purpose of calculating emissions, the connection point is assumed to be the one which would require a longer pipeline for connection, as this would represent the maximum emissions.

Groundwater from Sites 2, 3, and 4 would be conveyed to the Westlake Pump Station for treatment prior to addition to the Daly City distribution system. Sites 5, 6, and 7 include two treatment options: Consolidated Treatment at Site 6 and On-site Treatment. Under the consolidated treatment option, groundwater from Sites 5 and 7 would be conveyed to Site 6 for treatment before addition to the SFPUC regional water system. The consolidated treatment option requires pipelines to convey water from Sites 5 and 7 to Site 6. Under the on-site treatment option, groundwater would be treated at each of the sites, and water treated on-site would be added directly to the SFPUC regional water system. For the purpose of calculating emissions, only the On-site Treatment option is evaluated for criteria air pollutants, because construction of three separate buildings with treatment systems would generate more emissions than the Consolidated Treatment at Site 6 option which only has one building at Site 6. However, both options are evaluated for health risk impacts.

The proposed well facilities have been designed and sited so that wells are close to treatment systems and close to existing distribution systems (the SFPUC regional water system and the local distribution systems of the Partner Agencies), resulting in a more energy efficient system. Of the 16 well facility sites evaluated for the Project, four well facilities would connect to Daly City's distribution system; three to San Bruno's distribution system; two to Cal Water's distribution system; and seven to the SFPUC regional water system.

Well facility types would be either a:

- Well with a fenced enclosure which would include fencing, the wellhead, pump, piping and associated electrical controls; or
- Well with a building which would house the wellhead, pump, piping, treatment system, and associated electrical controls.

Where a building is proposed, the building size would vary between 20 feet x 35 feet to 23 feet by 103 feet. For the purpose of calculating emissions, all buildings were assumed to be the largest building size.

Each site would require underground piping to connect the new well to the local water distribution system or to the SFPUC regional water system, or to connect the well to a neighboring facility for treatment. Underground piping would connect well facilities to the local storm drain system and/or the sanitary sewer system to allow discharge of overboard well water, chloraminated water, or filter backwash. The total pipe length required for all 19 well facility sites, including either of the distribution system connections (whichever one is longer), would be approximately 19,000 feet of 6-inch and 8-inch pipe.

Project Construction Schedule

The SFPUC proposes to construct the project starting in June 2014, with completion targeted for May 2016 (an additional three months is provided in the event of a schedule delay, however construction would occur over 21 months as indicated in Table 1). Construction would occur in clusters of four well facilities, plus an alternate site, grouped together as shown in Table 1. Within each construction cluster, well construction would occur during the first month, followed by approximately three months of construction at the sites without a building or approximately 16 months of construction for sites with a building.

TABLE 1
Facility Construction Clusters and Construction Sequencing

Facility Sites	**Well Drilling**		**Well Facilities**	
	Estimated Construction Start date	**Estimated Construction Finish date**	**Estimated Construction Start date**	**Estimated Construction Finish date**
Construction Cluster A				
Sites 1, 3, 4, 7	June 2014	July 2014	July 2014	October 2015
Construction Cluster B				
Sites 12, 14, 15, 16, 19 (Alternate)	August 2014	September 2014	September 2014	December 2015
Construction Cluster C				
Sites 9, 11, 18 (Alternate)	October 2014	November 2014	November 2014	February 2016
Sites 10, 13	No well drilling needed	No well drilling needed	November 2014	February 2016
Construction Cluster D				
Sites 2, 5, 6, 8, Westlake Pump Station	No well drilling needed	No well drilling needed	June 2014	September 2015
Site 17 (Alternate)	July 2014	August 2014	August 2014	November 2015

Project Construction Methods

Wells

To install a production well on a site with no existing test well, the site would first be cleared of vegetation, if present, which would be temporarily stockpiled on-site. Then an area would be graded (as needed) and covered

with gravel base rock, to create a level pad for supporting the drill rig and other equipment. A 30-inch steel conductor casing would be installed to a depth of 50 feet and cemented in place. A minimum 22-inch diameter production borehole would be drilled to a depth of approximately 500 to 750 feet, the approximate depth of the aquifer that is proposed for production. Drilling and other drilling related activities (e.g., equipment and material delivery to support drilling) would extend for about a week both during the day and night. The well casing, consisting of a 12-inch diameter stainless steel well casing and well screen would be installed in the borehole. A 2-inch diameter steel pipe would be welded to the well casing and installed to a depth of approximately 350 to 400 feet. Finally, an impervious seal consisting of sand/cement grout would be placed in the well annular space above the filter pack.

Various well pumping tests would be performed after final well development. These tests would include: (a) pumping for durations of two hours each at different discharge rates ("step-drawdown test"); and (b) continuous pumping for 12 to 48 hours at the final design capacity of the well ("constant-discharge aquifer test").

After construction is complete, well sites would be restored to their general pre-construction conditions, and all disturbed areas would be hydroseeded and receive erosion control measures as necessary.

Well Facilities

Construction of facilities at the well sites may require additional site clearing and grubbing beyond that conducted for the well drilling. Most of the proposed facility sites are located within developed urban areas, many on existing rights-of-way where large SFPUC transmission pipes have previously been installed. Accordingly, large portions of many of the sites have already been disturbed. Site excavation and grading would be minor, with grading to a maximum depth of five feet for the building foundation (if the well facility is intended to have a building) and utilities underneath the building. After the foundation and utilities connections are constructed, the remainder of the building would be constructed and the well pump and other equipment installed, as needed.

Water Distribution and Utility Pipeline Installation

New pipelines would be installed below ground using standard open-trench construction methods. Open-trench construction involves the following steps:

1. vegetation removal and grading or pavement cutting depending on the location,
2. trench excavation and shoring to stabilize the sides of the trench if necessary,
3. pipeline installation,
4. trench backfilling and compacting, and
5. surface restoration.

Project Operation

The SFPUC and Partner Agencies would operate 16 new well facilities with an annual average pumping capacity of 7.2 million gallons per day (equivalent to 8,100 acre-feet per year) to provide a supplemental dry-year water supply. During dry-year conditions, Partner Agencies would also pump from their own existing wells up to annual average rates consistent with the pumping limitations expressed in the project's Operating Agreement. During wet or normal years, weekly or monthly exercising of the production wells for one- to four-hour periods would be required to ensure that the facilities remain operational. Operators may fine-tune the exercise schedule according to the characteristics of individual wells.

The well facilities would be powered by electricity. All well facilities would have provisions for a drive-up portable generator connection, so that in the event of a power failure the well pumps could continue to run in a dry year or be used as a temporary alternate water supply (in a normal or wet year). The portable diesel

generators would be trailer-mounted models with built-in sound reduction and spill containment features. SFPUC or the Partner Agencies would utilize existing generators and would not acquire new generators for this project.

Operation and maintenance activities would result in less than one vehicle trip to each site per day during a dry year and less than one vehicle trip per week during a wet or normal year. As a result, vehicle emissions associated with operation of the project would be negligible.

Project Setting

Appendix 2 includes aerial maps that show each facility site (including the planned construction footprint) and sensitive receptors located within 1,000 feet of each facility site. Also shown on those maps are cumulative sources of toxic air contaminants (TACs). These sources include freeways, highways, high volume roadways, and stationary sources listed by BAAQMD. Sensitive receptor locations include residential dwellings, schools, daycare facilities, senior care facilities, and medical facilities, as defined in the BAAQMD CEQA Air Quality Guidelines.

Project Significance Thresholds

Table 2 summarizes the air quality thresholds of significance used in this analysis. These thresholds are based on an evaluation by EP of thresholds identified by BAAQMD in May 2011[3].

TABLE 2
Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for New Sources			
Excess Cancer Risk	10 per one million	10 per one million	
Chronic or Acute Hazard Index	1.0	1.0	
Incremental annual average $PM_{2.5}$	0.3 $\mu g/m^3$	0.3 $\mu g/m^3$	

[3] BAAQMD. *California Environmental Quality Act Guidelines*. May, 2011.

TABLE 2
Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs./day)	Average Daily Emissions (lbs./day)	Annual Average Emissions (tons/year)
Health Risks and Hazards for Sensitive Receptors (Cumulative from all sources within 1,000 foot zone of influence) and Cumulative Thresholds for New Sources			
Excess Cancer Risk	100 per one million		
Chronic Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 $\mu g/m^3$		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = course particulate matter or particulates with an aerodynamic diameter of 10 micrometers (μm) or less, and $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5μm or less.

Project Emissions Modeling

On-site construction-period air pollutants were modeled using the latest version of the California Emissions Estimator Model, CalEEMod (Version 2011.1.1). The mobile emissions during construction, which include haul truck trips, vendor or delivery truck trips, and worker trips, were computed using the EMFAC2011 model developed by the California Air Resources Board (CARB). Both models also provide greenhouse gas emissions that were utilized as part of the project environmental impact analysis. The on-site modeling was based on the construction equipment inventories and schedule provided by SFPUC. A production well would be installed at each site, except for the Westlake Pump Station and Sites 2, 5, 6, 8, 10, and 13 where test wells currently exist. Either a well facility building or a fenced enclosure would be constructed at each site. In addition, pipelines would be installed to connect the well facilities to the existing distribution system. Interior upgrades at the Westlake Pump Station were not modeled because there would be very little use of diesel-powered equipment, so health risk impacts would be negligible. Emissions associated with each component of the construction activities were computed as follows:

- Well Drilling/Well Construction anticipated to last 30 working days
- Construction of Well Facility Building anticipated to last 240 working days
- Construction of Fenced Enclosure (for sites that would not have buildings) anticipated to last 40 working days
- Construction of pipeline anticipated to be constructed at a rate of 120 feet per day

For sites with well facility buildings, the largest building construction scenario was assumed and applied to each site on which a building is proposed, because this phase of construction would have the highest emissions. For Sites 5, 6 and 7, a well facility building was assumed at each site, because this configuration would have the highest emissions. Pipeline construction was based on an assumption that 120 feet of pipeline could be constructed in an average work day, because the majority of the pipeline is in soil where minimal obstructions are anticipated.

Model input assumptions are based on the type and quantity of equipment, projected average daily usage (in hours) and size (in terms of horsepower). Where horsepower was unknown, the CalEEMod default value for that type of equipment was assumed. CalEEMod only computes annual emissions in tons per year or maximum daily emissions in pounds per day. Since some of the construction phases would have relatively low emissions,

predicting annual emissions was found to be problematic, because CalEEMod only predicts emission in tons with accuracy to one significant decimal point. For $PM_{2.5}$ emissions, which are used for the health risk analysis, this would introduce a large error in the predicted emissions. To avoid this type of error, average daily emissions for an entire construction phase (e.g., Construction of Well Facility Building) were predicted by inputting the usage of each piece of construction equipment with average hours per day based on the entire construction duration. For example, a grader would be operated for approximately 4 hours on one day during the Site Preparation sub-phase of Production Well Installation, but was modeled as operating for 0.1 hours per Phase Day (4 hours divided by 30 days) to account for the average amount of time it would be operated over the course of the entire 30-day phase. As a result, average daily construction period emissions from the off-road equipment operating at each site were computed in terms of pounds per day.

Construction equipment assumptions in CalEEMod were adjusted to account for the CARB overestimation of emissions, because the model is based on older load factor assumptions. CARB adjusted construction fleet emissions by reducing the load factors used in their OFFROAD model by 33 percent. Since CalEEMod is also based on the same OFFROAD model, the load factors in the model for this project were also reduced by 33 percent.

Mobile-source emissions were computed using the CARB EMFAC2011 model that computes emissions from on-road vehicles. The emissions from haul truck tips were assumed to be all heavy heavy-duty trucks. Vendor and delivery truck trips were computed assuming a mix of 50 percent heavy-duty trucks and 50 percent medium-duty trucks. Worker trips were assumed to be 50 percent light-duty automobiles and 50 percent light-duty trucks. Vehicle trips were assumed to be the default trip lengths used in CalEEMod, which are 12.4 miles for worker trips, 7.3 miles for vendor truck trips and 20 miles for heavy-duty and heavy heavy-duty truck trips. Emissions for 10 minutes of idling were applied to each haul truck roundtrip, which would include 5 minutes for each trip.

Table 3 shows criteria air pollutant emissions associated with construction of each site. It is possible that alternate sites (Sites 17, 18 and 19) may need to be constructed. As an "alternate scenario", it is assumed that Site 1 through 19 plus the Westlake Pump Station modification would be developed, because these sites would represent the construction of all 19 possible sites. This would result in the maximum emissions.

The emissions are reported as total emissions for each site in pounds and average daily emissions are computed for the entire project construction period, assumed to be 420 days. Construction days were calculated based on 20 construction days over 21 months. Average daily emissions are compared against the daily criteria air pollutant emission significance thresholds and found to be below the significance thresholds, both for Sites 1-16 and the alternate scenario. However, NO_x emissions would exceed the significance thresholds under the Alternate Scenario where all 19 sites plus the Westlake Pump Station modification are constructed. Detailed emissions computations and assumptions along with CalEEMod modeling output are contained in *Appendix 3*.

Note that the computed emissions do not include fugitive dust, which is treated separately under the BAAQMD CEQA Air Quality Guidelines. Application of Best Management Practices for minimizing dust emissions that are identified in the BAAQMD CEQA Air Quality Guidelines would minimize those impacts to a less than significant level.

Mitigation of Project Construction NO_x Emissions for Construction of Alternate Sites

If one to three wells at Sites 1-16 are constructed but found to be unusable for any reason, and one to three wells are therefore constructed at alternate sites, the SFPUC shall reduce modeled NO_x emissions by 20% at the alternate sites. To meet this performance standard, the SFPUC shall develop and implement a plan demonstrating that the off-road equipment (i.e., equipment rated at more than 50 horsepower that is owned or leased by the contractor or subcontractors) to be used in constructing the wells and facilities at the alternate sites would achieve a fleet-wide average 20-percent NO_x reduction compared to the most recent CARB fleet average.

Acceptable options for reducing emissions include the use of late model engines (i.e., meeting U.S. EPA Tier 3 standards or later), low emission diesel products, alternative fuels that have lower NO_x emissions, engine retrofit technology, after-treatment products, add-on devices, and/or other options that may become available.

Construction NOx emissions for construction of all sites were recomputed assuming that all on-site off-road construction equipment used in constructing the wells and facilities at the alternate sites would have emissions that are 20 percent lower than the current fleet-wide average assumed in the CalEEMod model. With this mitigation measure, construction of all 19 sites plus the Westlake Pump Station modifications would result in daily NO_x emissions of 53.7 pounds per day on average over the 420-day construction period, which is below the threshold of 54 pounds per day.

TABLE 3
Estimated Criteria Air Pollutant Construction Emissions (in pounds)

Facility Site	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Site 1	205	1,511	81	73
Site 2	15	107	7	6
Site 3	57	419	22	20
Site 4	62	434	23	21
Westlake Pump Station	5	26	4	1
Site 5 (On-site Treatment)	176	1,291	77	66
Site 6 (On-site Treatment)	172	1,266	76	65
Site 7 (On-site Treatment)	220	1,593	88	79
Site 8	165	1,228	73	62
Site 9	207	1,522	82	74
Site 10	165	1,229	73	62
Site 11	212	1,549	85	76
Site 12	214	1,564	86	77
Site 13	179	1,308	79	68
Site 14	223	1,616	90	81
Site 15	209	1,534	83	75
Site 16	211	1,540	84	75
Site 17 (Alternate)	204	1,506	81	73
Site 18 (Alternate)	206	1,516	82	74
Site 19 (Alternate)	66	451	25	22
Sites 1-16 and Westlake Pump Station				
Total (pounds)	2,697	19,738	1,113	981
Average Daily Emissions[a] (pounds per day)	6.4	47.0	2.7	2.3

TABLE 3
Estimated Criteria Air Pollutant Construction Emissions (in pounds)

Facility Site	ROG	NO_x	PM_{10}	$PM_{2.5}$
Alternate Scenario (Sites 1 -19 [Alternate] and Westlake Pump Station)				
Total (pounds)	3,174	23,211	1,301	1,150
Average Daily Emissions[a] (pounds per day)	7.6	55.3	3.1	2.7

Notes: [a] Assumes 420 days of construction for entire project based on 20 construction days per month and 21 months.

Health Risk Analysis

The construction activities will require the use of heavy-duty diesel vehicles and equipment, which emit diesel particulate matter (DPM) as $PM_{2.5}$, which is a toxic air contaminant (TAC) that is identified by CARB as causing cancer. In addition, the organic gas components of diesel exhaust can pose non-cancer hazards. In order to address health risk impacts, emissions from construction activities are input to a dispersion model that computes DPM/$PM_{2.5}$ and organic compound concentrations at receptors. The exposures are computed based on receptor type (i.e., residential infant or adult, school child or daycare child) and the corresponding risks are based on the toxicity of the TAC and the sensitivity of the receptor (e.g., infant, child or adult). The corresponding cancer risk and non-cancer hazards are computed and the receptor with the highest impact is considered the maximum exposed individual (MEI).

BAAQMD Regulation 2, Rule 5 sets cancer risk limits for new and modified sources of TACs at the MEI at 10 chances per million. In addition to cancer risk, some TACs pose non-carcinogenic chronic and acute health hazards. Acute and chronic non-cancer health hazards are expressed in terms of a hazard index, or HI, which is a ratio of the TAC concentration to a reference exposure level (REL), a level below which no adverse health effects are expected, even for sensitive individuals.[4] If the HI is 1.0 or greater, which means that the TAC concentration equals or exceeds the REL, then the exposure is considered significant. In addition, particulate matter, primarily associated with construction equipment and mobile sources (vehicular emissions) is strongly associated with mortality, respiratory diseases, and impairment of lung development in children, and other endpoints such as hospitalization for cardiopulmonary disease. The U.S. Environmental Protection Agency (EPA) has proposed a Significant Impact Level (SIL) for $PM_{2.5}$. For developed urban areas, including much of San Francisco, the EPA has proposed a SIL of between 0.3 $\mu g/m^3$ to 0.8 $\mu g/m^3$. The SIL represents the level of incremental $PM_{2.5}$ emissions that represents a significant contribution to regional non-attainment.[5] The lower range of the EPA-recommended SIL of 0.3 $\mu g/m^3$ is an appropriate threshold for determining the significance of a source's $PM_{2.5}$ impact.

Potential health risks and hazards from project construction activities on existing sensitive receptors are assessed within a 1,000-foot zone of influence through (1) prediction of emissions from project activities; (2) dispersion modeling to identify exposure and (3) computing the resulting risks and hazards based on the type of receptor exposed.

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4 Ibid, p. D-35.

5 BAAQMD. *CEQA Air Quality Guidelines*. May, 2011, available online at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, p. D-36.

Project Emissions of TACs

Emissions of TACs were based on the project emissions modeling described above using the CalEEMod and EMFAC2011 models. Since all construction equipment was assumed to be diesel powered, all $PM_{2.5}$ emissions computed using CalEEMod were assumed to be DPM. The diesel $PM_{2.5}$ vehicle emissions produced by EMFAC2011 were assumed to represent DPM from on-road mobile sources associated with construction.

For each construction phase, the CalEEMod provided daily emissions of $PM_{2.5}$ exhaust emissions (assumed to be DPM) and emissions of ROG from the off-road construction equipment in pounds per day. These emissions were converted into grams per second per square meter ($g/sec/m^2$) for input into a dispersion model. The construction area was based on the size of the construction footprint for each construction phase (i.e., well construction, building or fenced enclosure construction and pipeline construction). Truck traffic emissions generated by the project were converted into grams per second per cubic meter ($g/sec/m^3$) for on-site truck travel and g/sec for trucks while traveling off-site for input into the dispersion model. Worker traffic was assumed to have a negligible affect on health risk due to the relatively low volume of traffic generated and the small amount of emissions when compared with daily construction equipment and truck activity. Much of the worker travel emissions occur beyond 1,000 feet from the facility sites. So those emissions from worker vehicle trips were not included in the health risk assessment.

Two sets of emissions were computed: (1) emissions based on average daily activity through the course of each construction component used to compute cancer risk and annual $PM_{2.5}$ concentrations and (2) a maximum daily scenario that uses the maximum daily emissions computed by CalEEMod when considering each sub-phase of construction (i.e., site preparation, building construction, or trenching for pipeline work) to compute acute non-cancer health risk. Therefore, the highest hourly concentration modeled using the maximum daily emission scenario was calculated.

For non-cancer health effects of DPM the California Office of Health Hazard Assessment (OEHHA) has established DPM concentration levels for evaluating chronic health effects; however, concentration levels for acute (short-term) health effects have not been identified for DPM as a whole. Thus, in order to evaluate potential acute health effects from exposure to diesel exhaust, the individual chemicals that make up the total organic gas (TOG) portion of diesel exhaust were evaluated for acute health effects. A speciation profile of individual chemicals in the TOG from off-road diesel equipment exhaust provided by the BAQMD was used to identify the compounds for evaluation of acute health effects. It was assumed that the ROG emissions computed using CalEEMod are functionally equivalent to TOG emissions, and, therefore, the ROG emissions from construction activities were used to calculate the emissions and concentrations for the individual chemicals with acute non-cancer health effects. The speciation profiles and the applicable toxicity values, based on acute exposures, are shown in Table 4.

Air Dispersion Modeling

As part of the health risk assessment, the U.S. EPA ISCST3 dispersion model was used to predict concentrations of DPM and ROG at existing residences and other sensitive receptors surrounding the facility sites. The ISCST3 dispersion model is a BAAQMD-recommended model for use in refined modeling analysis of CEQA projects[6]. The model calculates pollutant concentrations at receptors located in areas of flat or complex terrain from a variety of emission source types including point, area, volume and line sources. The model was run using regulatory default dispersion options and urban dispersion coefficients due to the urban nature of the project area.

[6] BAAQMD. *Recommended Methods for Screening and Modeling Local Risks and Hazards*. Version 2.0, May, 2011.

Annual modeled concentrations based on average daily emissions rates were used to compute cancer risk. Modeled worst-hour concentrations were used to compute acute hazards resulting from speciated TAC components of diesel exhaust with acute risks using BAAQMD speciation factors[7].
Emissions from on-site construction equipment were modeled as a series of area sources in the areas associated with construction activities. An emission release height of 6 meters was used for each area source. DPM emissions from truck traffic on-site were included in the on-site area sources and the off-site trucks traveling on the roadways near the facility sites were modeled as line sources (a series of volume sources along a path). Line sources for off-site truck travel were used to simulate the expected travel routes along local roadways within the 1,000-foot zone of influence from the construction sites.

Modeled receptors were placed at sensitive receptors anticipated to have the greatest impacts that are within 1,000 feet of the modeled construction site. For assessing impacts, the receptor with the highest impacts from construction activities within 1,000 feet would be identified as the maximum exposed individual (MEI). All receptors were assumed to be at ground-level with a breathing height of 1.5 meters. Since there is variation in the terrain elevations at some of the facility sites and surrounding areas, terrain elevations were used with the model. Elevations for project emission sources and sensitive receptor locations were obtained from USGS Digital Elevation Model (DEM) data for the project area. Receptor locations and the depiction of the project emission sources are shown in the figures provided in *Appendix 2*.

TABLE 4
Speciation Profile of Off-road Diesel Total Organic Gas Emissions Provided by BAAQMD and Acute Toxicity Values

Chemical	Fraction of TOG_1	OEHHA Acute Reference Exposure Level ($\mu g/m^3$)
acetaldehyde	0.07353	470
acrolein	0.01297 [a]	2.5
benzaldehyde	0.00699	--
benzene	0.02001	1,300
ethanol	0.00009	--
ethylbenzene	0.00305	--
ethylene	0.14377	--
ethylene dibromide (1,2-dibromoethane)	--	--
ethylene dichloride (1,2-dichloroethane)	--	--
ethylene glycol	--	--
ethylene oxide (1,2-epoxyethane)	--	--
ethylene thiourea	--	--
ethylene glycol butyl ether	--	--
ethylene glycol ethyl ether		
ethylene glycol ethyl ether acetate	--	--
ethylene glycol methyl ether	--	--
ethylene glycol methyl ether acetate	--	--
formaldehyde	0.14714	55
isobutane	0.01222	--
isopentane	0.00602	--
methane	0.04084	--

[7] Speciation factors are based on a March 30, 2011 email from Virginia Lau (BAAQMD).

TABLE 4
Speciation Profile of Off-road Diesel Total Organic Gas Emissions Provided by BAAQMD and Acute Toxicity Values

Chemical	Fraction of TOG[1]	OEHHA Acute Reference Exposure Level (µg/m^3)
methyl ethyl ketone (mek) (2-butanone)	0.01477	13,000
methylcyclopentane	0.00149	--
m-xylene	0.00611	--
n-butane	0.00104	--
n-hexane	0.00157	--
n-pentane	0.00175	--
o-xylene	0.00335	--
propionaldehyde	0.0097	
propylene	0.02597	
propylene glycol monomethyl ether		
propylene oxide		
toluene	0.01473	37,000

[a] Note that speciation factor for acrolein only applies to on-road diesel vehicles

BAAQMD collects and records meteorological data at a number of locations throughout the Bay Area. In the vicinity of the facility sites, there are two BAAQMD meteorological monitoring stations for which the BAAQMD has processed the hourly data for use with the ISCST3 model. Based on the locations of the facility sites, BAAQMD recommended that meteorological data collected at the District's Fort Funston station be used for sites 1 through 7 and data collected at San Francisco International Airport and processed by the District be used for the remaining sites[8]. BAAQMD provided the ISCST3 formatted data for both sites.

Emissions, computed for the project using CalEEMod as described above, were modeled as occurring between 7 am - 7 pm. For each site, these emissions would occur in 2014 and 2015. Annual concentrations were predicted for each year along with the maximum hourly concentration. For most sites, worst day emissions occurred during well installation. Well Facility Building construction had the highest emissions for those sites that did not include well construction.

The health risk associated with 19 facility sites was analyzed to capture potential health risks, even though only 16 facility sites would be constructed. Health risk was estimated by calculating risk at groups of geographically close sites. Some facility sites are separated sufficiently that they would not have additive effects with other sites. However, effects from some facility sites overlap with the effects from other sites ; therefore, those facility sites that had overlapping 1,000-foot zone of influences were grouped and modeled together, with an MEI for each group of modeled sites identified. Nine modeling groups were evaluated as follows, with Group 3 modeled under two different scenarios:

Group 1: Facility Site 1
Group 2: Facility Sites 2, 3 and 4
Group 3: Facility Sites 5, 6 and 7 (On-site Treatment)
Group 3: Facility Sites 5, 6, and 7 (Consolidated Treatment at Site 6)
Group 4: Facility Site 8 and Site 17 (Alternate)
Group 5: Facility Sites 9 and 10 and Site 18 (Alternate)
Group 6: Facility Sites 11 and 12 and Site 19 (Alternate)

[8] Based on email from James Cordova (BAAQMD) to Bill Popenuck (Illingworth & Rodkin, Inc.), dated April 16, 2012.

Group 7: Facility Site 13
Group 8: Facility Sites 14 and 15
Group 9: Facility Site 16

Note: Westlake Pump Station Upgrade was not included in health risk analysis, as noted under project Emissions Modeling above.

Excess Lifetime Cancer Risk and $PM_{2.5}$ Prediction

The dispersion modeling provided the annual $PM_{2.5}$ concentration predicted at each receptor. As discussed previously, $PM_{2.5}$ emissions from the project are conservatively assumed to be all DPM. The annual DPM concentrations are used to compute increased cancer risk caused by the project.

Increased cancer risks at each of the sites were calculated using the modeled annual average concentrations and using the most recent methods recommended by BAAQMD[9] and the California Office of Environmental Health Hazard Assessment (OEHHA)[10]. The factors used to compute cancer risk are highly dependent on modeled concentrations, exposure period or duration, and the type of receptor. The exposure level is determined by the modeled concentration; however, it has to be averaged over a representative exposure period. The averaging period is dependent on many factors, but primarily the type of sensitive receptor that would reside at a site. OEHHA has developed exposure assumptions for typical types of sensitive receptors. These include nearly continuous exposures for residences.

It should be noted that the cancer risk calculations for residential exposures reflect use of BAAQMD's most recent cancer risk calculation method, adopted in January 2010[11]. The cancer risk calculations were based on applying the BAAQMD recommended age sensitivity factors to TAC concentrations. Age sensitivity factors reflect the greater sensitivity of infants and children to cancer causing TACs. This analysis assumed that residential and daycare receptors represented infant exposures and applied a sensitivity factor of 10 to the cancer risk calculations. Where exposures were assumed to be school children, an age sensitivity factor of 3 was applied. An age sensitivity factor of 1 was applied to adult exposures. This analysis, therefore, presents the most conservative cancer risk for various types of exposures.

The cancer risk calculations incorporate breathing rates of 581 liters per kilogram day (L/kg-day) for infants and children and 302 L/kg-day for adults. Since the modeling was conducted assuming emissions occurred 365 days per year, a default OEHHA exposure period of 350 days per year was used. For school and daycare child exposure, they were assumed to be exposed to the construction emissions for 10 hours per day out of the 12 hours of daily construction emissions.

MEIs were identified for each geographic group of sites and are shown on Figures 1 through 10 in *Appendix 2*. The MEI for Group 3 is shown for the On-site Treatment configuration, because it represents a higher health risk than Group 3 with Consolidated Treatment at Site 6. The MEI for the group with the highest risk is the MEI for the project as a whole.

Table 5 summarizes the excess lifetime cancer risk and $PM_{2.5}$ concentrations for each group of sites at the MEIs. Cancer risk computations for each facility site, along with the assumptions used, are presented in *Appendix 4.* The figures contained in *Appendix 2* show model receptors and sources. Results were compared to the excess lifetime cancer risk threshold of 10 per million (evaluated as 10.0 per million) and an annual $PM_{2.5}$ concentration thresholds of 0.3 $\mu g/m^3$.

[9] BAAQMD, *Air Toxics NSR Program Health Risk Screening Analysis (HSRA) Guidelines.* January, 2010.

[10] OEHHA 2003. Air Toxics Hot Spots Program Risk Assessment Guid*elines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. Office of Environmental Health Hazard Assessment. August, 2003.

[11] BAAQMD. *Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines.* January, 2010.

Non-Cancer Hazard Index

Table 5 also includes the predicted chronic or acute hazards at the MEIs for each geographic group of sites, expressed as the hazard index (HI). Potential non-cancer health effects due to chronic exposure to DPM were estimated using the modeled $PM_{2.5}$ concentration and the chronic inhalation REL for DPM of 5 $\mu g/m^3$. There is no REL for acute exposures associated with DPM. Therefore, speciated total organic gas components of diesel exhaust that have acute toxicity values assigned were used to evaluate hazards due to acute exposures. For this assessment, ROG emissions were considered to be equivalent to total organic gas emissions from construction activities. Emissions were modeled using CalEEMOD, which provides ROG emissions. Modeled worst-hour concentrations were used to compute acute hazards resulting from speciated TAC components of DPM with acute risks using BAAQMD speciation factors[12]. BAAQMD risk management policy does not recommend including acrolein in health risk assessments due to the lack of reliable emissions data[13]. EP recommends that acrolein be included for truck traffic, but not off-road construction emissions. Since the project would generate very little hourly truck traffic during construction, the effects of acrolein were not evaluated. Table 4 includes the speciation profiles and acute toxicity values for organic DPM compounds.

Discussion of Excess Cancer Risks, Hazard Indices, and $PM_{2.5}$ Concentrations

The excess cancer risk, hazard index for acute or chronic exposures (whichever is highest) and the highest $PM_{2.5}$ concentrations for each of the geographic groups of sites are shown in Table 5. The results shown in Table 5 apply to the MEI for each group. Results that exceed the applicable thresholds are highlighted in Table 5.

As indicated in Table 5, the excess cancer risk at the MEI for each geographic group caused by construction of the project would range from 1.05 to 10.74. The highest value would be 10.74, which exceeds the BAAQMD threshold of 10 in a million, at Group 3 for Sites 5, 6, and 7 for the On-site Treatment option. Because construction of Group 3 with On-site Treatment would have the highest risk, the MEI for Group 3 would also be the MEI for the project as a whole.

The Hazard Index, which evaluates non-cancer health risks, would range from 0.11 to 0.72, which is less than the BAAMQD project impact threshold of 1.00. The annual $PM_{2.5}$ concentrations would range from 0.01 to 0.07 $\mu g/m^3$, which would be less than the BAAMQD project impact threshold of 0.3 $\mu g/m^3$.

TABLE 5

Project and Cumulative Cancer Risks, Non-Cancer Hazard Indices and $PM_{2.5}$ Concentrations

Site Modeling Group	Cumulative TAC Source Analyzed[a]	Lifetime Excess Cancer Risk (per million)	Non-Cancer Acute or Chronic Hazard Index[c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Project Thresholds		**10**	**1.00**	**0.3**
Cumulative Thresholds		**100**	**10.00**	**0.8**
Group 1: Site 1				
PROJECT RISK		**2.41**	**0.48**	**0.02**
Cumulative	I-280	9.85	0.04	0.15
Cumulative	John Daly Blvd.	1.14	0.02	0.03
Cumulative	G11629	0.91	0.00	0.00

[12] Speciation factors are based on a March 30, 2011 email from Virginia Lau (BAAQMD).

[13] BAAQMD. *BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines*. January, 2010.

TABLE 5

Project and Cumulative Cancer Risks, Non-Cancer Hazard Indices and $PM_{2.5}$ Concentrations

Site Modeling Group	Cumulative TAC Source Analyzed[a]	Lifetime Excess Cancer Risk (per million)	Non-Cancer Acute or Chronic Hazard Index[c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Cumulative	14852	1.18	0.00	0.00
Cumulative	13420	0.42	0.00	0.00
Cumulative	13221	0.67	0.00	0.00
	CUMULATIVE RISK AT GROUP 1 MEI	**16.58**	**0.54**	**0.21**
Group 2: Sites 2, 3 and 4				
PROJECT RISK		**1.51**	**0.72**	**0.02**
Cumulative	S. Park Plaza Drive	3.34	0.02	0.098
Cumulative	87th St.	1.68	0.02	0.059
Cumulative	16794	4.08	0.00	0.00
Cumulative	G10657	0.48	0.00	0.00
Cumulative	12568	5.03	0.00	0.00
Cumulative	12876	2.05	0.00	0.00
	CUMULATIVE RISK AT GROUP 2 MEI	**18.18**	**0.76**	**0.18**
Group 3: Sites 5, 6 and 7 (Consolidated Treatment at Site 6)				
PROJECT RISK		**1.31**	**0.11**	**0.01**
Cumulative	I-280	7.74	0.01	0.13
Cumulative	Junipero Serra Blvd.	1.84	0.02	0.05
Cumulative	San Pedro Rd.	1.04	0.02	0.05
Cumulative	Washington St	0.96	0.02	0.02
Cumulative	G9309	0.29	0.00	0.00
Cumulative	14102	6.32	0.00	0.00
	CUMULATIVE RISK AT GROUP 3 MEI	**19.50**	**0.18**	**0.26**
Group 3: Sites 5, 6 and 7 (On-site Treatment)				
PROJECT RISK		**10.74**	**0.22**	**0.08**
Cumulative	I-280	7.74	0.01	0.13
Cumulative	Junipero Serra Blvd.	1.84	0.02	0.05
Cumulative	San Pedro Rd.	1.04	0.02	0.05

TABLE 5

Project and Cumulative Cancer Risks, Non-Cancer Hazard Indices and $PM_{2.5}$ Concentrations

Site Modeling Group	Cumulative TAC Source Analyzed[a]	Lifetime Excess Cancer Risk (per million)	Non-Cancer Acute or Chronic Hazard Index[c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Cumulative	Washington St	0.96	0.02	0.02
Cumulative	G9309	0.29	0.00	0.00
Cumulative	14102	6.32	0.00	0.00
	CUMULATIVE RISK AT GROUP 3 MEI	**28.93**	**0.29**	**0.33**
Group 4: Facility Site 8 and Site 17 (Alternate)				
PROJECT RISK		**1.05**	**0.18**	**0.01**
Cumulative	Mission Rd. (SR 82)	4.28	0.01	0.06
Cumulative	Serramonte Blvd.	2.64	0.02	0.08
Cumulative	1364	0.45	0.02	0.26
Cumulative	G11198	0.14	0.00	0.00
	CUMULATIVE RISK AT GROUP 4 MEI	**8.56**	**0.23**	**0.41**
Group 5: Facility Sites 9 and 10				
PROJECT RISK		**5.87**	**0.33**	**0.05**
Cumulative	El Camino Real (SR 82)	1.73	0.00	0.02
Cumulative	Hickey Blvd	0.61	0.02	0.02
Cumulative	G3305	1.43	0.00	0.00
	CUMULATIVE RISK AT GROUP 5 MEI	**9.64**	**0.35**	**0.07**
Group 5: Sites 9 and 10 and Site 18 (Alternate)				
PROJECT RISK		**9.55**	**0.53**	**0.08**
Cumulative	No sources within 1,000 feet			
	CUMULATIVE RISK AT GROUP 5 MEI	**9.55**	**0.53**	**0.08**
Group 6: Sites 11 and 12 and Site 19 (Alternate)				
PROJECT RISK		**7.88**	**0.46**	**0.07**
Cumulative	El Camino Real (SR 82)	2.28	0.00	0.03
Cumulative	Westborough Blvd.	1.50	0.02	0.05

TABLE 5

Project and Cumulative Cancer Risks, Non-Cancer Hazard Indices and $PM_{2.5}$ Concentrations

Site Modeling Group	Cumulative TAC Source Analyzed[a]	Lifetime Excess Cancer Risk (per million)	Non-Cancer Acute or Chronic Hazard Index[c]	$PM_{2.5}$ Concentration ($\mu g/m^3$)
Cumulative	G11428	0.73	0.00	0.00
	CUMULATIVE RISK AT GROUP 6 MEI	**12.39**	**0.48**	**0.15**
Group 7: Site 13				
PROJECT RISK		**1.34**	**0.14**	**0.01**
Cumulative	South Spruce Ave.	5.62	0.02	0.20
Cumulative	G12073	0.17	0.00	0.00
Cumulative	2483	0.19	0.00	14.30
	CUMULATIVE RISK AT GROUP 7 MEI	**7.32**	**0.16**	**14.53**
Group 8: Sites 14 and 15				
PROJECT RISK		**3.37**	**0.54**	**0.03**
Cumulative	Sneath Lane	0.75	0.02	0.02
	CUMULATIVE RISK AT GROUP 8 MEI	**4.12**	**0.56**	**0.05**
Group 9: Site 16				
PROJECT RISK		**7.60**	**0.37**	**0.06**
Cumulative	CalTrain	5.70	0.01	0.03
Cumulative	El Camino Real (SR 82)	1.66	0.00	0.02
Cumulative	19283	2.35	0.00	0.00
Cumulative	19194	2.21	0.00	0.01
Cumulative	G6250	0.02	0.00	0.00
Cumulative	G2970	2.25	0.00	0.00
Cumulative	19561	7.30	0.00	0.02
	CUMULATIVE RISK AT GROUP 9 MEI	**29.09**	**0.38**	**0.14**

Notes:

[a] Stationary sources are identified by their BAAQMD Plant ID.

[b] There are no cumulative sources for the MEI at Group 5.

[c] The acute or chronic hazard index is reported, whichever is higher.

Mitigation of Project Construction Health Risks for Group 3 with On-site Treatment

During the construction of Site 5 (On-site Treatment), the SFPUC shall utilize off-road equipment (more than 50 horsepower) with late model engines meeting U.S. EPA Tier 4 (Interim), or utilize a combination of Tier 2 or Tier 3 engines with add-on devices that consist of level 3 diesel particulate filters.

Construction emissions for Group 3, which includes Site 5 (On-site Treatment), Site 6 (On-site Treatment), and Site 7 (On-site Treatment), were recomputed in CalEEMod assuming that all on-site off-road construction equipment larger than 50 horsepower for construction of the well facility building would have diesel engines that meet the minimum mitigation requirements. This would reduce $PM_{2.5}$ emissions by greater than 50 percent. As a result, excess cancer risks were computed to be less than 5.39 per million. The resulting cancer risks with mitigation would be below the significance thresholds.

Cumulative Health Risk Analysis

Potential health risks and hazards were assessed from TAC sources that are located within 1,000 feet of the MEIs for each geographic group of sites. Note that the MEI refers to the receptor that has the greatest impact with respect to health risks caused only by the project. Cumulative sources were then identified for each group of facility sites and the impact of those sources upon the MEI for each group was evaluated. For those sources that were more than 1,000 feet from the MEI for each group, the contribution to the cumulative impact was considered to be negligible (i.e., the sources beyond the 1,000-feet radius had a negligible contribution to the MEI cancer risk, non-cancer hazards or $PM_{2.5}$ concentrations). For each group of sites, cumulative health risks were predicted at the MEI for that group.

These cumulative health risks are presented in Table 5. The cumulative risk analysis included the aggregate effects of past, present and foreseeable TAC sources within 1,000 feet of the MEI for the group; these sources included the project, highways, local roads (with average daily volume above 10,000 vehicles), and stationary sources identified using BAAQMD's database. Cumulative TAC source data are included in Appendix 5.

Roadways

Busy roadways are a source of TAC emissions that could affect sensitive receptors near the facility site. The BAAQMD provides screening tables that indicate predicted community risk impacts that roadways pose[14]. These tables were used to develop screening levels of cancer risk and $PM_{2.5}$ concentrations. Note that the screening tables published by BAAQMD indicate that non-cancer chronic and acute hazards from traffic would be well below the BAAQMD thresholds. BAAQMD reports the chronic and acute Hazard Index for local roadways as less than 0.02. The traffic level on each roadway was estimated and rounded upward to the traffic volumes analyzed by the BAAQMD screening tables. Traffic volumes were estimated by assuming the peak-hour traffic volumes reported in the traffic section (1st Administrative Draft EIR, Transportation and Circulation Section Table 5.6-3) was about 8 to 10 percent of the average daily traffic volume. The distance between the roadway and the MEI for each geographic group was measured and the screening levels cancer risk and $PM_{2.5}$ levels were identified in the BAAQMD screening tables.

BAAQMD provides a Highway Screening Analysis Google Earth Map tool to identify estimated risk and hazard impacts from highways throughout the Bay Area. Cumulative risk, hazard and $PM_{2.5}$ impacts at various distances from the highway are estimated for different segments of the highways. The tool uses the average annual daily traffic (AADT) count, fleet mix and other modeling parameters specific to that segment of the highway. Impacts from Interstate 280 and State Route 82 were assessed using this tool.

[14] BAAQMD. Roadway Analysis Tables can be accessed from BAAQMD's website at: http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. Note that these tables are used to determine whether additional refined analyses are necessary.

Stationary Sources

The risk, hazard and $PM_{2.5}$ impacts from stationary sources were assessed using the BAAQMD Stationary Source Screening Analysis Google Earth Map tool. This tool was used to identify sources within 1,000 feet of the MEI locations. BAAQMD provided screening risk data for each of the identified sources. BAAQMD also provided distances multipliers to adjust the risk and $PM_{2.5}$ concentrations of gasoline station and diesel engine sources from the screening distance of 50 feet to the actual measured distance. In the case where screening risk data were not available, a source health risk screening assessment (HRSA) was requested from BAAQMD through the Stationary Source Information Request process.

CalTrain Rail Line at Group 9 (Site 16)

Trains using the CalTrain rail line are a source of DPM emissions. The CalTrain rail line near Group 9 was modeled to assess cancer risk, hazards and $PM_{2.5}$ concentrations at the group MEI location affected by Group 9. The rail line within the 1,000 ft buffer area of Site 16 was modeled using ISCST2 with hourly historical meteorological data from San Francisco International Airport.

Annual DPM/$PM_{2.5}$ emissions were computed based on the current schedule that includes 62 CalTrain passenger trains and 4 freight trains. Travel speed was assumed at 30 mph. CalTrain is planning to electrify the line, so DPM emissions may not occur in the future, however no definitive date for implementation has been established. DPM emissions from CalTrain were assumed to occur through the year 2025. For acute impacts, maximum short-term emissions were calculated assuming there would be a maximum of 3 trains (2 Caltrain and 1 freight train) during a one-hour period passing the MEI location.

Based on this modeling, the child exposure cancer risk was 4.5 per million at a DPM/$PM_{2.5}$ concentration of 0.03 $\mu g/m^3$. The chronic DPM HI was 0.005. The maximum 1-hour volatile organic compound concentration was 1.09 $\mu g/m^3$. TAC concentrations with acute health effects were calculated using the U.S. EPA Speciation Profile 4674 for Medium Duty Trucks. The acute total Hazard Index is 0.01 from rail traffic.

Discussion of Cumulative Excess Cancer Risks, Hazard Indices, and $PM_{2.5}$ Concentrations

Table 5 shows the cumulative risk, hazard indices and annual $PM_{2.5}$ concentrations for construction at each group of sites. Results that exceed the applicable thresholds are highlighted in Table 5.

The cumulative excess cancer risk at the MEIs for the groups would range from 4.12 to 29.09. The project MEI would be at Group 3 (Sites 5, 6, 7 with On-site Treatment). The cumulative excess cancer risk to the project MEI would be 28.93 in one million, which is below the cumulative significance threshold of 100 in one million.

The cumulative non-cancer Hazard Index at the MEIs for the groups would range from 0.16 to 0.76. The cumulative Hazard Index for the project MEI would be at Group 2 (Sites 2, 3, and 4) and is predicted to be 0.76, which is below the cumulative significance threshold of 10.0.

The cumulative annual $PM_{2.5}$ concentration at the MEIs for the groups would range from 0.05 $\mu g/m^3$ to 14.53 $\mu g/m^3$. The highest value for the cumulative annual $PM_{2.5}$ concentration occurs at Group 7 (Site 13) and is due primarily to a stationary source in South San Francisco, Bimbo Bakery. Much of this concentration appears to be caused by fugitive emissions of flour from the flour holding tanks, reported only as PM or total particulate matter and assumed to be all $PM_{2.5}$. The cumulative $PM_{2.5}$ concentration from construction at Group 7 would exceed the BAAQMD threshold of 0.8 $\mu g/m^3$, however the project contribution to this cumulative impact is only 0.01 $\mu g/m^3$. The cumulative annual $PM_{2.5}$ concentration for the project MEI at Group 3 is predicted to be 0.33 $\mu g/m^3$, which is below the cumulative significance threshold of 0.8 $\mu g/m^3$.

Health Risk Uncertainties

The resulting health risks reported are based on a series of assumptions related to predicted emissions, concentrations, exposures, and chemical toxicity. The assumptions used in the analysis are generally conservative and meant to provide upper-bound estimates of risk. Emissions from the project are based on the best available estimates of project activity and emissions factors from models recommended by BAAQMD. The uncertainty of the emissions is unknown. Dispersion modeling to predict resulting concentrations was conducted using a model recommended by BAAQMD that used meteorological data recommended by the District's meteorologist. The exposure periods are assumed to be almost continuous for the type of receptors modeled (i.e., the receptors will be present almost continuously during the period that activity occurs). In addition, the most sensitive receptors that could be present were assumed. For example, an infant was assumed to be continuously present at all residential receptors. Infants were considered to be ten times more susceptible to carcinogenic TACs. In general, the methods used in this risk assessment are meant to be conservative, so that the real risks from the source would be lower than the risks predicted in this assessment.

Appendix 1
GSR Air Quality Scope of Work, dated June 24, 2011 and Revised October 28, 2011

Memo

To: Kristine Gaspar, *Winzler & Kelly*

Date: June 24, 2011, Revised October 28, 2011

From: James A. Reyff

Subject: Regional Groundwater Storage and Recovery (GSR) Project EIR Air Quality Analysis

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As you are aware, Illingworth & Rodkin, Inc. (I&R) prepared a draft air quality analysis of GSR Project environmental impacts. That air quality analysis was conducted in 2009 and used the URBEMIS2007 model to conservatively analyze air pollutant emissions from construction of the project. Operational emissions were considered to be negligible, since there were no emissions expected from the facilities and maintenance or worker travel would be minor.

Since that analysis was conducted, the Bay Area Air Quality Management District (BAAQMD) adopted new CEQA Air Quality Guidelines. These guidelines include adopted thresholds for construction emissions and community risk. GSR emissions are difficult to compare against thresholds, because construction activities at each well facility site are quite small, but there are 20 potential construction sites. The construction schedule (see attached) indicates that construction of all sites may overlap to some extent.

A new CEQA air quality issue that has come up is community health risk associated with construction activities. In May 2010, BAAQMD made construction screening tables available that indicate the distances from construction activities to where health risk for $PM_{2.5}$ levels would be at less-than-significant levels. These tables are quite conservative and indicate that minimal setbacks would be around 300 feet. District staff admittedly believes these are quite conservative and expect to issue more refined guidance in 2011.

In response to the new BAAQMD CEQA Air Quality Guidelines, the San Francisco Planning Department's Environmental Planning (EP) division has developed new guidance for reviewing environmental documents. Where there are substantial or significant air quality issues, the guidance requires an air quality technical report. As a result, there are several air quality issues that need to be addressed for this project:

1. Significance of construction period emissions as compared to the new BAAQMD CEQA thresholds;
2. Prediction of construction period health risk impacts; and
3. Preparation of an Air Quality Technical Report per EP guidelines.

Below is the proposed scope of work to prepare a Focused Air Quality Technical Report for the GSR Project. This scope addresses the three items listed above.

Project Description

The purpose of the proposed Project is to further the use of the South Westside Groundwater Basin as an underground storage reservoir by storing water in the basin during wet periods for subsequent recapture during dry periods. The San Francisco Public Utilities Commission (SFPUC) proposes to provide surface water to the cities of Daly City and San Bruno, and the California Water Company (Cal Water) in its South San Francisco service area (collectively designated as Partner Agencies) to be used by these agencies in lieu of pumping groundwater during normal and wet rainfall years. As part of the Project, SFPUC would install new groundwater well facilities, which would be operated by SFPUC and the Partner Agencies for pumping groundwater during dry years as part of the regional water supply.

The proposed Project consists of installation and operation of up to 16 new groundwater production well facilities within the South Westside Groundwater Basin. Nineteen well facility sites are currently being evaluated; however, a maximum of 16 well facilities would be developed and operated as part of the Project. In addition, an existing pump station site may be upgraded.

The new project sites are located in San Mateo County overlying the South Westside Groundwater Basin. Four well facilities would connect to Daly City's distribution system; three well facilities would connect to San Bruno's distribution system; three well facilities would connect to Cal Water's distribution system; and nine well facilities would connect to the SFPUC distribution system. Most of the proposed project sites are located within developed urban areas, many on existing rights-of-way where large SFPUC transmission pipes have previously been installed. Accordingly, large portions of many of the sites have already been disturbed.

Each groundwater well facility site would contain a pump or a well facility to house above-ground pumps, and pipeline and utility trenches to connect the site to water mains, sanitary sewer, storm drains, and the electrical grid. In some cases monitoring wells and geotechnical borings may be installed. In addition, the Westlake Pump Station may require upgrades.

The SFPUC proposes to construct the proposed Project starting in February 2013 through approximately November 2015. The well facility sites would be constructed in groups of four and phased during this time period. Not all construction activities include traditional air-emitting activities such as ground disturbance and running of heavy equipment. Following is a list of the activities and estimated duration associated with construction of a single well facility and its associated features.

- Monitoring well (if needed): approximately 3 weeks each.
- Geotechnical boring (as needed): 1 day each.
- Production well: 45 days each.
- Well station building: 14 months total for each building
    - Clearing and grubbing and other site preparation activity: 1 month
    - Foundation and utility connections: 2 months
    - Building and equipment: 9 months
    - Start-up and testing: 2 months

- Well facilities at Sites 2, 3, and 4: These facilities would be constructed only during the summer months (when school is not in session).
- Pipelines: 300 to 600 feet per week (approximately one to two blocks per week).
- 16 months total.

All construction activities would occur during the daytime hours, from 7 AM to 7 PM, Monday through Friday except for construction of wells, which would require nighttime construction during drilling and other drilling-related activities (for seven consecutive days/nights) and a pump test (for one continuous 48-hour period) at each site.

Focused Air Quality Technical Report

The Air Quality Technical Report would focus on construction period impacts and explain why operational impacts are not quantified (the only operational emissions identified are, at maximum, from one maintenance vehicle visit per day and eight supply deliveries per month to a well site with full treatment).

The Focused Air Quality Technical Report for the project will include the following sections:

Project Description

A brief project description would be prepared, focusing on those elements of the GSR Project that relate to air quality. Since the project includes 20 project sites, a reference to the detailed project description would be included to keep the report to a reasonable size. The attached figures will be used in the Report.

Project Setting

Construction activities that would generate emissions of TACs will be described for each kind of project site. Maps showing the construction sites and the surrounding sensitive receptors would be shown. A table listing the distance from the nearest sensitive receptor to the construction area boundary will be included. In addition, other sources of TAC emissions identified using BAAQMD's stationary source screening tool would be identified on these maps.

Impact of Criteria Air Pollutants

Construction period criteria air pollutants would be modeled using the latest version of the CalEEMod . Construction equipment assumptions in the model would be adjusted to account for the California Air Resources Board (CARB) overestimation of emissions. These adjustments would be verified with City staff or CARB. Model input in terms of equipment quantity, daily usage, size, and number of days used at the site will be developed in consultation with SFPUC. Average daily construction period emissions would be computed. Average daily emissions would be compared against the BAAQMD significance thresholds. Mitigation measures to reduce fugitive dust, and if necessary, exhaust emissions would be identified. Emissions of on-site (construction site) diesel exhaust fine particulate matter emissions developed in this task would be used in the health risk assessment tasks described below.

Single-Source Health Risk Construction Analysis

Where sensitive receptors are located within 1,000 feet of a construction site, the potential for health effects in terms of community risk would be addressed. I&R would conduct a health risk assessment that would model emissions from each of the construction project sites (i.e., construction of a well or

pump facility, including chemical treatment and filtration). The pipeline construction associated with these sites would be included. Even though pipeline construction is expected to have very small impacts due to the short duration, the pipeline construction within 1,000 feet of the well facility construction sites would be included.

This modeling would be conducted by computing construction period emissions of toxic air contaminants (TACs) and $PM_{2.5}$ and using dispersion models to predict the received concentrations. The health risks associated with the received concentrations would be assessed by applying BAAQMD risk calculation methods that include age-sensitivity factors. Health risk would be predicted per BAAQMD Risk Management policy. Details of this analysis include:

- Construction Emissions would be computed using the CalEEMod model as described above. If construction equipment is known or SFPUC commits to certain construction equipment fleet emissions requirements, then CARB's OFFROAD2007 and EMFAC2007 model would be used. As described above, construction equipment activity levels would be determined using the CalEEMod model, unless specific information is provided by SFPUC. All $PM_{2.5}$ exhaust emissions from on-site off-road and on-road equipment will be considered as diesel particulate matter. The latest off-road equipment load factors recommended by CARB would be applied to the CalEEMod modeling.

- EPA's ISCST3 model would be used to model emissions from the construction activities. The first approach would be to identify appropriate hourly meteorological data that could be used in this task. This would be done by consulting with BAAQMD's meteorologist in consultation with City staff. Otherwise, screening meteorological conditions would be used to model a worst-hour concentration. The worst-hour concentration would be converted to an annual concentration to address cancer, non-cancer chronic health risk impacts and annual $PM_{2.5}$ concentrations. Modeled worst-hour concentrations would be used to compute acute hazards resulting from acrolein and all other speciated TAC components of DPM with acute risks using BAAQMD speciation factors[1]. Annual concentrations would be adjusted from worst-hour concentrations by applying a 0.1 persistence factor. Screening meteorological conditions would be based on the meteorological conditions used by the SCREEN3 model[2]. Receptors would be placed at sensitive receptors anticipated to have the greatest impacts that are within 1,000 feet from the modeled construction site. For assessing impacts, the receptor with the highest impacts from construction activities within 1,000 feet would be identified. This analysis would also take into account the situations where some receptors would be within 1,000 feet of more than one construction site. A draft receptor grid will be provided to EP for review prior to modeling and revised per EP comments.

- Health risks and $PM_{2.5}$ concentrations would be predicted based on BAAQMD guidance for sensitive receptor exposures. We would confirm the exposure assumptions and speciation factors for emissions with the City EP Division and BAAQMD to ensure risks are not under or over predicted. The analysis would incorporate the appropriate breathing rates (for adults and children), hours of operation and the number of days per year that emissions would occur.

<u>Cumulative Health Risks</u>

[1] Speciation factors would be based on a 3/30/2011 email from Virginia Lau (BAAQMD). The City EP Division and/or BAAQMD would be consulted to identify the acute reference exposure levels.

[2] The SCREEN3 meteorological data is a set of 54 discrete combinations of wind speed, wind direction and atmospheric stability.

Screening tables and screening analysis tools provided by BAAQMD along with the database on stationary sources would be used to identify community risk impacts from other nearby sources. The impact from project construction combined with published impacts from roadways or stationary sources within 1,000 feet of each project site would be compared against the BAAQMD thresholds. At this point, modeling of cumulative sources that are not part of the project is not proposed. It is assumed, at this time, that cumulative impacts from non-project sources would not contribute to a significant cumulative health risk. If cumulative risk would exceed the BAAQMD thresholds, then additional refined modeling, which is not included in this scope of work, may be necessary.

For each site, a table would be developed for the maximally exposed individual (MEI), based on exposure to the project construction sites. This table would report the cancer risk, chronic and acute non-cancer risk and $PM_{2.5}$ concentration associated with the project (including the combination of multiple project sites that are within 1,000 feet). This would be the maximum project impact and compared to the BAAQMD community risk thresholds for a single source (e.g., cancer risk of 10 in one million).

In addition, the table would list the impacts from other sources using BAAQMD screening tables for roadways and BAAQMD's stationary source database. The impacts from roadways would be looked up in the screening tables based on the receptor distance from the roadway. Impacts from stationary sources would be based on a search using BAAQMD's Google Earth Stationary Source tool to initially identify the nearby sources. For each site that has identified stationary sources within 1,000 feet, a request would be made to BAAQMD to provide the screening level risk and $PM_{2.5}$ data that would be used as screening level. BAAQMD distance adjustment factors for any diesel engines would be applied. These data would be entered into the table and combined with the project impacts to assess cumulative risk. The risk from each source would be added and the total would be compared against BAAQMD's community risk thresholds for cumulative sources (e.g., cancer risk of 100 in one million).

Appendices

The model print outs, speciation tables, emission factors, and this scope of work will be included in the appendices. In addition, correspondence with any agency, such as BAAQMD or CARB, which was used in developing the technical report, will be included.

Attachments: Proposed GSR Construction Schedule

08-139

Appendix 2
Site Maps Showing Construction Area and Sensitive Receptors

Path: \\corpiwkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Overall-AQ.mxd

Figure 2 - Group 1
Site 1
Figure 3 - Group 2
WLPS
Site 2
Site 3
Site 4
Figure 4 - Group 3
Site 5
Site 6
Site 7
Figure 5 - Group 4
Site 17 (Alternate)
Site 8
Figure 6 - Group 5
Site 9
Site 10
Site 18 (Alternate)
Figure 7 - Group 6
Site 11
Site 19 (Alternate)
Site 12
Figure 8 - Group 7
Site 13
Figure 9 - Group 8
Site 14
Site 15
Figure 10 - Group 9
Site 16

Overview Map

Legend

- Extent of Figure
- Construction Area
- 1,000-Foot Radius from Construction Area

N

0 2,300 4,600 9,200

Scale Feet

1" = 4,600 feet

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 1

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\v4 - June 2012\Site_01-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Daycare Facilities

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 75 150 300
Scale Feet
1" = 300'

N

Group 1 - Site 1

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 2

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site 2,3,4-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Schools

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 112.5225 450
Scale Feet

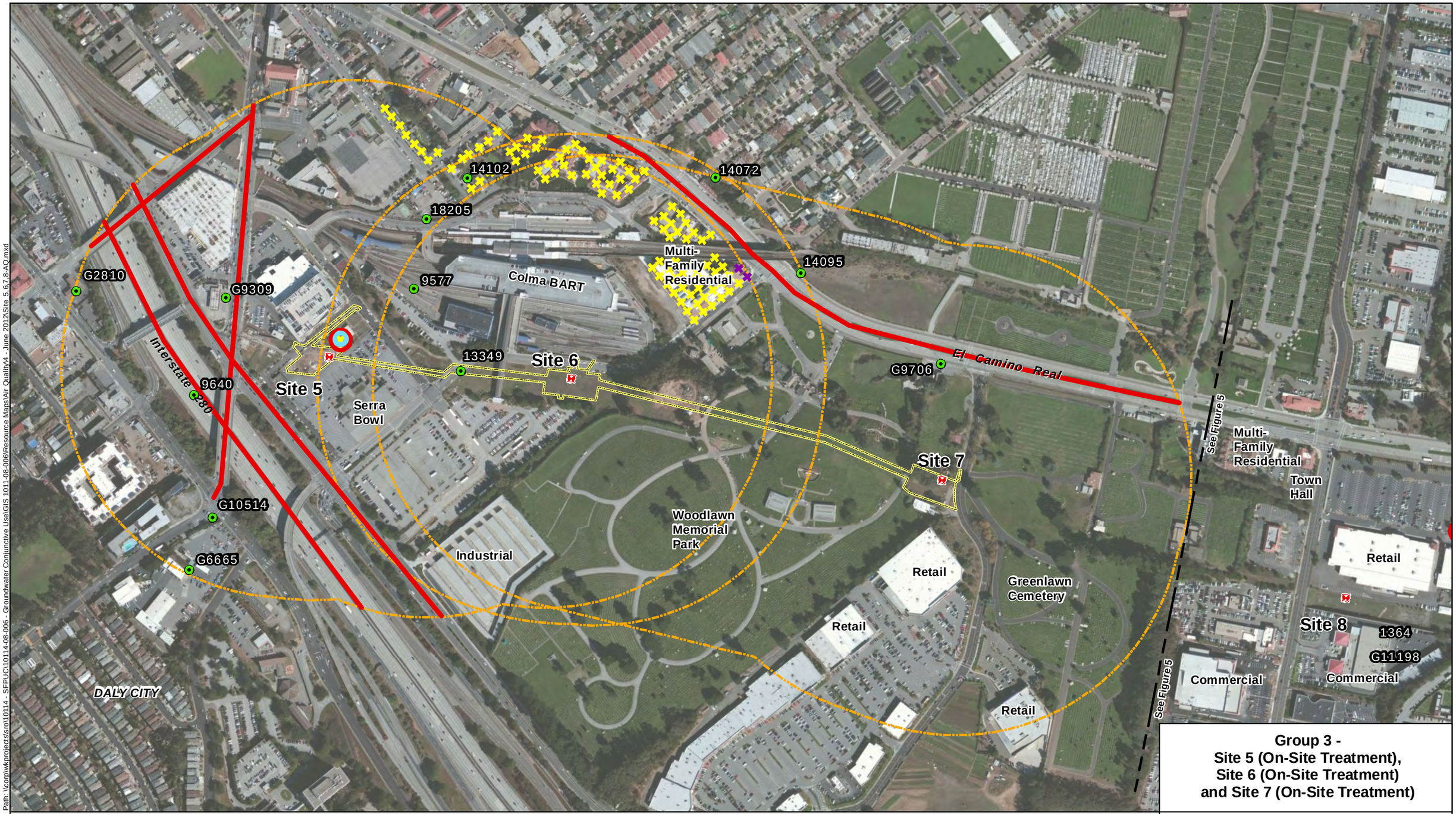
1" = 450'

Group 2 - Site 2, Site 3, Site 4, and Westlake Pump Station (WLPS) Upgrades

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 3



Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site 5,6,7,8-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Daycare Facilities

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

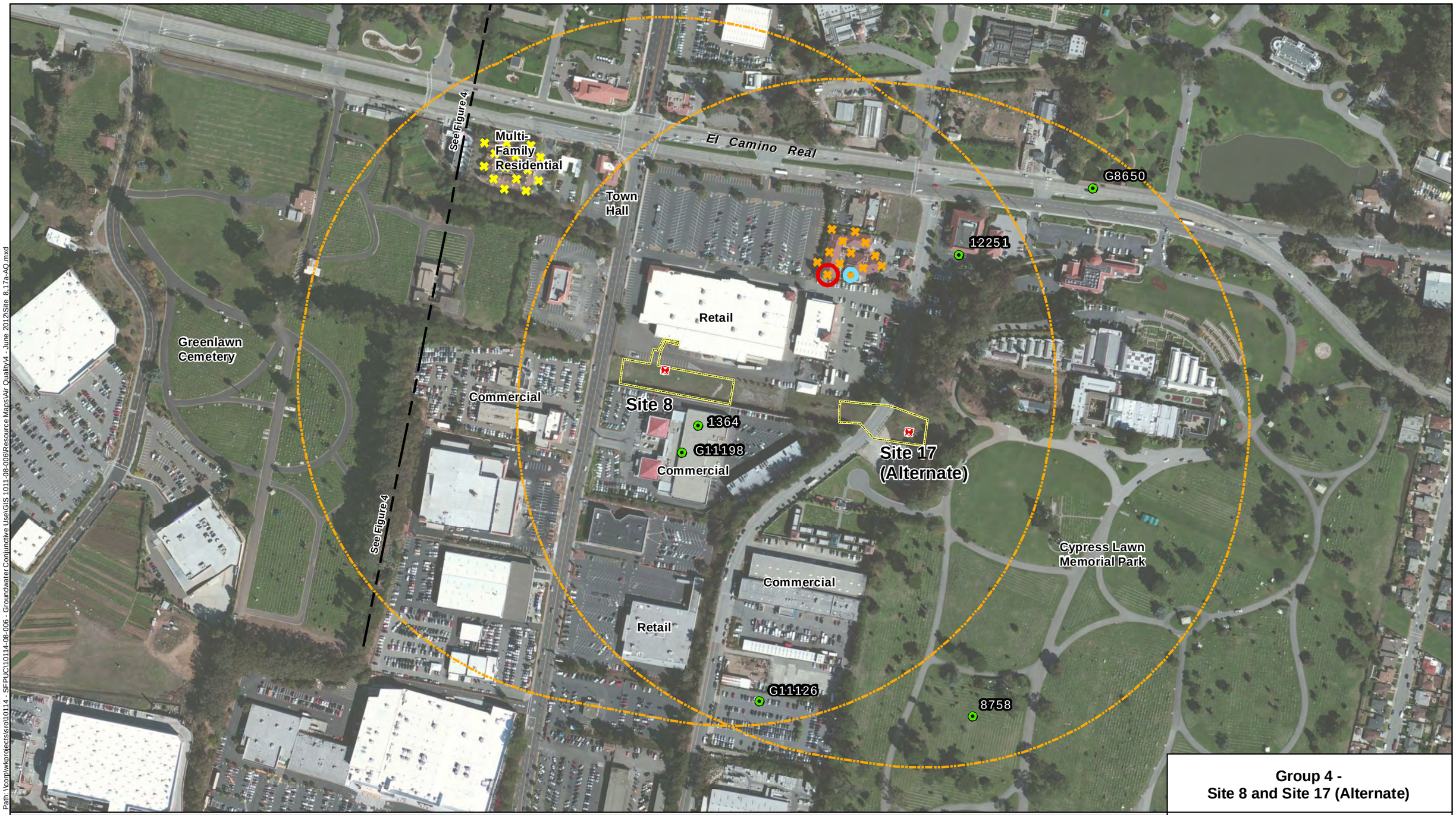
0 100 200 400
Scale Feet
1" = 400'

Group 3 -
Site 5 (On-Site Treatment),
Site 6 (On-Site Treatment)
and Site 7 (On-Site Treatment)

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 4



Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site_8,17a-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Senior Facilities

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 70 140 280 Feet

Scale

1" = 280'

Group 4 - Site 8 and Site 17 (Alternate)

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 5

Cypress Lawn Memorial Park

Mobile Home Park

Mt. Olivet Cemetery

11016

Site 9

G3305

Hickey Blvd.

Single-Family Residential

Multi-Family Residential

Retail

El Camino Real

Commercial

Junipero Serra Blvd.

Site 10

Site 18 (Alternate)

Single-Family Residential

Alta Loma Middle School

Alta Loma Park

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Schools
- Daycare Facilities

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 105 210 420

Scale Feet

1" = 420'

Group 5 - Site 9, Site 10, and Site 18 (Alternate)

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 6

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site_09.10.18a-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Hospitals
- Residential
- Daycare Facilities
- Schools

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 100 200 400
Scale Feet
1" = 400'

Group 6 - Site 11, Site 12, and Site 19 (Alternate)

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 7

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site_11_12_19_AQ.mxd

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site_13-AQ.mxd

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential
- Schools

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 80 160 320
Scale Feet
1" = 320'

Group 7 - Site 13

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 8

Path: \\corp\wkprojects\sro\10114 - SFPUC\10114-08-006 - Groundwater Conjunctive Use\GIS 1011-08-006\Resource Maps\Air Quality\4 - June 2012\Site_14,15-AQ.mxd

Single-Family Residential

Site 14 Golden Gate National Cemetery

Site 15

Sneath Lane

El Camino Real

Commercial

Industrial

19262

Multi-Family Residential

Interstate 280

Interstate 380

Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Residential

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 100 200 400

Scale Feet

1" = 400'

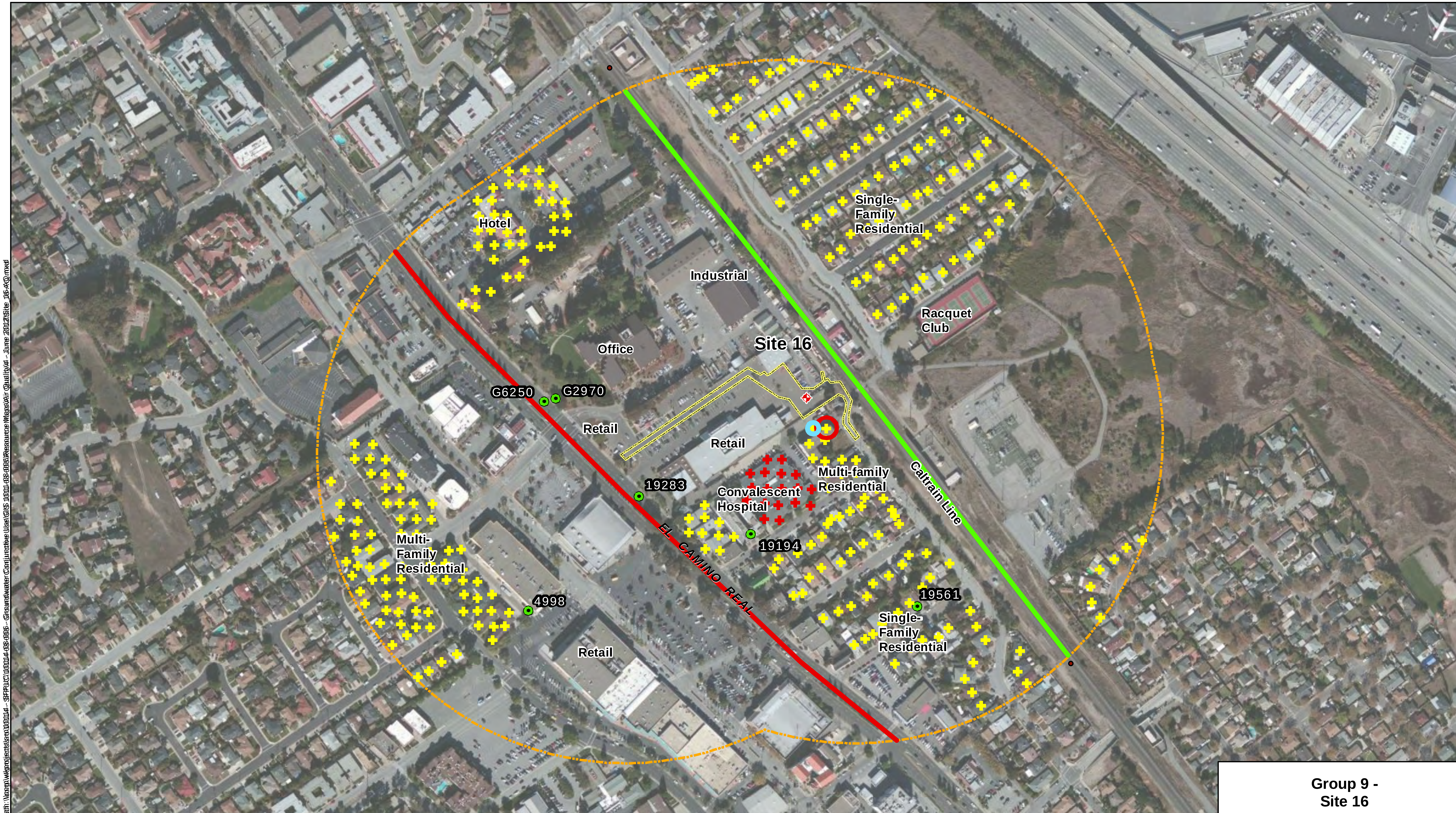
N

Group 8 - Site 14 and Site 15

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 9



Legend

- Well
- Construction Area
- 1,000-Foot Radius from Construction Area

Sources

- Roadways with over 10,000 ADT
- Caltrain Line
- Stationary Sources from BAAQMD

Sensitive Receptor Grid

- Hospitals
- Residential

Maximum Exposed Individual

- Acute Hazard
- Cancer Risk and Chronic Hazard

0 75 150 300

Scale Feet

1" = 300'

Group 9 - Site 16

Regional Groundwater Storage and Recovery Project

Air Quality Technical Report

Figure 10

Appendix 3
Detailed Emissions Computations and CalEEMod Modeling Output Files

Regional Groundwater Storage and Recovery Project

Summary of Criteria Air Pollutant Emissions

Construction Schedule: June 2014 to February 2016 = 21 Months of Construction

Site ID	Pipeline Length	Vehicle Trips: Haul Truck	Vehicle Trips: Vendor/ Worker Trips	Vehicle Trips: Estimated Worker Trips (b)	Vehicle Trips: Estimated Vendor Trips (c)	Construction Type: Well	Construction Type: Fence	Construction Type: WF & Treatment	Emissions in total pounds: ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2	Mitigated NOx	Mitigated $PM_{2.5}$
Site 1	295	9	1435	952	482	x		x	205	1511	81	73	275967	1511	73
Site 2[b]	440	2	125	81	44		x		15	107	7	6	16685	107	6
Site 3[b]	845	10	353	266	87	x	x		57	419	22	20	99645	419	20
Site 4[b]	1000	27	358	270	88	x	x		62	434	23	21	102559	434	21
Westlake Pump Station	0	0	440	280	160				5	26	4	1	10585	26	1
Site 5 (assume worst case)[a]	2135	7	1370	877	492			x	176	1291	77	66	211294	1291	**30**
Site 6 (assume worst case)[a]	1530	4	1346	859	486			x	172	1266	76	65	206707	1266	65
Site 7 (assume worst case)[a]	2435	17	1484	990	495	x		x	220	1593	88	79	291094	1593	79
Site 8	450	5	1335	851	484			x	165	1228	73	62	199948	1228	62
Site 9	600	8	1445	960	485	x		x	207	1522	82	74	277961	1522	74
Site 10	455	7	1335	851	484			x	165	1229	73	62	200199	1229	62
Site 11	1315	9	1469	978	491	x		x	212	1549	85	76	282999	1549	76
Site 12	1635	15	1480	986	494	x		x	214	1564	86	77	285856	1564	77
Site 13	2475	14	1403	902	501			x	179	1308	79	68	214884	1308	**32**
Site 14	2895	25	1522	1017	504	x		x	223	1616	90	81	295628	1616	81
Site 15	935	8	1456	968	488	x		x	209	1534	83	75	280271	1534	75
Site 16	1095	8	1462	972	489	x		x	211	1540	84	75	281374	1540	75
Site 17 (Alternate)	140	10	1430	949	481	x		x	204	1506	81	73	275015	**1221**	73
Site 18 (Alternate)	425	10	1438	955	483	x		x	206	1516	82	74	276950	**1230**	74
Site 19 (Alternate)	1640	15	380	286	94	x	x		66	451	25	22	105668	**366**	22
Total (Sites 1 - 16):									2,697	19,738	1,113	981	3,533,657		
Average Daily Emissions (Sites 1 - 16):									**6.42**	**46.99**	**2.65**	**2.34**			
assuming 420 construction days															
Total + Alternative Sites:									3174	23211	1301	1150		22555	
assuming 420 construction days									**7.56**	**55.26**	**3.10**	**2.74**		**53.70**	

(a) Worst-case assumes chemical treatment, longest pipeline and hightest trip generation.

(b) Based on dfference between Worker/Vendor trips and computed vendor trips

(c) Calculated based on Worker/Vendor trips and worker trips.

Regional Groundwater Storage and Recovery Project

GSR Construction Phasing and Equipment List for Air Quality Modeling
Preliminary - Subject to Change
Revised May 31, 2012

Well Drilling/Well Construction

Phase	Working Days[3]	Equipment Type[1]	hp (if known)	Fuel Type	Quantity of Equipment[2]	No. of Days	Hours per Day	Average Hours per Sub-Phase Day	Average Hours per Phase Day		ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2
Site Preparation	3	Grader			1	1	4	1.3	0.1		Max Day				
Pilot Hole	2	Mounted Drill Rig			1	2	8	8.0	0.5	2014	5.69	46.35	1.58	1.58	9204
		Cement Truck			2	1	1	0.5	0.0		during Well Development				
Bore Hole, Drilling	9	Mounted Drill Rig	330	diesel	1	5	24	13.3	4.0						
Well Development	6	Mounted Drill Rig	330	diesel	1	6	12	12.0	2.4		Average Day				
		Cement Truck			3	1	1	0.2	0.0	2014	1.34	9.5	0.39	0.39	2487
		Air Compressor	300	diesel	1	6	12	12.0	2.4						
		Pump Truck			1	1	8	1.3	0.3		Total per Phase			30 days	
Pump Testing, Water Sampling	8	Diesel pump - submersible	100		1	4	12	6.0	1.6		40.20	285.00	11.70	11.70	74610.00
Continuous 48-hour pumping	2	Diesel pump - submersible	100		1	2	24	24.0	1.6		Mitigated Average day				
	Total Days										0.68	6.57	0.10	0.10	2487
	30														
											Total per Phase			30 days	
											20.40	197.10	3.00	3.00	74610.00

Construction for WF & Treatment Building (5 rooms)

Phase	Working Days[3]	Equipment Type[1]	hp (if known)	Fuel Type	Quantity of Equipment[2]	No. of Days	Hours per Day	Average Hours per Sub-Phase Day	Average Hours per Phase Day		ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2
Site Preparation	18	Frontend Loaders			1	14	6	4.67	0.4		Max Day				
		Graders/Roller Compactor			1	4	8	1.78	0.1	2014	2.47	15.77	1.07	1.07	2475
		Generator			1	18	1	1.00	0.1		during Site Preperation				
Building Foundation	32	Cement Trucks			14	1	1	0.03	0.0		Average Day				
		Pump Truck			1	1	4	0.13	0.0	2014	0.61	4.66	0.23	0.23	678
		Generator			1	32	1	1.00	0.1	2015	0.57	4.21	0.2	0.2	678
		Forklift			1	32	2	2.00	0.3		Total per Phase			240 days	
Building Construction	180	Forklift			1	180	2	2.00	1.5		146.40	1118.40	55.20	55.20	162720.00
		Cement Trucks			9	3	1	0.02	0.0						
		Pump Truck			1	3	4	0.07	0.1		Mitigated Average Day				
		Crane	200		1	45	8	2.00	1.5	2014	0.34	3.22	0.08	0.08	678
		Generator			1	180	1	1.00	0.8	2015	0.33	3.00	0.07	0.07	678
Pipeline (onsite)	8	Loader Backhoe			1	8	8	8.00	0.3		Total per Phase			240 days	
		Roller compactor or wacker			1	8	2	2.00	0.1		81.60	772.80	19.20	19.20	162720.00
Paving	2	Cement Trucks			1	1	1	0.50	0.0						
		Rollers			1	1	2	1.00	0.0						
		Asphalt Truck			1	1	2	1.00	0.0						
~~Well &~~ Pump Install**	NA	Accounted for Under Building Construction													
Landscaping	NA	None													
	Total Days														
	240														

Construction for Fenced Enclosure

Phase	Working Days[3]	Equipment Type[1]	hp (if known)	Fuel Tupe	Quantity of Equipment[2]	No. of Days	Hours per Day	Average Hours per Sub-Phase Day	Average Hours per Phase Day		ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2
											Max Day				
Site Preparation	5	Skid Steer Loaders			1	1	6	1.20	0.2						
		Graders/Roller Compactor			1	1	8	1.60	0.20	2014	**1.07**	**7.43**	**0.44**	**0.44**	**823**
		Generator			1	2	1	0.40	0.05		**during Site Preperation**				
Foundation	10	Cement Trucks			4	1	1	0.10	0.03		**Average Day**				
		Generator			1	10	1	1.00	0.25	2014	**0.24**	**1.75**	**0.10**	**0.10**	**224**
		Forklift			1	10	2	2.00	0.50						
Pipeline (onsite)	5	Loader Backhoe			1	5	8	8.00	1.00		**Total per Phase**			**40 days**	
		Roller compactor or wacker			1	5	2	2.00	0.25		**9.60**	**70.00**	**4.00**	**4.00**	**8960.00**
Paving	4	Cement Trucks			1	1	1	0.25	0.03						
		Rollers			1	1	2	0.50	0.05						
		Asphalt Truck			1	1	2	0.50	0.05						
Pump Install	1	Small Crane	200		1	1	2	2.00	0.05						
Mechanical Pump	5	None													
Landscaping	NA	None													
Fencing	5	None													
Electrical	5	None													
	Total Days														
	40														

Construction of Pipeline (per 120 feet)*

Phase	~~Working Days~~[3]	Equipment Type[1]	hp (if known)	Fuel Type	Quantity of Equipment[2]	No. of Days	Hours per Day	Average Hours per Sub-Phase Day	Average Hours per Phase Day		ROG	NOx	PM_{10}	$PM_{2.5}$	CO_2
Vegetation Removal	1	None						0.00	0.0		**Max Day (street work)**				
Trenching	1	Loader Backhoe			1	1	4	4.00	4.00	2014	**2.47**	**17.73**	**0.96**	**0.96**	**2564.77**
Pipeline	1	Tractors/Loaders/Backhoes			1	1	2	2.00	2.00						
		Generator			1	1	1	1.00	1.00		**Average Day (no street work)**				
Backfill	1	Loader Backhow			1	1	2	2.00	2.00	2014	**0.76**	**4.26**	**0.33**	**0.33**	**736.74**
		Small Roller Compactor or wacker			1	1	2	2.00	2.00						
Surface Restoration***	1	Cement Trucks			2	1	1	1.00	1.00		**Total per Phase**			**1 days**	
		Rollers			1	1	8	8.00	8.00		**0.76**	**4.26**	**0.33**	**0.33**	**736.74**
		Asphalt Truck			1	1	8	8.00	8.00		**Mitigated Average Day (no street work)**				
											0.54	**2.64**	**0.24**	**0.24**	**736.74**
	Total Days														
	NA										**Total per Phase**			**1 days**	
											0.54	**2.64**	**0.24**	**0.24**	**736.74**

1. Revise equipment type, except "On Highway Trucks," as appropriate for this project. Provide hp if known.
2. For "On Highway Trucks" (which includes vendors, haul trucks,& deliveries) the "quantity of equipment" should be reported as round trip truck trips.
3. Working days are counted as 20 days within a calendar month.

* Typically we use an average of 60 - 120 ft/day pipeline construction, depending on conditions. Majority of the pipeline in this project is in soil where we would anticipate minimal obstructions, so we can assume a higher production rate.
** Assume pump, tanks, and other equipment installed during building construction, while fork lift and crane are avaialble. The 40 days includes testing
*** Needed for pipeline work in the street.

Regional Groundwater Storage and Recovery Project

On-Road Vehicle Emissions

Air Pollutant and GHG Emissions using EMFAC2011 for 2014

Site ID	Round Trips	Vehicle Emissions per Construction Period (pounds)								
		ROG	NOx	PM10	PM2.5	PM2.5	PM2.5	CO2	CO2	CO2
Site 1					Running	Idle		Running	Idle	
Employee Traffic	952	8.77	12.30	8.48	2.55	0.00	2.55	18539	0	18,539
Vendor/Equipment Trips	482	5.95	66.52	4.36	2.04	0.09	2.13	14175	1308	15,482
Heavy-Heavy Duty Trucks	9	0.32	4.83	0.30	0.17	0.00	0.17	954	23	977
Total	**1444**	**15.05**	**83.65**	**13.14**	**4.8**	**0.1**	**4.85**	**33,667**	**1,331**	**34,998**
Site 2										
Employee Traffic	81	0.75	1.05	0.72	0.22	0.00	0.22	1577	0	1,577
Vendor/Equipment Trips	44	0.54	6.02	0.39	0.18	0.01	0.19	1283	118	1,401
Heavy-Heavy Duty Trucks	2	0.07	1.07	0.07	0.04	0.00	0.04	212	5	217
Total	**127**	**1.36**	**8.14**	**1.18**	**0.4**	**0.0**	**0.45**	**3072**	**124**	**3,195**
Site 3										
Employee Traffic	266		3.44	2.37	0.71	0.00	0.71	5180	0	5,180
Vendor/Equipment Trips	87		12.00	0.79	0.37	0.02	0.38	2557	236	2,793
Heavy-Heavy Duty Trucks	10		5.37	0.34	0.18	0.00	0.19	1060	26	1,086
Total	**363**		**20.81**	**3.49**	**1.3**	**0.0**	**1.28**	**8798**	**262**	**9,059**
Site 4										
Employee Traffic	270	2.49	3.49	2.40	0.72	0.00	0.72	5256	0	5,256
Vendor/Equipment Trips	88	1.09	12.18	0.80	0.37	0.02	0.39	2595	239	2,835
Heavy-Heavy Duty Trucks	27	0.97	14.49	0.91	0.50	0.00	0.50	2862	70	2,931
Total	**385**	**4.54**	**30.16**	**4.11**	**1.6**	**0.0**	**1.62**	**10713**	**309**	**11,022**
Westlake Pump Station										
Employee Traffic	280	2.58	3.62	2.49	0.75	0.00	0.75	5450	0	5,450
Vendor/Equipment Trips	160	1.97	22.06	1.44	0.68	0.03	0.71	4701	434	5,134
Heavy-Heavy Duty Trucks	0	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
Total	**440**	**4.55**	**25.68**	**3.94**	**1.4**	**0.0**	**1.46**	**10151**	**434**	**10,585**
Site 5 (assume worst case)										
Employee Traffic	877	8.08	11.33	7.81	2.35	0.00	2.35	17077	0	17,077
Vendor/Equipment Trips	492	6.08	67.89	4.45	2.08	0.09	2.18	14467	1335	15,802
Heavy-Heavy Duty Trucks	7	0.25	3.76	0.23	0.13	0.00	0.13	742	18	760
Total	**1377**	**14.41**	**82.98**	**12.49**	**4.6**	**0.1**	**4.66**	**32286**	**1,353**	**33,638**
Site 6 (assume worst case)										
Employee Traffic	859	7.92	11.10	7.65	2.30	0.00	2.30	16724	0	16,724
Vendor/Equipment Trips	486	6.00	67.06	4.39	2.06	0.09	2.15	14290	1318	15,608
Heavy-Heavy Duty Trucks	4	0.14	2.15	0.13	0.07	0.00	0.07	424	10	434
Total	**1350**	**14.06**	**80.31**	**12.18**	**4.4**	**0.1**	**4.53**	**31437**	**1,329**	**32,766**
Site 7 (assume worst case)										
Employee Traffic	990	9.12	12.78	8.81	2.65	0.00	2.65	19262	0	19,262
Vendor/Equipment Trips	495	6.11	68.23	4.47	2.09	0.10	2.19	14538	1341	15,879
Heavy-Heavy Duty Trucks	17	0.61	9.12	0.57	0.31	0.00	0.32	1802	44	1,846
Total	**1501**	**15.83**	**90.13**	**13.85**	**5.1**	**0.1**	**5.16**	**35602**	**1,385**	**36,987**
Site 8										
Employee Traffic	851	7.84	11.00	7.58	2.28	0.00	2.28	16570	0	16,570
Vendor/Equipment Trips	484	5.97	66.70	4.37	2.05	0.09	2.14	14213	1311	15,524
Heavy-Heavy Duty Trucks	5	0.18	2.68	0.17	0.09	0.00	0.09	530	13	543
Total	**1340**	**13.99**	**80.38**	**12.12**	**4.4**	**0.1**	**4.51**	**31313**	**1,324**	**32,637**
Site 9										
Employee Traffic	960	8.84	12.40	8.55	2.57	0.00	2.57	18687	0	18,687
Vendor/Equipment Trips	485	5.99	66.87	4.38	2.05	0.09	2.14	14249	1314	15,564
Heavy-Heavy Duty Trucks	8	0.29	4.29	0.27	0.15	0.00	0.15	848	21	869
Total	**1453**	**15.12**	**83.57**	**13.20**	**4.8**	**0.1**	**4.87**	**33785**	**1,335**	**35,120**

Site ID	Round Trips	Vehicle Emissions per Construction Period (pounds)								
		ROG	NOx	PM10	PM2.5	PM2.5	PM2.5	CO2	CO2	CO2
Site 10										
Employee Traffic	851	7.84	11.00	7.58	2.28	0.00	2.28	16573	0	16,573
Vendor/Equipment Trips	484	5.97	66.71	4.37	2.05	0.09	2.14	14214	1311	15,525
Heavy-Heavy Duty Trucks	7	0.25	3.76	0.23	0.13	0.00	0.13	742	18	760
Total	**1342**	**14.06**	**81.46**	**12.18**	**4.5**	**0.1**	**4.55**	**31529**	**1,329**	**32,858**
Site 11										
Employee Traffic	978	9.01	12.63	8.71	2.62	0.00	2.62	19035	0	19,035
Vendor/Equipment Trips	491	6.06	67.69	4.43	2.08	0.09	2.17	14424	1331	15,755
Heavy-Heavy Duty Trucks	9	0.32	4.83	0.30	0.17	0.00	0.17	954	23	977
Total	**1478**	**15.39**	**85.15**	**13.44**	**4.9**	**0.1**	**4.96**	**34414**	**1,354**	**35,767**
Site 12										
Employee Traffic	986	9.08	12.73	8.78	2.64	0.00	2.64	19191	0	19,191
Vendor/Equipment Trips	494	6.09	68.06	4.46	2.09	0.09	2.18	14503	1338	15,841
Heavy-Heavy Duty Trucks	15	0.54	8.05	0.50	0.28	0.00	0.28	1590	39	1,628
Total	**1495**	**15.71**	**88.85**	**13.74**	**5.0**	**0.1**	**5.11**	**35284**	**1,377**	**36,660**
Site 13										
Employee Traffic	902	8.31	11.65	8.03	2.42	0.00	2.42	17556	0	17,556
Vendor/Equipment Trips	501	6.18	69.03	4.52	2.12	0.10	2.21	14708	1357	16,065
Heavy-Heavy Duty Trucks	14	0.50	7.51	0.47	0.26	0.00	0.26	1484	36	1,520
Total	**1417**	**14.99**	**88.19**	**13.02**	**4.8**	**0.1**	**4.89**	**33748**	**1,393**	**35,141**
Site 14										
Employee Traffic	1017	9.37	13.14	9.06	2.73	0.00	2.73	19804	0	19,804
Vendor/Equipment Trips	504	6.22	69.51	4.55	2.13	0.10	2.23	14811	1366	16,178
Heavy-Heavy Duty Trucks	25	0.89	13.42	0.84	0.46	0.00	0.46	2650	64	2,714
Total	**1547**	**16.49**	**96.07**	**14.45**	**5.3**	**0.1**	**5.42**	**37265**	**1,431**	**38,696**
Site 15										
Employee Traffic	968	8.92	12.51	8.62	2.60	0.00	2.60	18850	0	18,850
Vendor/Equipment Trips	488	6.02	67.26	4.40	2.06	0.09	2.16	14331	1322	15,653
Heavy-Heavy Duty Trucks	8	0.29	4.29	0.27	0.15	0.00	0.15	848	21	869
Total	**1464**	**15.23**	**84.06**	**13.30**	**4.8**	**0.1**	**4.90**	**34030**	**1,343**	**35,372**
Site 16										
Employee Traffic	972	8.96	12.56	8.66	2.61	0.00	2.61	18928	0	18,928
Vendor/Equipment Trips	489	6.04	67.44	4.42	2.07	0.09	2.16	14371	1326	15,696
Heavy-Heavy Duty Trucks	8	0.29	4.29	0.27	0.15	0.00	0.15	848	21	869
Total	**1470**	**15.28**	**84.29**	**13.34**	**4.8**	**0.1**	**4.92**	**34147**	**1,346**	**35,493**
Site 17 (Alternate)										
Employee Traffic	949	8.74	12.25	8.45	2.54	0.00	2.54	18468	0	18,468
Vendor/Equipment Trips	481	5.94	66.36	4.35	2.04	0.09	2.13	14139	1304	15,443
Heavy-Heavy Duty Trucks	10	0.36	5.37	0.34	0.18	0.00	0.19	1060	26	1,086
Total	**1440**	**15.04**	**83.98**	**13.13**	**4.8**	**0.1**	**4.86**	**33667**	**1,330**	**34,997**
Site 18 (Alternate)										
Employee Traffic	955	8.80	12.33	8.50	2.56	0.00	2.56	18588	0	18,588
Vendor/Equipment Trips	483	5.96	66.64	4.36	2.04	0.09	2.14	14199	1310	15,509
Heavy-Heavy Duty Trucks	10	0.36	5.37	0.34	0.18	0.00	0.19	1060	26	1,086
Total	**1448**	**15.12**	**84.34**	**13.20**	**4.8**	**0.1**	**4.88**	**33847**	**1,336**	**35,182**
Site 19 (Alternate)										
Employee Traffic	286	2.63	3.69	2.55	0.77	0.00	0.77	5567	0	5,567
Vendor/Equipment Trips	94	1.16	12.91	0.85	0.40	0.02	0.41	2752	254	3,006
Heavy-Heavy Duty Trucks	15	0.54	8.05	0.50	0.28	0.00	0.28	1590	39	1,628
Total	**395**	**4.33**	**24.66**	**3.90**	**1.4**	**0.0**	**1.46**	**9909**	**293**	**10,202**

Vehicle & Trip Information

Description	Trip Length*	% LDA	%LDT	%MDT	%HDT	%HHDT
Employee Vehicles	**12.4**	50%	50%			
Vendor/Equipment Trips	**7.3**			50%	50%	
Heavy Duty Trucks	**20**				100%	
Heavy-Heavy Duty Trucks	**20**					100%

* Trip length is one way distance in miles

Entrained Roadway Dust (PM10) gm/mi

Vehicle	PM10	PM2.5
All	0.116	0.029

EPA AP-42 Section 13.2.1

$E = k(sL)^{0.91} \times (W)^{1.02}$ EPA AP-42 Section 13

Where:

k (PM2.5) = 0.25

k (PM10) = 1.00

sL = 0.035 g/m2 for major & colle

W = 2.4 tons

Composite Running Emission Factors, gm/mi

						Entrained Dust	
Description	**ROG**	**NOx**	**PM10**	**PM2.5**	**CO2**	**PM10**	**PM2.5**
Employee Vehicles	0.144	0.213	0.047	0.020	350.06	0.116	0.029
Vendor/Equipment Trips	0.294	3.216	0.158	0.102	906.02	0.116	0.029
Heavy Duty Trucks	0.363	5.768	0.263	0.180	1202.52	0.116	0.029
Heavy-Heavy Duty Trucks	0.418	8.488	0.241	0.170	1646.48	0.116	0.029

Emission factors based on EMFAC2011

Trip Emissions, gm/trip

Description	ROG	NOx	PM10	PM2.5	CO2
Employee Vehicles	0.311	0.289	0.003	0.003	78.09
Vendor/Equipment Trips	0.450	0.635	0.002	0.002	55.31
Heavy Duty Trucks	0.317	0.460	0.001	0.001	8.56
Heavy-Heavy Duty Trucks	0.323	0.397	0.000	0.000	5.29

Emission factors based on EMFAC2011

Idle Emissions, gm/hr-veh

Description	ROG	NOx	PM10	PM2.5	CO2
Employee Vehicles[a]	-	-	-	-	-
Vendor/Equipment Trips[b]	2.489	86.283	0.569	0.524	7382.69
Heavy Duty Trucks[c]	6.357	72.190	0.384	0.3536	7022.55
Heavy-Heavy Duty Trucks[c]	6.357	72.190	0.384	0.354	7022.55

Emision rates from CARB Idling Emission Rates for EMFAC2011-HD Vehicle Categories, Feb. 8, 2012

Idle time per vehicle round trip assumet to be = 10 minutes

[a] Idle emissions from employee vehicles assumed to be negligible

[b] Idle emissions from Vendor/Equipment vehicles assumed to be same as for MHDT vehicle category

[c] Idle emissions from Heavy Duty Trucks and Heavy-Heavy Duty trucks assumed to be same as for HHDT vehicle category

4/8/2012
From Table 3-4

	Approximate Pipeline Lengths (feet)					
Site ID	**Proposed Water Connection Pipeline**	**Alternate Water Connection Pipeline**	**Sanitary Sewer Pipeline**	**Storm Drain Pipeline**	**Total**	**Total Days**
Site 1	125	175	55	65	295	2.5
Site 2[(b)]	315	None	None	125	440	3.7
Site 3[(b)]	375	None	None	470	845	7.0
Site 4[(b)]	670	None	None	330	1000	8.3
Westlake Pump Station	None	None	None	None	0	0.0
Site 5 (Consolidated Treatment at Site 6) [(c)]	1,120	None	None	370	1490	12.4
Site 6 (Consolidated Treatment at Site 6) [(c)]	115	525	130	110	765	6.4
Site 7 (Consolidated Treatment at Site 6) [(c)]	1,780	None	None	170	1950	16.3
Site 5 (On-Site Treatment)	145	165	110	370	645	5.4
Site 6 (On-Site Treatment)	115	525	130	110	765	6.4
Site 7 (On-Site Treatment)	75	145	170	170	485	4.0
Site 8	145	125	85	220	450	3.8
Site 9	245	None	185	170	600	5.0
Site 10	200	100	145	110	455	3.8
Site 11	205	160	965	145	1315	11.0
Site 12	925	90	355	355	1635	13.6
Site 13	1,835	185	495	145	2,475	20.6
Site 14	1,785	None	None	1,110	2895	24.1
Site 15	670	680	100	155	935	7.8
Site 16	40	700	290	105	1095	9.1
Site 17 (Alternate)	105	20	70	75	140	1.2
Site 18 (Alternate)	130	120	140	155	425	3.5
Site 19 (Alternate)[(d)]	1450	150	None	190	1640	13.7
				Total	22740	

a. Pipelines listed in the table are illustrated on site plans for each site – Figures 3-12 through Figure 3-39.

b. The water connection pipeline for Sites 2, 3, and 4 includes the length of pipeline needed to connect to the existing Daly City pipeline for conveyance to the Westlake Pump Station.

c. Water connection pipelines for Site 5 (Consolidated Treatment at Site 6) and Site 7 (Consolidated Treatment at Site 6) include the pipeline length necessary to deliver water to Site 6 for treatment.

Regional Groundwater Storage and Recovery Project

Vehilce Trips Breakdown

5/31/2012

Taken from Sheet 1, PD Table 3-10, andPD Table 3-11

				Round-trips											
					Worker, Equipment, and Delivery Trips				Vendor Trips (Equipment & Delivery)				Haul Trips (Soil Import/Export)			
	Well Drilling	Building or Fenced-only	Pipeline Length	Haul Truck Trips	Well	Facility	Pipeline	Total	Well	Facility	Pipeline	Total	Well	Facility	Pipeline	Total
Cluster A																
Site 1	Yes	Building	295	9	105	1,320	10	1,435	0	480	2	482	5.0	2.0	2.0	9
Site 3[(b)]	Yes	Fenced-only	845	10	105	220	28	353	0	80	7	87	6.0	4.0	0.0	10
Site 4[(b)]	Yes	Fenced-only	1,000	27	105	220	33	358	0	80	8	88	6.0	5.0	16.0	27
Site 7 (on-site is worse)	Yes	Building	1,780	17	105	1,320	59	1,484	0	480	15	495	6.0	10.0	1.0	17
Subtotal			**3,920**	**63**	**420**	**3,080**	**131**	**3,631**								
Cluster B																
Site 12	Yes	Building	1,635	15	105	1,320	55	1,480	0	480	14	494	5.0	8.0	2.0	15
Site 14	Yes	Building	2,895	25	105	1,320	97	1,522	0	480	24	504	5.0	18.0	2.0	25
Site 15	Yes	Building	935	8	105	1,320	31	1,456	0	480	8	488	5.0	3.0	0.0	8
Site 16 (alternate water connection, which is longer)	Yes	Building	1,095	8	105	1,320	37	1,462	0	480	9	489	4.0	4.0	0.0	8
Site 19 (Alternate)[(d)]	Yes	Fenced-only	1,640	15	105	220	55	380	0	80	14	94	6.0	5.0	4.0	15
Subtotal			**8,200**	**71**	**525**	**5,500**	**273**	**6,298**								
Cluster C																
Site 9	Yes	Building	600	8	105	1,320	20	1,445	0	480	5	485	5.0	3.0	0.0	8
Site 10	No	Building	455	7	-	1,320	15	1,335	0	480	4	484	-	3.0	4.0	7
Site 11	Yes	Building	1,315	9	105	1,320	44	1,469	0	480	11	491	6.0	3.0	0.0	9
Site 13	No	Building	2,475	14	-	1,320	83	1,403	0	480	21	501	-	14.0	0.0	14
Site 18 (Alternate)	Yes	Building	395	10	105	1,320	13	1,438	0	480	3	483	6.0	2.0	2.0	10
Subtotal			**5,240**	**48**	**315**	**6,600**	**175**	**7,090**								
Cluster D																
Site 2[(b)]	No	Fenced-only	440	2	-	110	15	125	0	40	4	44	-	1.0	1.0	2
Site 5 (on-site is worse)	No	Building	1,490	7	-	1,320	50	1,370	0	480	12	492	-	7.0	0.0	7
Site 6	No	Building	765	4	-	1,320	26	1,346	0	480	6	486	-	2.0	2.0	4
Site 8	No	Building	450	5	-	1,320	15	1,335	0	480	4	484	-	2.5	2.5	5
Site 17 (Alternate)	Yes	Building	150	10	105	1,320	5	1,430	0	480	1	481	6.0	2.0	2.0	10
Westlake Pump Station		Pumps and treatment only	-	-	-	440	-	440	0	160	-	160	0.0	0.0	0.0	0
Subtotal			**3,295**	**28**	**105**	**5,830**	**110**	**6,045**								
Total			**20,655**	**210**	**1,365**	**21,010**	**689**	**23,064**								

F & G column is calculated:

(average typical workers + Delivery and Equipment trips from PD Table 3-8)*days per month

Regional Groundwater Storage and Recovery Project

EMFAC2011 - Average Emission Rates
2014 Estimated Annual Emission Rates
San Mateo COUNTY

		Fraction	Total	Fraction	Fraction	ROG		TOG		NOx		PM10		PM2.5		CO2 (Pavley + LCFS)		PM2.5	
	Population (Vehicles)	of Total Vehicles	VMT (Miles/day)	of Total VMT	Diesel VMT of Class	Running* (gms/mile)	Starting (gms/trip)	Running* (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	Running** (gms/mile)	Starting (gms/trip)	Running** (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	All Fuels Exh (gms/mile)	Diesel Exhaust (gms/mile)
LDA	343,898	0.594	12,487,933	0.5778	0.00408	0.10856	0.24873	0.12358	0.26590	0.1386	0.19463	0.04686	0.00291	0.01967	0.00265	296.431	66.676	0.001919	0.03488
LDT1	34,964	0.060	1,358,386	0.0628	0.00145	0.28812	0.51092	0.32047	0.54600	0.3757	0.34515	0.04948	0.00518	0.02206	0.00474	352.419	78.181	0.004309	0.07284
LDT2	95,611	0.165	3,813,529	0.1764	0.00049	0.13961	0.32404	0.16051	0.34613	0.2565	0.39596	0.04680	0.00276	0.01962	0.00254	421.942	93.528	0.001874	0.04868
LHD1	15,491	0.027	647,808	0.0300	0.24450	0.41367	0.55407	0.45085	0.59171	1.4979	1.47038	0.07207	0.00153	0.03747	0.00140	850.143	42.628	0.015318	0.05247
LHD2	2,193	0.004	91,310	0.0042	0.49494	0.35807	0.37110	0.39197	0.39661	2.2474	0.96805	0.10041	0.00111	0.05487	0.00100	739.945	29.065	0.025508	0.04821
MCY	13,488	0.023	139,857	0.0065	0.00000	3.29148	2.42327	3.55540	2.60691	1.2899	0.31959	0.00088	0.00270	0.00070	0.00211	149.04149	46.07064	0.000700	0.00070
MDV	63,894	0.110	2,504,597	0.1159	0.00129	0.17007	0.59812	0.20208	0.63877	0.3898	0.63374	0.04697	0.00351	0.01980	0.00323	542.530	120.102	0.002046	0.03151
MH	1,610	0.003	21,240	0.0010	0.15298	0.32416	0.87092	0.37225	0.93327	2.1618	1.05938	0.09653	0.00252	0.05785	0.00214	745.812	34.264	0.033810	0.20342
OBUS	764	0.001	55,083	0.0025	0.66381	0.35810	0.33224	0.40035	0.35531	6.4430	0.69446	0.22055	0.00045	0.14718	0.00039	1192.688	12.715	0.102139	0.15339
SBUS	116	0.000	5,038	0.0002	0.53149	0.94070	1.63654	1.03104	1.74911	7.0771	1.85677	0.48737	0.00405	0.23856	0.00364	1023.027	60.379	0.058997	0.10401
MHDT (T6)	5,781	0.010	327,966	0.0152	0.84516	0.34975	0.31584	0.39314	0.33814	5.0933	0.47505	0.26905	0.00069	0.18296	0.00059	1092.459	9.367	0.130469	0.15401
HHDT (T7)	591	0.001	81,307	0.0038	0.92420	0.41831	0.32252	0.47369	0.34606	8.4884	0.39745	0.24058	0.00047	0.17035	0.00038	1646.479	5.294	0.136975	0.14814
UBUS	508	0.001	80,455	0.0037	0.91903	0.83005	0.49309	0.92853	0.52691	14.8226	0.74147	1.05012	0.00043	0.57908	0.00038	2385.570	12.178	0.244245	0.26538
Total	578,910	1.00	21,614,508	1.00															

* ROG running includes evaporative running loss

** PM10 & PM2.5 running includes tire & brake wear

Average Weekday Emisions Factors

Vehicle Class	Fraction of Total Vehicles	Fraction of Total VMT	Fraction Diesel VMT of Class	ROG		TOG		NOx		PM10		PM2.5		CO2		All Fuels	Diesel
				Running (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	Running (gms/mile)	Starting (gms/trip)	PM2.5 (gms/mile)	PM2.5 (gms/mile)
LDA	0.594	0.5778	0.00408	0.10856	0.24873	0.12358	0.26590	0.13858	0.19463	0.04686	0.00291	0.01967	0.00265	296.431	66.676	0.00192	0.03488
LDT	0.226	0.2393	0.00074	0.17862	0.37312	0.20252	0.39863	0.28778	0.38262	0.04750	0.00340	0.02026	0.00312	403.682	89.497	0.00251	0.05503
MDT	0.141	0.1501	0.06376	0.22401	0.58293	0.25710	0.62255	0.66340	0.81023	0.05349	0.00304	0.02431	0.00281	609.521	102.067	0.00536	0.03617
HDT*	0.015	0.0227	0.80471	0.36337	0.31717	0.40914	0.33971	5.76778	0.45964	0.26339	0.00065	0.18046	0.00055	1202.521	8.558	0.13176	0.15284

* HDT includes emissions from MHDT and HHDT, but not from any buses

Average Daily Emissions

CalEEMod Version: CalEEMod.2011.1.1 Date: 6/14/2012

GSR - Well Drilling/Well Construction

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Heavy Industry	0	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	
Climate Zone	5	**Precipitation Freq (Days)**	70		

1.3 User Entered Comments

Project Characteristics -

Land Use - Small Area for Well

Construction Phase - Project-specific schedule using 2/1/2014 as earliest start date and 20-day construction period.

Off-road Equipment - Project-specific equipment & LF adjustment (-33%)

Off-road Equipment - Project-specific equipment list averaged to daily use over 30 construction days
Adjusted load factors by -33%

Trips and VMT - Worker trips computed seperately using EMFAC2011

Construction Off-road Equipment Mitigation -

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	1.34	9.50	6.93	0.02	0.49	0.39	0.89	0.02	0.39	0.41	0.00	2,484.03	0.00	0.12	0.00	2,486.56
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	0.78	6.57	83.78	0.02	0.02	0.10	0.11	0.02	0.10	0.11	0.00	2,484.03	0.00	0.12	0.00	2,486.56
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

3.2 Well Drilling/WellConstruction - 2014

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	lb/day										lb/day					
Off-Road	1.15	9.32	4.88	0.02		0.38	0.38		0.38	0.38		2,103.12		0.10		2,105.24
Total	**1.15**	**9.32**	**4.88**	**0.02**		**0.38**	**0.38**		**0.38**	**0.38**		**2,103.12**		**0.10**		**2,105.24**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.19	0.19	2.05	0.00	0.49	0.01	0.51	0.02	0.01	0.03		380.90		0.02		381.32
Total	**0.19**	**0.19**	**2.05**	**0.00**	**0.49**	**0.01**	**0.51**	**0.02**	**0.01**	**0.03**		**380.90**		**0.02**		**381.32**

3.2 Well Drilling/WellConstruction - 2014

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	lb/day										lb/day					
Off-Road	0.59	6.38	81.73	0.02		0.08	0.08		0.08	0.08	0.00	2,103.12		0.10		2,105.24
Total	**0.59**	**6.38**	**81.73**	**0.02**		**0.08**	**0.08**		**0.08**	**0.08**	**0.00**	**2,103.12**		**0.10**		**2,105.24**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.19	0.19	2.05	0.00	0.02	0.01	0.03	0.02	0.01	0.03		380.90		0.02		381.32
Total	**0.19**	**0.19**	**2.05**	**0.00**	**0.02**	**0.01**	**0.03**	**0.02**	**0.01**	**0.03**		**380.90**		**0.02**		**381.32**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

Average Daily Emissions

CalEEMod Version: CalEEMod.2011.1.1 Date: 6/14/2012

GSR - Construction WF & Treatment Building Avg Day

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	2	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Utility Company**	Pacific Gas & Electric Company
Climate Zone	5	**Precipitation Freq (Days)**	70		

1.3 User Entered Comments

Project Characteristics -

Land Use -

Construction Phase - Based on project information - total Building Phase

Off-road Equipment - Equipment list and load factor adjustment -33%

Off-road Equipment - Equipment list averaged over entire 240-day period and adjusted load factors down by 33%

Trips and VMT - All trips modeled using EMFAC2011

Construction Off-road Equipment Mitigation -

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	0.61	4.66	2.46	0.01	0.01	0.23	0.24	0.00	0.23	0.23	0.00	677.03	0.00	0.05	0.00	678.17
2015	0.57	4.21	2.41	0.01	0.01	0.20	0.22	0.00	0.20	0.20	0.00	676.80	0.00	0.05	0.00	677.86
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	0.34	3.22	2.75	0.01	0.00	0.08	0.08	0.00	0.08	0.08	0.00	677.03	0.00	0.05	0.00	678.17
2015	0.33	3.00	2.72	0.01	0.00	0.07	0.07	0.00	0.07	0.07	0.00	676.80	0.00	0.05	0.00	677.86
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

3.2 WF & Treatment Building - 2014

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	lb/day										lb/day					
Off-Road	0.60	4.66	2.40	0.01		0.23	0.23		0.23	0.23		665.49		0.05		666.62
Total	**0.60**	**4.66**	**2.40**	**0.01**		**0.23**	**0.23**		**0.23**	**0.23**		**665.49**		**0.05**		**666.62**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.01	0.00	0.02	0.00	0.00	0.00		11.54		0.00		11.56
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**		**11.54**		**0.00**		**11.56**

3.2 WF & Treatment Building - 2014

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	lb/day										lb/day					
Off-Road	0.34	3.22	2.69	0.01		0.08	0.08		0.08	0.08	0.00	665.49		0.05		666.62
Total	**0.34**	**3.22**	**2.69**	**0.01**		**0.08**	**0.08**		**0.08**	**0.08**	**0.00**	**665.49**		**0.05**		**666.62**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		11.54		0.00		11.56
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**11.54**		**0.00**		**11.56**

3.2 WF & Treatment Building - 2015

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	lb/day										lb/day					
Off-Road	0.56	4.20	2.36	0.01		0.20	0.20		0.20	0.20		665.49		0.05		666.54
Total	**0.56**	**4.20**	**2.36**	**0.01**		**0.20**	**0.20**		**0.20**	**0.20**		**665.49**		**0.05**		**666.54**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.01	0.00	0.02	0.00	0.00	0.00		11.31		0.00		11.32
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**		**11.31**		**0.00**		**11.32**

3.2 WF & Treatment Building - 2015

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	lb/day										lb/day					
Off-Road	0.32	3.00	2.66	0.01		0.07	0.07		0.07	0.07	0.00	665.49		0.05		666.54
Total	**0.32**	**3.00**	**2.66**	**0.01**		**0.07**	**0.07**		**0.07**	**0.07**	**0.00**	**665.49**		**0.05**		**666.54**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		11.31		0.00		11.32
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**11.31**		**0.00**		**11.32**

4.0 Mobile Detail

4.1 Mitigation Measures Mobile

GSR - Fenced Enclosure Construction

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Heavy Industry	1	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	
Climate Zone	5		2.2		
		Precipitation Freq (Days)			
			70		

1.3 User Entered Comments

Project Characteristics -

Land Use - Small Area for Fenced Enclosure around Well

Construction Phase - Project-specific schedule using 3/4/2014 as earliest start date and 20-day construction period.

Off-road Equipment - Project-specific equipment & LF adjustment (-33%)

Off-road Equipment - Project-specific equipment list with hours adjusted for entire phase duration of 40 construction days

Adjusted load factors by -33%

Trips and VMT - Worker trips computed seperately using EMFAC2011

Average Daily Emissions

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2013	0.24	1.75	0.97	0.00	0.00	0.10	0.10	0.00	0.10	0.10	0.00	222.95	0.00	0.02	0.00	223.39
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2013	0.24	1.75	0.97	0.00	0.00	0.10	0.10	0.00	0.10	0.10	0.00	222.95	0.00	0.02	0.00	223.39
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

3.2 Fenced Enclosure Construction - 2013

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	lb/day										lb/day					
Off-Road	0.24	1.75	0.97	0.00		0.10	0.10		0.10	0.10		222.95		0.02		223.39
Total	**0.24**	**1.75**	**0.97**	**0.00**		**0.10**	**0.10**		**0.10**	**0.10**		**222.95**		**0.02**		**223.39**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	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
Total	**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**

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	lb/day										lb/day					
Off-Road	0.24	1.75	0.97	0.00		0.10	0.10		0.10	0.10	0.00	222.95		0.02		223.39
Total	**0.24**	**1.75**	**0.97**	**0.00**		**0.10**	**0.10**		**0.10**	**0.10**	**0.00**	**222.95**		**0.02**		**223.39**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	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
Total	**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**

GSR - Pipeline Per Day Construction

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Heavy Industry	1	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	
Climate Zone	5		2.2		
		Precipitation Freq (Days)			
			70		

1.3 User Entered Comments

Project Characteristics -

Land Use - Small Area for pipeline

Construction Phase - These are per-day estimates of activity that would construct 120-linear feet of pipeline

Off-road Equipment - Project-specific equipment & LF adjustment (-33%)

Off-road Equipment - Max. Avg Day equipment activity based on one day of pipline construction

Adjusted load factors by -33%

Trips and VMT - Worker trips computed seperately using EMFAC2011

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	0.76	4.26	4.39	0.01	0.34	0.33	0.68	0.01	0.33	0.34	0.00	735.26	0.00	0.07	0.00	736.74
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	0.76	4.26	4.39	0.01	0.01	0.33	0.34	0.01	0.33	0.34	0.00	735.26	0.00	0.07	0.00	736.74
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

3.2 Pipeline Construction - 2014

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	lb/day										lb/day					
Off-Road	0.63	4.13	2.95	0.00		0.32	0.32		0.32	0.32		469.78		0.06		470.96
Total	**0.63**	**4.13**	**2.95**	**0.00**		**0.32**	**0.32**		**0.32**	**0.32**		**469.78**		**0.06**		**470.96**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.13	0.13	1.43	0.00	0.34	0.01	0.35	0.01	0.01	0.02		265.48		0.01		265.77
Total	**0.13**	**0.13**	**1.43**	**0.00**	**0.34**	**0.01**	**0.35**	**0.01**	**0.01**	**0.02**		**265.48**		**0.01**		**265.77**

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	lb/day										lb/day					
Off-Road	0.63	4.13	2.95	0.00		0.32	0.32		0.32	0.32	0.00	469.78		0.06		470.96
Total	**0.63**	**4.13**	**2.95**	**0.00**		**0.32**	**0.32**		**0.32**	**0.32**	**0.00**	**469.78**		**0.06**		**470.96**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.13	0.13	1.43	0.00	0.01	0.01	0.02	0.01	0.01	0.02		265.48		0.01		265.77
Total	**0.13**	**0.13**	**1.43**	**0.00**	**0.01**	**0.01**	**0.02**	**0.01**	**0.01**	**0.02**		**265.48**		**0.01**		**265.77**

Maximum Daily Emissions

CalEEMod Version: CalEEMod.2011.1.1 Date: 6/5/2012

GSR - Well Drilling/Well Construction

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Heavy Industry	0	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	
Climate Zone	5		2.2		
		Precipitation Freq (Days)			
			70		

1.3 User Entered Comments

Project Characteristics -

Land Use - Small Area for Well

Construction Phase - Project-specific schedule using 2/1/2014 as earliest start date and 20-day construction period.

Off-road Equipment - Project-specific equipment & LF adjustment (-33%)

Off-road Equipment - Project-specific equipment list averaged to daily use over 30 construction days

Adjusted load factors by -33%

Trips and VMT - Worker trips computed seperately using EMFAC2011

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	5.79	46.35	20.62	0.08	0.49	1.58	2.07	0.02	1.58	1.60	0.00	9,193.47	0.00	0.51	0.00	9,204.23
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	5.79	46.35	20.62	0.08	0.02	1.58	1.60	0.02	1.58	1.60	0.00	9,193.47	0.00	0.51	0.00	9,204.23
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

3.2 Well Drilling/WellConstruction - 2014

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	lb/day										lb/day					
Off-Road	5.60	46.16	18.57	0.08		1.57	1.57		1.57	1.57		8,812.57		0.49		8,822.90
Total	**5.60**	**46.16**	**18.57**	**0.08**		**1.57**	**1.57**		**1.57**	**1.57**		**8,812.57**		**0.49**		**8,822.90**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.19	0.19	2.05	0.00	0.49	0.01	0.51	0.02	0.01	0.03		380.90		0.02		381.32
Total	**0.19**	**0.19**	**2.05**	**0.00**	**0.49**	**0.01**	**0.51**	**0.02**	**0.01**	**0.03**		**380.90**		**0.02**		**381.32**

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	lb/day										lb/day					
Off-Road	5.60	46.16	18.57	0.08		1.57	1.57		1.57	1.57	0.00	8,812.57		0.49		8,822.90
Total	**5.60**	**46.16**	**18.57**	**0.08**		**1.57**	**1.57**		**1.57**	**1.57**	**0.00**	**8,812.57**		**0.49**		**8,822.90**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.19	0.19	2.05	0.00	0.02	0.01	0.03	0.02	0.01	0.03		380.90		0.02		381.32
Total	**0.19**	**0.19**	**2.05**	**0.00**	**0.02**	**0.01**	**0.03**	**0.02**	**0.01**	**0.03**		**380.90**		**0.02**		**381.32**

Maximum Daily Emissions

CalEEMod Version: CalEEMod.2011.1.1 Date: 6/5/2012

GSR - Construction WF & Treatment Building

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Light Industry	2	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	Pacific Gas & Electric Company
Climate Zone	5		2.2		
		Precipitation Freq (Days)			
			70		

1.3 User Entered Comments

Project Characteristics -

Land Use -

Construction Phase - Based on project information

Off-road Equipment - Equipment list and load factor adjustment -33%

Off-road Equipment - Equipment list and load factor adjustment -33%

Off-road Equipment - Per project information, no demolition planned

Off-road Equipment - Equipment list and load factor adjustment -33%

Off-road Equipment - Equipment list and load factor adjustment -33%

Off-road Equipment - Equipment list and load factor adjustments -33%

Trips and VMT - All trips modeled using EMFAC2011

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	2.47	15.77	13.95	0.03	1.55	1.07	2.62	0.44	1.07	1.51	0.00	2,470.28	0.00	0.23	0.00	2,475.02
2015	1.66	10.21	7.80	0.01	0.22	0.75	0.98	0.01	0.75	0.76	0.00	1,407.44	0.00	0.15	0.00	1,410.59
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	2.47	15.77	13.95	0.03	0.78	1.07	1.85	0.44	1.07	1.51	0.00	2,470.28	0.00	0.23	0.00	2,475.02
2015	1.66	10.21	7.80	0.01	0.01	0.75	0.76	0.01	0.75	0.76	0.00	1,407.44	0.00	0.15	0.00	1,410.59
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

3.2 Demolition - 2014

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	lb/day										lb/day					
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00		0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**		**0.00**		**0.00**		**0.00**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.06	0.06	0.62	0.00	0.15	0.00	0.15	0.01	0.00	0.01		115.43		0.01		115.55
Total	**0.06**	**0.06**	**0.62**	**0.00**	**0.15**	**0.00**	**0.15**	**0.01**	**0.00**	**0.01**		**115.43**		**0.01**		**115.55**

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	lb/day										lb/day					
Off-Road	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00	0.00	0.00		0.00		0.00
Total	**0.00**	**0.00**	**0.00**	**0.00**		**0.00**	**0.00**		**0.00**	**0.00**	**0.00**	**0.00**		**0.00**		**0.00**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.06	0.06	0.62	0.00	0.01	0.00	0.01	0.01	0.00	0.01		115.43		0.01		115.55
Total	**0.06**	**0.06**	**0.62**	**0.00**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**		**115.43**		**0.01**		**115.55**

3.3 Site Preparation - 2014

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	lb/day										lb/day					
Fugitive Dust					0.03	0.00	0.03	0.00	0.00	0.00						0.00
Off-Road	0.94	6.80	5.03	0.01		0.44	0.44		0.44	0.44		807.67		0.08		809.44
Total	**0.94**	**6.80**	**5.03**	**0.01**	**0.03**	**0.44**	**0.47**	**0.00**	**0.44**	**0.44**		**807.67**		**0.08**		**809.44**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.05	0.05	0.50	0.00	0.12	0.00	0.12	0.00	0.00	0.01		92.34		0.00		92.44
Total	**0.05**	**0.05**	**0.50**	**0.00**	**0.12**	**0.00**	**0.12**	**0.00**	**0.00**	**0.01**		**92.34**		**0.00**		**92.44**

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	lb/day										lb/day					
Fugitive Dust					0.03	0.00	0.03	0.00	0.00	0.00						0.00
Off-Road	0.94	6.80	5.03	0.01		0.44	0.44		0.44	0.44	0.00	807.67		0.08		809.44
Total	**0.94**	**6.80**	**5.03**	**0.01**	**0.03**	**0.44**	**0.47**	**0.00**	**0.44**	**0.44**	**0.00**	**807.67**		**0.08**		**809.44**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.05	0.05	0.50	0.00	0.00	0.00	0.01	0.00	0.00	0.01		92.34		0.00		92.44
Total	**0.05**	**0.05**	**0.50**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**	**0.00**	**0.01**		**92.34**		**0.00**		**92.44**

3.4 Building Foundation - 2014

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	lb/day										lb/day					
Fugitive Dust					0.75	0.00	0.75	0.41	0.00	0.41						0.00
Off-Road	2.17	15.48	10.66	0.02		1.05	1.05		1.05	1.05		1,858.52		0.19		1,862.59
Total	**2.17**	**15.48**	**10.66**	**0.02**	**0.75**	**1.05**	**1.80**	**0.41**	**1.05**	**1.46**		**1,858.52**		**0.19**		**1,862.59**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.30	0.30	3.30	0.01	0.79	0.02	0.82	0.03	0.02	0.05		611.76		0.03		612.43
Total	**0.30**	**0.30**	**3.30**	**0.01**	**0.79**	**0.02**	**0.82**	**0.03**	**0.02**	**0.05**		**611.76**		**0.03**		**612.43**

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	lb/day										lb/day					
Fugitive Dust					0.75	0.00	0.75	0.41	0.00	0.41						0.00

Off-Road	2.17	15.48	10.66	0.02		1.05	1.05		1.05	1.05	0.00	1,858.52		0.19		1,862.59
Total	**2.17**	**15.48**	**10.66**	**0.02**	**0.75**	**1.05**	**1.80**	**0.41**	**1.05**	**1.46**	**0.00**	**1,858.52**		**0.19**		**1,862.59**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.30	0.30	3.30	0.01	0.03	0.02	0.05	0.03	0.02	0.05		611.76		0.03		612.43
Total	**0.30**	**0.30**	**3.30**	**0.01**	**0.03**	**0.02**	**0.05**	**0.03**	**0.02**	**0.05**		**611.76**		**0.03**		**612.43**

3.5 Building Construction - 2014

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	lb/day										lb/day					
Off-Road	1.35	9.59	6.82	0.01		0.64	0.64		0.64	0.64		1,232.98		0.12		1,235.51
Total	**1.35**	**9.59**	**6.82**	**0.01**		**0.64**	**0.64**		**0.64**	**0.64**		**1,232.98**		**0.12**		**1,235.51**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.01	0.00	0.02	0.00	0.00	0.00		11.54		0.00		11.56
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**		**11.54**		**0.00**		**11.56**

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	lb/day										lb/day					
Off-Road	1.35	9.59	6.82	0.01		0.64	0.64		0.64	0.64	0.00	1,232.98		0.12		1,235.51
Total	**1.35**	**9.59**	**6.82**	**0.01**		**0.64**	**0.64**		**0.64**	**0.64**	**0.00**	**1,232.98**		**0.12**		**1,235.51**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		11.54		0.00		11.56
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**11.54**		**0.00**		**11.56**

3.5 Building Construction - 2015

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	lb/day										lb/day					
Off-Road	1.24	8.69	6.76	0.01		0.56	0.56		0.56	0.56		1,232.98		0.11		1,235.32
Total	**1.24**	**8.69**	**6.76**	**0.01**		**0.56**	**0.56**		**0.56**	**0.56**		**1,232.98**		**0.11**		**1,235.32**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.01	0.00	0.02	0.00	0.00	0.00		11.31		0.00		11.32
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.01**	**0.00**	**0.02**	**0.00**	**0.00**	**0.00**		**11.31**		**0.00**		**11.32**

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	lb/day										lb/day					
Off-Road	1.24	8.69	6.76	0.01		0.56	0.56		0.56	0.56	0.00	1,232.98		0.11		1,235.32
Total	**1.24**	**8.69**	**6.76**	**0.01**		**0.56**	**0.56**		**0.56**	**0.56**	**0.00**	**1,232.98**		**0.11**		**1,235.32**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.01	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00		11.31		0.00		11.32
Total	**0.01**	**0.01**	**0.06**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**		**11.31**		**0.00**		**11.32**

3.6 On-site Pipeline - 2015

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	lb/day										lb/day					
Off-Road	0.51	3.36	2.77	0.00		0.26	0.26		0.26	0.26		408.87		0.05		409.84
Total	**0.51**	**3.36**	**2.77**	**0.00**		**0.26**	**0.26**		**0.26**	**0.26**		**408.87**		**0.05**		**409.84**

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	lb/day										lb/day					
Hauling	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

Vendor	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
Worker	0.05	0.05	0.57	0.00	0.15	0.00	0.15	0.01	0.00	0.01		113.09		0.01		113.21
Total	**0.05**	**0.05**	**0.57**	**0.00**	**0.15**	**0.00**	**0.15**	**0.01**	**0.00**	**0.01**		**113.09**		**0.01**		**113.21**

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	lb/day										lb/day					
Off-Road	0.51	3.36	2.77	0.00		0.26	0.26		0.26	0.26	0.00	408.87		0.05		409.84
Total	**0.51**	**3.36**	**2.77**	**0.00**		**0.26**	**0.26**		**0.26**	**0.26**	**0.00**	**408.87**		**0.05**		**409.84**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.05	0.05	0.57	0.00	0.01	0.00	0.01	0.01	0.00	0.01		113.09		0.01		113.21
Total	**0.05**	**0.05**	**0.57**	**0.00**	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.01**		**113.09**		**0.01**		**113.21**

3.7 Paving - 2015

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	lb/day										lb/day					
Off-Road	1.58	10.14	6.94	0.01		0.74	0.74		0.74	0.74		1,237.80		0.14		1,240.77
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**1.58**	**10.14**	**6.94**	**0.01**		**0.74**	**0.74**		**0.74**	**0.74**		**1,237.80**		**0.14**		**1,240.77**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.08	0.08	0.86	0.00	0.22	0.01	0.23	0.01	0.01	0.01		169.64		0.01		169.82
Total	**0.08**	**0.08**	**0.86**	**0.00**	**0.22**	**0.01**	**0.23**	**0.01**	**0.01**	**0.01**		**169.64**		**0.01**		**169.82**

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	lb/day										lb/day					
Off-Road	1.58	10.14	6.94	0.01		0.74	0.74		0.74	0.74	0.00	1,237.80		0.14		1,240.77
Paving	0.00					0.00	0.00		0.00	0.00						0.00
Total	**1.58**	**10.14**	**6.94**	**0.01**		**0.74**	**0.74**		**0.74**	**0.74**	**0.00**	**1,237.80**		**0.14**		**1,240.77**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	0.08	0.08	0.86	0.00	0.01	0.01	0.01	0.01	0.01	0.01		169.64		0.01		169.82
Total	**0.08**	**0.08**	**0.86**	**0.00**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**		**169.64**		**0.01**		**169.82**

Maximum Daily Emissions

CalEEMod Version: CalEEMod.2011.1.1 Date: 4/19/2012

GSR - Pipeline Per Day Construction

San Mateo County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric
General Heavy Industry	1	1000sqft

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**		**Utility Company**	
Climate Zone	5		2.2		
		Precipitation Freq (Days)			
			70		

1.3 User Entered Comments

Project Characteristics -

Land Use - Small Area for pipeline

Construction Phase - These are per-day estimates of activity that would construct 120-linear feet of pipeline

Off-road Equipment - Project-specific equipment & LF adjustment (-33%)

Off-road Equipment - Max. Worst Day equipment activity based on one day of pipline construction

Adjusted load factors by -33%

Trips and VMT - Worker trips computed seperately using EMFAC2011

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

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	lb/day										lb/day					
2014	2.47	17.73	9.17	0.02	0.00	0.96	0.96	0.00	0.96	0.96	0.00	2,560.15	0.00	0.22	0.00	2,564.77
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

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	lb/day										lb/day					
2014	2.47	17.73	9.17	0.02	0.00	0.96	0.96	0.00	0.96	0.96	0.00	2,560.15	0.00	0.22	0.00	2,564.77
Total	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

3.0 Construction Detail

3.1 Mitigation Measures Construction

3.2 Pipeline Construction - 2014

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	lb/day										lb/day					
Off-Road	2.47	17.73	9.17	0.02		0.96	0.96		0.96	0.96		2,560.15		0.22		2,564.77
Total	**2.47**	**17.73**	**9.17**	**0.02**		**0.96**	**0.96**		**0.96**	**0.96**		**2,560.15**		**0.22**		**2,564.77**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	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
Total	**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**

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	lb/day										lb/day					
Off-Road	2.47	17.73	9.17	0.02		0.96	0.96		0.96	0.96	0.00	2,560.15		0.22		2,564.77
Total	**2.47**	**17.73**	**9.17**	**0.02**		**0.96**	**0.96**		**0.96**	**0.96**	**0.00**	**2,560.15**		**0.22**		**2,564.77**

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	lb/day										lb/day					
Hauling	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
Vendor	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
Worker	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
Total	**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**

Appendix 4
Dispersion Modeling Inputs and Health Risk Calculations

SFPUC GSR - Construction Impacts
Maximum DPM Cancer Risk & Hazard Index Calculations From Construction
at Sensitive Receptors

	Residential Child Exposure						Residential Adult Exposure						School Child Exposure						Day Care Child Exposure					
	Location of Maximum (m)		Maximum Concentration (ug/m3)		Cancer Risk	Chronic Hazard	Location of Maximum (m)		Maximum Concentra (ug/m3)		Cancer Risk	Chronic Hazard	Location of Maximum (m)		Maximum Concentration (ug/m3)		Cancer Risk	Chronic Hazard	Location of Maximum (m)		Maximum Concentration (ug/m3)		Cancer Risk	Chronic Hazard
Site	UTMx (m)	UTMy (m)	2014	2015	(in a million)	Index	UTMx (m)	UTMy (m)	2014	2015	(in a million)	Index	UTMx (m)	UTMy (m)	2014	2015	(in a million)	Index	UTMx (m)	UTMy (m)	2014	2015	(in a million)	Index
Site 1	***546492.6***	***4172909.3***	***0.01984***	***0.00774***	***2.41***	***0.0040***	***546492.6***	***4172909.3***	***0.01984***	***0.00774***	***0.13***	***0.0040***	-	-	-	-	-	-	***546785.6***	***4172896.3***	***0.00444***	***0.00176***	***0.45***	***0.0009***
Sites 2	545838.6	4172219.9	0.00051	0.00000	0.04	0.0001	545838.6	4172219.9	0.00051	0.00000	0.00	0.0001	545840.1	4172114.0	0.00377	0.00000	0.08	0.0008	-	-	-	-	-	-
Sites 3	545672.3	4172025.2	0.00807	0.00000	0.71	0.0016	545672.3	4172025.2	0.00807	0.00000	0.04	0.0016	545765.9	4172051.9	0.05397	0.00000	1.18	0.0108	-	-	-	-	-	-
Sites 4	545889.6	4171962.2	0.01542	0.00000	1.35	0.0031	545889.6	4171962.2	0.01542	0.00000	0.07	0.0031	545889.6	4171962.2	0.05877	0.00000	1.29	0.0118	-	-	-	-	-	-
Sites 2, 3, and 4	***545887.7***	***4171925.1***	***0.01721***	***0.00000***	***1.51***	***0.0034***	***545887.7***	***4171925.1***	***0.01721***	***0.00000***	***0.08***	***0.0034***	***545889.6***	***4171962.2***	***0.06168***	***0.00000***	***1.35***	***0.0123***	-	-	-	-	-	-
Site 5 - On-Site Treatment	546797.1	4171010.2	0.07866	0.04335	10.68	0.0157	546797.1	4171010.2	0.07866	0.04335	0.56	0.0157	-	-	-	-	-	-	547278.8	4170750.6	0.00053	0.00028	0.06	0.0001
Site 6 - On-Site Treatment	547188.0	4170823.7	0.00921	0.00471	1.22	0.0018	547188.0	4170823.7	0.00921	0.00471	0.06	0.0018	-	-	-	-	-	-	547278.8	4170750.6	0.00327	0.00167	0.36	0.0007
Site 7 - On-Site Treatment	547280.7	4170734.4	0.00055	0.00022	0.07	0.0001	547280.7	4170734.4	0.00055	0.00022	0.00	0.0001	-	-	-	-	-	-	547280.7	4170734.4	0.00055	0.00022	0.06	0.0001
Sites 5, 6,and 7 - On-Site Treatment	***546797.1***	***4171010.2***	***0.07911***	***0.04356***	***10.74***	***0.0158***	***546797.1***	***4171010.2***	***0.07911***	***0.04356***	***0.56***	***0.0158***	-	-	-	-	-	-	***547278.8***	***4170750.6***	***0.00430***	***0.00215***	***0.47***	***0.0009***
Sites 5- Consolidated Treatment	546797.1	4171010.2	0.01428	0.00000	1.25	0.0029	546797.1	4171010.2	0.01428	0.00000	0.06	0.0029	-	-	-	-	-	-	547278.8	4170750.6	0.00037	0.00000	0.03	0.0001
Sites 6- Consolidated Treatment	547188.0	4170823.7	0.00928	0.00507	1.26	0.0019	547188.0	4170823.7	0.00928	0.00507	0.07	0.0019	-	-	-	-	-	-	547278.8	4170750.6	0.00328	0.00180	0.37	0.0007
Sites 7- Consolidated Treatment	547188.5	4170733.4	0.00119	0.00000	0.10	0.0002	547188.5	4170733.4	0.00119	0.00000	0.01	0.0002	-	-	-	-	-	-	547280.7	4170734.4	0.00089	0.00000	0.06	0.0002
Sites 5, 6, and 7 - Consolidated Treatme	***546797.1***	***4171010.2***	***0.01471***	***0.00020***	***1.31***	***0.0029***	***546797.1***	***4171010.2***	***0.01471***	***0.00020***	***0.07***	***0.0029***	-	-	-	-	-	-	***547278.8***	***4170750.6***	***0.00447***	***0.00180***	***0.46***	***0.0009***
Site 8	547821.3	4169865.4	0.00514	0.00266	0.68	0.0010	547821.3	4169865.4	0.00514	0.00266	0.04	0.0010	-	-	-	-	-	-	-	-	-	-	-	-
Site 17 (Alternate)	547866.6	4169840.3	0.00329	0.00136	0.41	0.0007	547866.6	4169840.3	0.00329	0.00136	0.02	0.0007	-	-	-	-	-	-	-	-	-	-	-	-
Sites 8 & 17 (Alternate)	***547821.3***	***4169865.4***	***0.00808***	***0.00388***	***1.05***	***0.0016***	***547821.3***	***4169865.4***	***0.00808***	***0.00388***	***0.05***	***0.0016***	-	-	-	-	-	-	-	-	-	-	-	-
Site 9	548717.3	4168997.6	0.04847	0.01860	5.87	0.0097	548717.3	4168997.6	0.04847	0.01860	0.31	0.0097	548509.4	4168634.5	0.00108	0.00042	0.03	0.0002	548348.4	4168416.7	0.00040	0.00015	0.04	0.0001
Site 10	548129.0	4168779.0	0.01271	0.00662	1.69	0.0025	548129.0	4168779.0	0.01271	0.00662	0.09	0.0025	548496.6	4168632.5	0.00179	0.00091	0.06	0.0004	548348.4	4168416.7	0.00036	0.00019	0.04	0.0001
Site 18 (Alternate)	548240.8	4168525.7	0.07916	0.02810	9.39	0.0158	548240.8	4168525.7	0.07916	0.02810	0.49	0.0158	548407.3	4168526.2	0.01023	0.00426	0.32	0.0020	548348.4	4168416.7	0.00607	0.00231	0.61	0.0012
Sites 9, 10 & 18 (Alternate)	***548240.8***	***4168525.7***	***0.08036***	***0.02867***	***9.55***	***0.0161***	***548240.8***	***4168525.7***	***0.08036***	***0.02867***	***0.50***	***0.0161***	***548407.3***	***4168526.2***	***0.01157***	***0.00488***	***0.36***	***0.0023***	***548348.4***	***4168416.7***	***0.00682***	***0.00265***	***0.69***	***0.0014***
Site 11	549597.5	4167859.8	0.00982	0.00393	1.20	0.0020	549597.5	4167859.8	0.00982	0.00393	0.06	0.0020	550464.3	4167276.2	0.00033	0.00013	0.01	0.0001	549957.7	4167477.6	0.00048	0.00018	0.05	0.0001
Site 12	550052.8	4167342.1	0.05927	0.02449	7.33	0.0119	550052.8	4167342.1	0.05927	0.02449	0.38	0.0119	550464.3	4167276.2	0.00205	0.00072	0.06	0.0004	549957.0	4167460.9	0.00594	0.00184	0.57	0.0012
Site 19	549913.2	4167413.3	0.02302	0.00000	2.02	0.0046	549913.2	4167413.3	0.02302	0.00000	0.10	0.0046	550464.3	4167276.2	0.00048	0.00000	0.01	0.0001	549957.0	4167460.9	0.01401	0.00000	1.02	0.0028
Sites 11, 12 & 19 (Alternate)	***550052.8***	***4167342.1***	***0.06545***	***0.02460***	***7.88***	***0.0131***	***550052.8***	***4167342.1***	***0.06545***	***0.02460***	***0.41***	***0.0131***	***550464.3***	***4167276.2***	***0.00286***	***0.00084***	***0.08***	***0.0006***	***549957.0***	***4167460.9***	***0.02038***	***0.00200***	***1.63***	***0.0041***
Site 13	***550947.2***	***4166668.7***	***0.01101***	***0.00432***	***1.34***	***0.0022***	***550947.2***	***4166668.7***	***0.01101***	***0.00432***	***0.07***	***0.0022***	***550812.5***	***4166835.3***	***0.00134***	***0.00054***	***0.04***	***0.0003***	-	-	-	-	-	-
Site14	550305.3	4165663.4	0.02693	0.01006	3.24	0.0054	550305.3	4165663.4	0.02693	0.01006	0.17	0.0054	-	-	-	-	-	-	-	-	-	-	-	-
Site 15	550384.1	4165224.3	0.00576	0.00093	0.59	0.0012	550384.1	4165224.3	0.00576	0.00093	0.03	0.0012	-	-	-	-	-	-	-	-	-	-	-	-
Sites 14 & 15	***550305.3***	***4165663.4***	***0.02813***	***0.0104***	***3.37***	***0.0056***	***550305.3***	***4165663.4***	***0.02813***	***0.0104***	***0.18***	***0.0056***	-	-	-	-	-	-	-	-	-	-	-	-
Site 16	***553511.1***	***4162274.6***	***0.06411***	***0.02275***	***7.60***	***0.0128***	***553511.1***	***4162274.6***	***0.06411***	***0.02275***	***0.40***	***0.0128***	-	-	-	-	-	-	-	-	-	-	-	-

Cancer Risk Calculation Method

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air $(\mu g/m^3)$
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

		Exposure Type			
		Residential		School	Day Care
Exposure Parameter	Units	Child	Adult	Child	Child
Breathing Rate (DBR)	(L/kg-day)	581	302	581	581
Exposure period					
Daily	(hours/day)	24	24	10	10
Annual (EF)	(days/year)	350	350	180	245
Exposure Duration (ED)	(years)	2	2	2	2
Exposure Period	(years)	70	70	70	70
Averaging Time (AT)	(days)	25,550	25,550	25,550	25,550
Age Adjustment Factor (ASF)	-	10	1	3	10

Site Construction Activities

Daily (hours/day) = 12
Weekly (days/week) = 5
Annual (days/year) = varies by site

Modeling Time Periods

Days used in Model (days/year) = 365
Hours used in Model (hours/day) = 12 (7am - 7 pm)

DPM Health Risk Factors

DPM Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$ = 1.10E+00
DPM Reference Exposure Level (ug/m^3) = 5

GSR - Construction Impacts
Summary of Maximum Acute Health Hazard Index (HI) at Sensitive Receptors from Construction Equipment Diesel Exhaust at each Project Site Location

Site	Acute Hazard Index MEI Location		Total Hazard Index
	UTM- X (m)	UTM-Y (m)	
Site 1	***546492.6***	***4172909.3***	***0.48***
Site 2	545902.4	4172053.9	0.12
Site 3	545720.0	4172035.7	0.56
Site 4	545889.6	4171962.2	0.58
Sites 2, 3, and 4	***545903.7***	***4171924.5***	***0.72***
Site 5 - On-Site Treatment	546797.1	4171010.2	0.22
Site 6 - On-Site Treatment	547188.7	4170748.5	0.10
Site 7 - On-Site Treatment	547219.4	4170734.0	0.22
Sites 5, 6, and 7 - On-Site Treatment	***546797.1***	***4171010.2***	***0.22***
Sites 5- Consolidated Treatment	546797.1	4171010.2	0.11
Sites 6- Consolidated Treatment	547188.7	4170748.5	0.10
Sites 7- Consolidated Treatment	547219.4	4170734.0	0.03
Sites 5, 6, and 7 - Consolidated Treatment at 6	***546797.1***	***4171010.2***	***0.11***
Site 8	547821.3	4169865.4	0.05
Site 17 (Alternate)	547837.8	4169850.8	0.10
Sites 8 & 17 (Alternate)	***547837.8***	***4169850.8***	***0.18***
Site 9	548635.6	4169049.6	0.33
Site 10	548167.8	4168971.0	0.13
Site 18 (Alternate)	548240.8	4168525.7	0.40
Sites 9, 10 & 18 (Alternate)	***548620.7***	***4169049.6***	***0.53***
Site 11	549597.5	4167859.8	0.13
Site 12	550052.8	4167342.1	0.32
Site 19	549940.8	4167476.8	0.38
Sites 11, 12 & 19 (Alternate)	***550073.6***	***4167327.8***	***0.46***
Site 13	***550947.2***	***4166668.7***	***0.14***
Site14	550305.3	4165663.4	0.32
Site 15	550538.9	4165182.4	0.05
Sites 14 & 15	***550313.4***	***4165695.5***	***0.54***
Site 16	***553497.0***	***4162273.9***	***0.37***

Acute Health Effects Hazard Index (HI) by Chemical and Total HI for all Chemicals at Maximum Exposed Individual (MEI) Location for Each Project Site

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 1 Chemical Concentration (ug/m^3)	Site 1 Hazard Index	Site 2 Chemical Concentration (ug/m^3)	Site 2 Hazard Index	Site 3 Chemical Concentration (ug/m^3)	Site 3 Hazard Index	Site 4 Chemical Concentration (ug/m^3)	Site 4 Hazard Index	Site 2, 3, and 4 (all souces at same time) Chemical Concentration (ug/m^3)	Site 2, 3, and 4 (all souces at same time) Hazard Index
Acetaldehyde	0.07353	470	12.471	0.027	3.000	0.006	14.566	0.031	14.846	0.032	18.566	0.040
Benzene	0.02001	1,300	3.394	0.003	0.816	0.001	3.964	0.003	4.040	0.003	5.053	0.004
Formaldehyde	0.14714	55	24.955	0.454	6.003	0.109	29.148	0.530	29.708	0.540	37.153	0.676
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	2.505	0.0002	0.603	0.0000	2.926	0.0002	2.982	0.0002	3.729	0.0003
Toluene	0.01473	37,000	2.498	0.0001	0.601	0.0000	2.918	0.0001	2.974	0.0001	3.719	0.0001
Total Hazard Index				**0.48**		**0.12**		**0.56**		**0.58**		**0.72**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 5 (Onsite Treatment) Chemical Concentration (ug/m^3)	Site 5 (Onsite Treatment) Hazard Index	Site 6 (Onsite Treatment) Chemical Concentration (ug/m^3)	Site 6 (Onsite Treatment) Hazard Index	Site 7 (Onsite Treatment) Chemical Concentration (ug/m^3)	Site 7 (Onsite Treatment) Hazard Index	Site 5, 6, and 7 (Onsite Treatment) (all souces at same time) Chemical Concentration (ug/m^3)	Site 5, 6, and 7 (Onsite Treatment) (all souces at same time) Hazard Index
Acetaldehyde	0.07353	470	5.625	0.012	2.551	0.005	0.890	0.002	5.552	0.012
Benzene	0.02001	1,300	1.531	0.001	0.694	0.001	0.242	0.000	1.511	0.001
Formaldehyde	0.14714	55	11.256	0.205	5.106	0.093	1.780	0.032	11.109	0.202
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	1.130	0.0001	0.513	0.0000	0.179	0.0000	1.115	0.0001
Toluene	0.01473	37,000	1.127	0.0000	0.511	0.0000	0.178	0.0000	1.112	0.0000
Total Hazard Index				**0.22**		**0.10**		**0.03**		**0.22**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 5 (Treatment at Site 6) Chemical Concentration (ug/m^3)	Site 5 (Treatment at Site 6) Hazard Index	Site 6 (Treatment at Site 6) Chemical Concentration (ug/m^3)	Site 6 (Treatment at Site 6) Hazard Index	Site 7 (Treatment at Site 6) Chemical Concentration (ug/m^3)	Site 7 (Treatment at Site 6) Hazard Index	Site 5, 6, and 7 (Treatment at Site 6) (all souces at same time) Chemical Concentration (ug/m^3)	Site 5, 6, and 7 (Treatment at Site 6) (all souces at same time) Hazard Index
Acetaldehyde	0.07353	470	2.735	0.006	2.551	0.005	0.890	0.002	2.735	0.006
Benzene	0.02001	1,300	0.744	0.001	0.694	0.001	0.242	0.000	0.744	0.001
Formaldehyde	0.14714	55	5.474	0.100	5.106	0.093	1.780	0.032	5.474	0.100
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	0.549	0.0000	0.513	0.0000	0.179	0.0000	0.549	0.0000
Toluene	0.01473	37,000	0.548	0.0000	0.511	0.0000	0.178	0.0000	0.548	0.0000
Total Hazard Index				**0.11**		**0.10**		**0.03**		**0.11**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 8 Chemical Concentration (ug/m^3)	Site 8 Hazard Index	Site 17 Chemical Concentration (ug/m^3)	Site 17 Hazard Index	Site 8 and 17 (Alternate) (all souces at same time) Chemical Concentration (ug/m^3)	Site 8 and 17 (Alternate) (all souces at same time) Hazard Index
Acetaldehyde	0.07353	470	1.412	0.003	2.625	0.006	4.581	0.010
Benzene	0.02001	1,300	0.384	0.000	0.714	0.001	1.247	0.001
Formaldehyde	0.14714	55	2.825	0.051	5.253	0.096	9.167	0.167
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	0.284	0.0000	0.527	0.0000	0.920	0.0001
Toluene	0.01473	37,000	0.283	0.0000	0.526	0.0000	0.918	0.0000
Total Hazard Index				**0.05**		**0.10**		**0.18**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 9 Chemical Concentration (ug/m^3)	Site 9 Hazard Index	Site 10 Chemical Concentration (ug/m^3)	Site 10 Hazard Index	Site 18 Chemical Concentration (ug/m^3)	Site 18 Hazard Index	Site 9, 10 and 18 (Alternate) (all souces at same time) Chemical Concentration (ug/m^3)	Site 9, 10 and 18 (Alternate) (all souces at same time) Hazard Index
Acetaldehyde	0.07353	470	8.581	0.018	3.301	0.007	10.434	0.022	13.625	0.029
Benzene	0.02001	1,300	2.335	0.002	0.898	0.001	2.839	0.002	3.708	0.003
Formaldehyde	0.14714	55	17.171	0.312	6.607	0.120	20.879	0.380	27.265	0.496
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	1.724	0.0001	0.663	0.0001	2.096	0.0002	2.737	0.0002
Toluene	0.01473	37,000	1.719	0.0000	0.661	0.0000	2.090	0.0001	2.729	0.0001
Total Hazard Index				**0.33**		**0.13**		**0.40**		**0.53**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 11 Chemical Concentration (ug/m^3)	Site 11 Hazard Index	Site 12 Chemical Concentration (ug/m^3)	Site 12 Hazard Index	Site 19 (Alternate) (all souces at same time) Chemical Concentration (ug/m^3)	Site 19 (Alternate) Hazard Index	Site 11, 12 and 19 (Alternate) (all souces at same time) Chemical Concentration (ug/m^3)	Site 11, 12 and 19 (Alternate) Hazard Index
Acetaldehyde	0.07353	470	3.280	0.007	8.154	0.017	9.831	0.021	11.765	0.025
Benzene	0.02001	1,300	0.893	0.001	2.219	0.002	2.675	0.002	3.202	0.002
Formaldehyde	0.14714	55	6.564	0.119	16.318	0.297	19.673	0.358	23.542	0.428
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	0.659	0.0001	1.638	0.0001	1.975	0.0002	2.363	0.0002
Toluene	0.01473	37,000	0.657	0.0000	1.634	0.0000	1.969	0.0001	2.357	0.0001
Total Hazard Index				**0.13**		**0.32**		**0.38**		**0.46**

Acute Health Effects Hazard Index (HI) by Chemical and Tota

Chemical	Fraction of TOG	Acute REL (ug/m3)	Site 13 Chemical Concentration (ug/m^3)	Site 13 Hazard Index	Site 14 Chemical Concentration (ug/m^3)	Site 14 Hazard Index	Site 15 Chemical Concentration (ug/m^3)	Site 15 Hazard Index	Site 14 and 15 (all souces at same time) Chemical Concentration (ug/m^3)	Site 14 and 15 Hazard Index	Site 16 Chemical Concentration (ug/m^3)	Site 16 Hazard Index
Acetaldehyde	0.07353	470	3.677	0.008	8.382	0.018	1.404	0.003	13.875	0.030	9.522	0.020
Benzene	0.02001	1,300	1.001	0.001	2.281	0.002	0.382	0.000	3.776	0.003	2.591	0.002
Formaldehyde	0.14714	55	7.357	0.134	16.774	0.305	2.810	0.051	27.765	0.505	19.055	0.346
Methyl Ethyl Ketone (2-butanone)	0.01477	13,000	0.739	0.0001	1.684	0.0001	0.282	0.0000	2.787	0.0002	1.913	0.0001
Toluene	0.01473	37,000	0.737	0.0000	1.679	0.0000	0.281	0.0000	2.780	0.0001	1.908	0.0001
Total Hazard Index				**0.14**		**0.32**		**0.05**		**0.54**		**0.37**

Appendix 5
Cumulative TAC Data

Maximum Modeled 1-Hour ROG Concentrations at Each Project Site Location

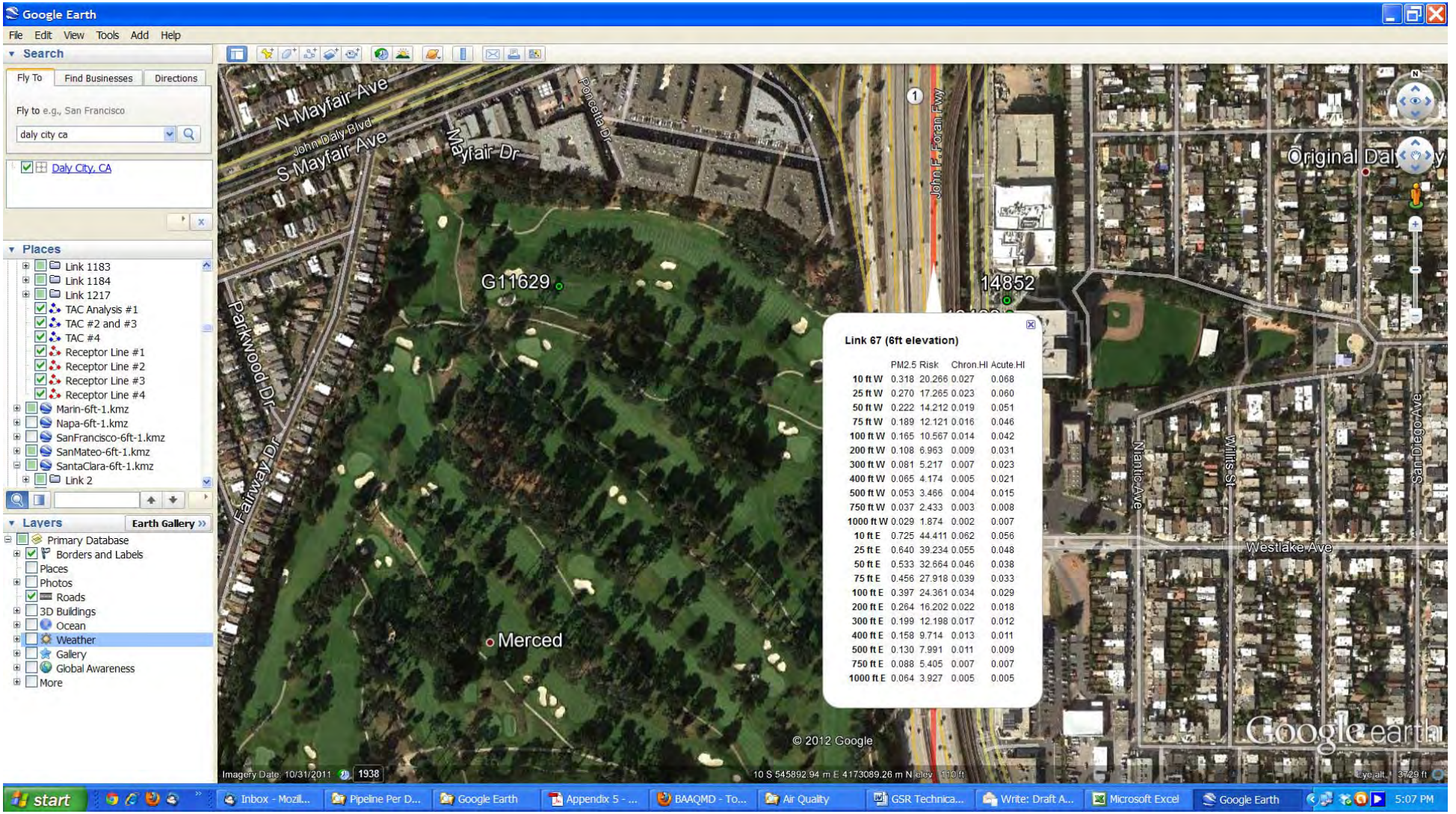
Site	Maximum ROG Concentration UTM x (m)	UTM y (m)	(ug/m3)	Max Conc From
1	546492.59	4172909.31	109.1	Treatment Facility
1	546492.59	4172909.31	169.6	Well
2	545902.4	4172053.87	40.8	Fence Construction
3	545719.97	4172035.68	198.1	Well in field adjacent to well construction site
4	545889.63	4171962.19	201.9	Well in field adjacent to well construction site
2, 3, and 4	545903.72	4171924.54	252.5	from all sources at all sites at the same time
5 (Onsite Treatment)	546797.12	4171010.2	76.5	Treatment Facility
6 (Onsite Treatment)	547188.71	4170748.51	34.7	Treatment Facility
7 (Onsite Treatment)	547219.39	4170733.95	12.1	Well
5, 6, 7 (Onsite Treatment)	546797.12	4171010.2	75.5	from all sources at all sites at the same time
5 (Treatment at 6)	546797.12	4171010.2	37.2	Fence Construction
6 (Treatment at 6)	547188.71	4170748.51	34.7	Treatment Facility
7 (Treatment at 6)	547219.39	4170733.95	12.1	Well
5, 6, and 7 (Treatment at 6)	546797.12	4171010.2	37.2	from all sources at all sites at the same time
8	547821.3	4169865.44	19.2	Treatment Facility
17 (Alternate)	547837.83	4169850.81	35.7	Well
8 and 17 (Alternate)	547837.83	4169850.81	62.3	from all sources at all sites at the same time
9	548635.55	4169049.56	116.7	Well
10	548167.79	4168970.99	44.9	Treatment Facility
18 (Alternate)	548240.75	4168525.69	141.9	Well
9, 10, and 18 (Alternate)	548620.74	4169049.56	185.3	from all sources at all sites at the same time
11	549597.51	4167859.77	44.61	Well
12	550052.75	4167342.12	110.9	Well
19 (Alternate)	549940.83	4167476.79	133.7	Well
11, 12, and 19 (Alternate)	550073.61	4167327.84	160.0	from all sources at all sites at the same time
13	550947.2	4166668.67	50.0	Treatment Facility
14	550305.3	4165663.44	114.0	Well
15	550538.85	4165182.35	19.1	Well
14 and 15	550313.39	4165695.45	188.7	from all sources at all sites at the same time
16	553496.99	4162273.85	129.5	Well

Regional Groundwater Storage and Recovery Project

Cumulative TAC Impacts

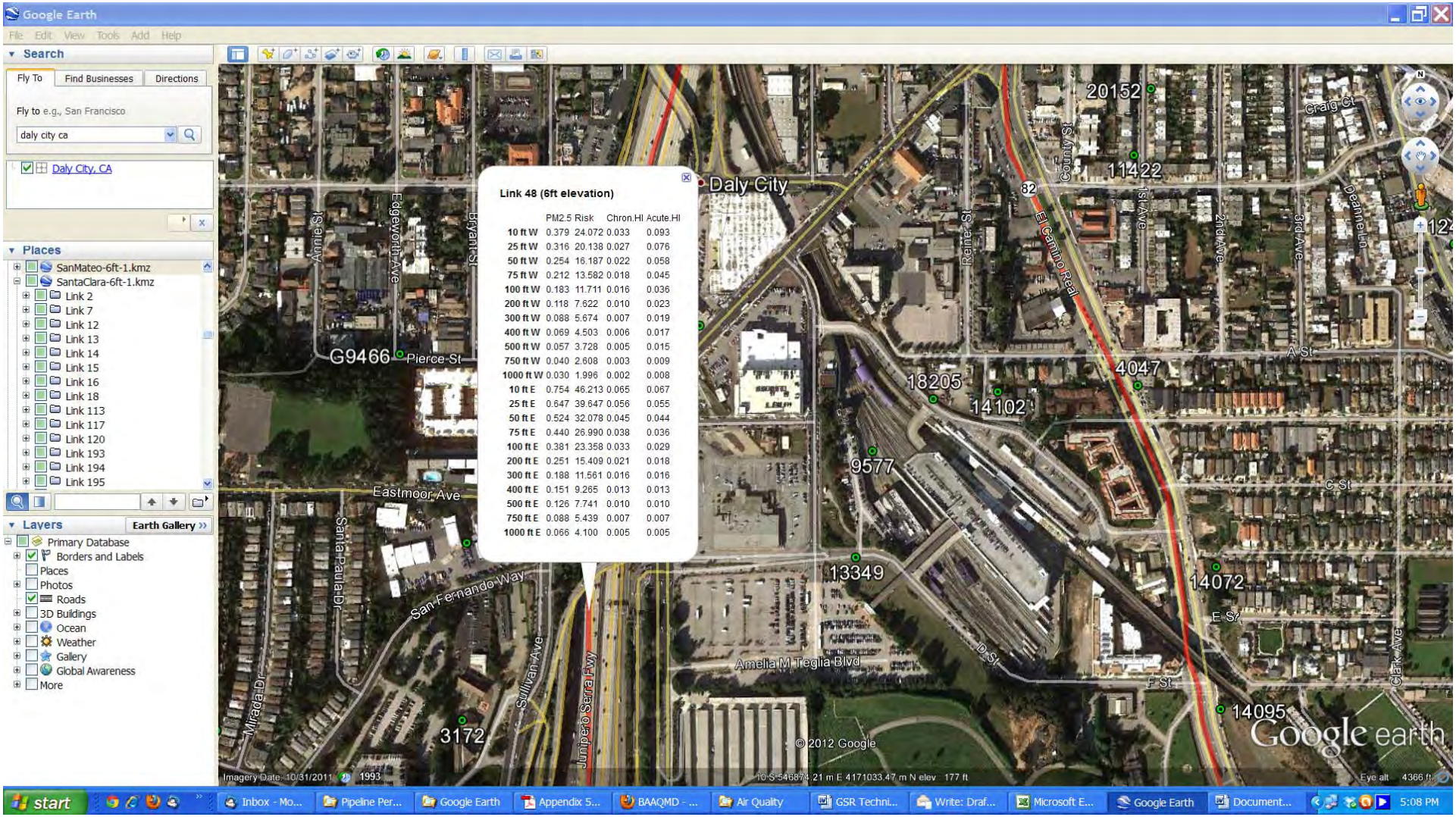
MEI Source	Distance (feet)	Cancer Risk (per million)	Hazard HI	$PM_{2.5}$ µg/m^3	Source
Site 1					
I-280	120	9.85	0.04	0.15	BAAQMD Google Earth Highway Screening Analysis Tool
John Daly Blvd (estimated 35,000 ADT)	900	1.14	0.02	0.03	BAAQMD Roadway Screening Analysis Tables (east-west road, 40,000 ADT)
G11629	900	0.91	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
14852	700	1.18	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
13420	700	0.42	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
13221	1000	0.67	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
		14.17	0.06	0.19	
Site 2, 3, 4					
S.Park Plaza Drive (estimated <10,000 ADT)	50	3.34	0.02	0.098	BAAQMD Roadway Screening Analysis Tables (north-south road, 10,000 ADT)
87th St. (unknown ADT)	360	1.68	0.02	0.059	BAAQMD Roadway Screening Analysis Tables (east-west road, 20,000 ADT)
16794	730	4.08	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
G10657	900	0.48	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
12568	590	5.03	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
12876	1000	2.05	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
		16.67	0.04	0.16	
Site 5,6,7					
I-280	560	7.74	0.01	0.13	BAAQMD Google Earth Highway Screening Analysis Tool
Junipero Serra Blvd (estimated 20,000 ADT)	350	1.84	0.02	0.05	BAAQMD Roadway Screening Analysis Tables (north-south road, 20,000 ADT)
San Pedro Rd (estimated 20,000 ADT)	500	1.04	0.02	0.05	BAAQMD Roadway Screening Analysis Tables (north-south road, 20,000 ADT)
Washington St (estimated 15,000 ADT)	500	0.96	0.02	0.02	BAAQMD Roadway Screening Analysis Tables (east-west road, 20,000 ADT)
G9309	580	0.29	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
14102	660	6.32	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
		18.19	0.07	0.25	
Sites 8 and 17 (alternate)					
Mission Rd (SR 82)	100	4.28	0.01	0.06	BAAQMD Google Earth Highway Screening Analysis Tool
Serramonte Blvd (estimated 20,000 ADT)	>200	2.64	0.02	0.08	BAAQMD Roadway Screening Analysis Tables (north-south road, 20,000 ADT)
1364	900	0.45	0.02	0.26	BAAQMD Stationary Source data with diesel engine multiplier
G11198	950	0.14	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
		7.51	0.05	0.40	
Sites 9, 10, 18 (alternate)	MEI at Site 18, no cumulative sources within 1,000 feet				
Site 9 and 10					
El Camino Real (SR 82)	>500	1.73	0.00	0.02	BAAQMD Google Earth Highway Screening Analysis Tool
Hickey Blvd (estimated 25,000 ADT)	1000	0.61	0.02	0.02	BAAQMD Roadway Screening Analysis Tables (east-west road, 30,000 ADT)
G3305	870	1.43	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
		3.77	0.02	0.04	
Site 11, 12 and 19 (alternate)					
El Camino Real (SR 82)	300	2.28	0.00	0.03	
Westborough Blvd (estimated 30,000 ADT)	500	1.50	0.02	0.05	BAAQMD Roadway Screening Analysis Tables (east-west road, 40,000 ADT)
G11428	600	0.73	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
		4.51	0.02	0.08	
Site 13					

South SpruceAve (estimated 30,000 ADT)	70	5.62	0.02	0.20	BAAQMD Roadway Screening Analysis Tables (north-south road, 30,000 ADT)
G12073	700	0.17	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
2483	400	0.19	0.00	14.00	Bimbos Bakery
		5.98	0.02	14.20	
Site 14 and 15					
Sneath Lane (estimated 20,000 ADT)	700	0.75	0.02	0.02	BAAQMD Roadway Screening Analysis Tables (east-west road, 20,000 ADT)
Site 16					
CalTrain	150	5.70	0.01	0.03	Dispersion Modeling of CalTrain
19283	130	2.35	0.00	0.00	BAAQMD Stationary Source data with diesel engine multiplier
19194	500	2.21	0.00	0.01	BAAQMD HRSA obtained from Public Records Request
G6250	500	0.02	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
G2970	950	2.25	0.00	0.00	BAAQMD Stationary Source data with gasoline station multiplier
19561	700	7.30	0.00	0.02	BAAQMD HRSA obtained from Public Records Request
		19.82	0.02	0.06	



Link 67 (6ft elevation)

	PM2.5 Risk	Chron.HI	Acute.HI
10 ft W	0.318 20.266	0.027	0.068
25 ft W	0.270 17.265	0.023	0.060
50 ft W	0.222 14.212	0.019	0.051
75 ft W	0.189 12.121	0.016	0.046
100 ft W	0.165 10.567	0.014	0.042
200 ft W	0.108 6.963	0.009	0.031
300 ft W	0.081 5.217	0.007	0.023
400 ft W	0.065 4.174	0.005	0.021
500 ft W	0.053 3.466	0.004	0.015
750 ft W	0.037 2.433	0.003	0.008
1000 ft W	0.029 1.874	0.002	0.007
10 ft E	0.725 44.411	0.062	0.056
25 ft E	0.640 39.234	0.055	0.048
50 ft E	0.533 32.664	0.046	0.038
75 ft E	0.456 27.918	0.039	0.033
100 ft E	0.397 24.361	0.034	0.029
200 ft E	0.264 16.202	0.022	0.018
300 ft E	0.199 12.198	0.017	0.012
400 ft E	0.158 9.714	0.013	0.011
500 ft E	0.130 7.991	0.011	0.009
750 ft E	0.088 5.405	0.007	0.007
1000 ft E	0.064 3.927	0.005	0.005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SantaClara-6ft-1.kmz
Link 2
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Link 18
Link 113
Link 117
Link 120
Link 193
Link 194
Link 195
Layers
Earth Gallery
Primary Database
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Link 48 (6ft elevation)
PM2.5 Risk Chron.HI Acute.HI
10 ft W 0.379 24.072 0.033 0.093
25 ft W 0.316 20.138 0.027 0.076
50 ft W 0.254 16.187 0.022 0.058
75 ft W 0.212 13.582 0.018 0.045
100 ft W 0.183 11.711 0.016 0.036
200 ft W 0.118 7.622 0.010 0.023
300 ft W 0.088 5.674 0.007 0.019
400 ft W 0.069 4.503 0.006 0.017
500 ft W 0.057 3.728 0.005 0.015
750 ft W 0.040 2.608 0.003 0.009
1000 ft W 0.030 1.996 0.002 0.008
10 ft E 0.754 46.213 0.065 0.067
25 ft E 0.647 39.647 0.056 0.055
50 ft E 0.524 32.078 0.045 0.044
75 ft E 0.440 26.990 0.038 0.036
100 ft E 0.381 23.358 0.033 0.029
200 ft E 0.251 15.409 0.021 0.018
300 ft E 0.188 11.561 0.016 0.016
400 ft E 0.151 9.265 0.013 0.013
500 ft E 0.126 7.741 0.010 0.010
750 ft E 0.088 5.439 0.007 0.007
1000 ft E 0.066 4.100 0.005 0.005
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Craig Ct
Annie St
Edgeworth Ave
Bryant St
Reiner St
El Camino Real
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2nd Ave
3rd Ave
Deanne Ln
G9466
Pierce St
18205
14102
4047
A St
9577
C St
Eastmoor Ave
Santa Paula Dr
San Fernando Way
13349
14072
E St
Amelia M Teglia Blvd
D St
F St
Clark Ave
Mirada Dr
Sullivan Ave
Junipero Serra Fwy
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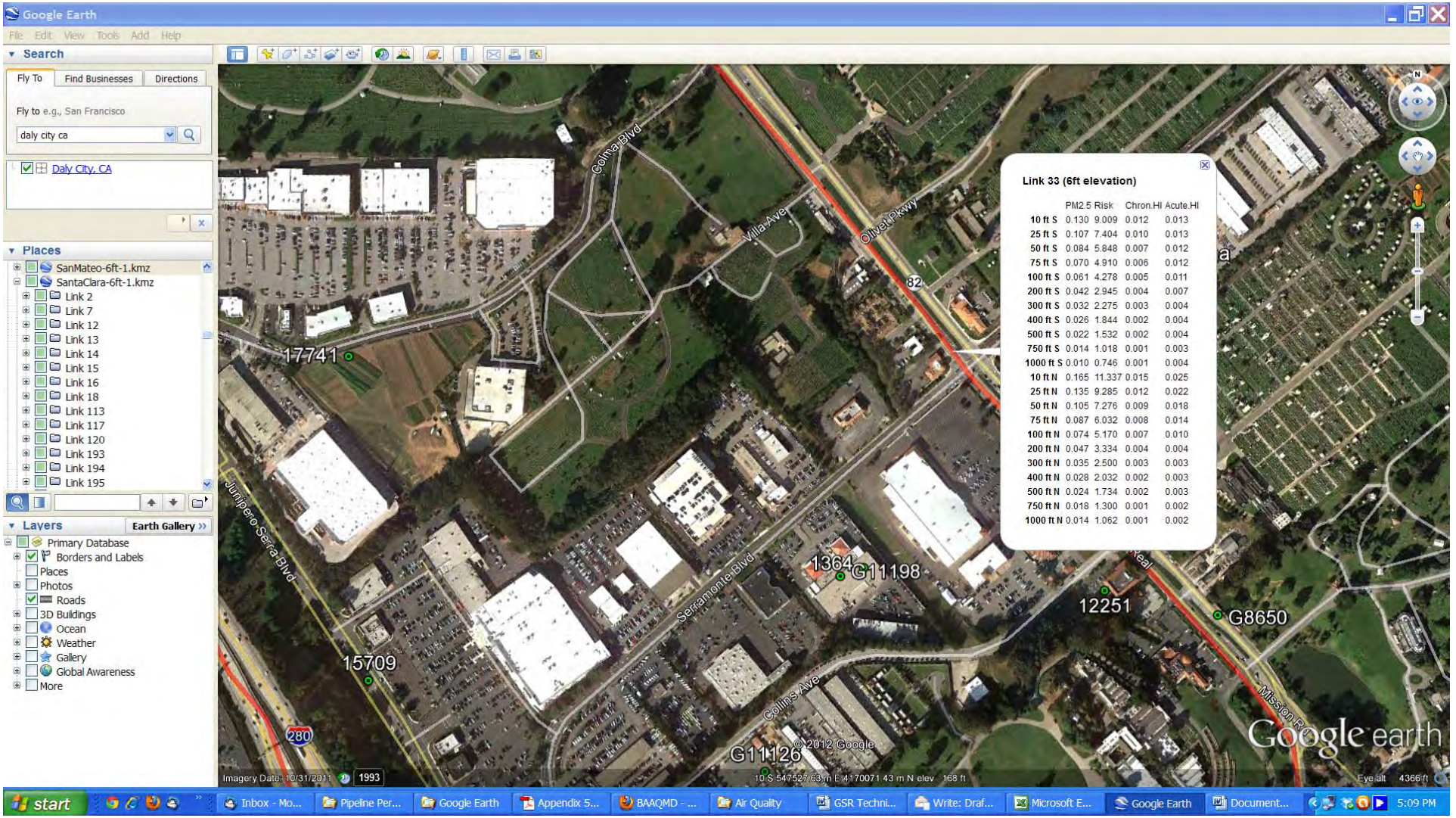
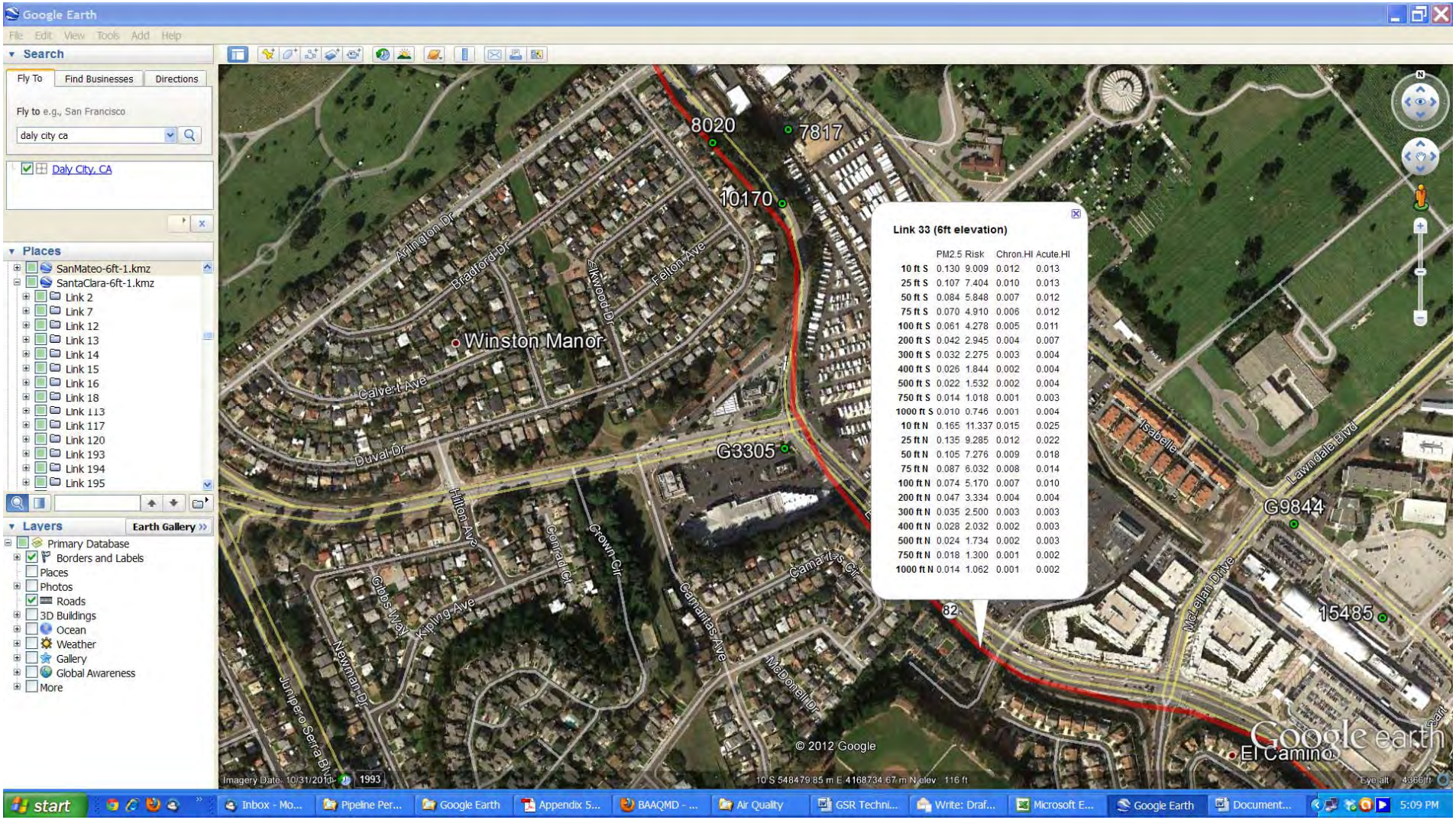


Link 33 (6ft elevation)

	PM2.5	Risk	Chron.HI	Acute.HI
10 ft S	0.130	9.009	0.012	0.013
25 ft S	0.107	7.404	0.010	0.013
50 ft S	0.084	5.848	0.007	0.012
75 ft S	0.070	4.910	0.006	0.012
100 ft S	0.061	4.278	0.005	0.011
200 ft S	0.042	2.945	0.004	0.007
300 ft S	0.032	2.275	0.003	0.004
400 ft S	0.026	1.844	0.002	0.004
500 ft S	0.022	1.532	0.002	0.004
750 ft S	0.014	1.018	0.001	0.003
1000 ft S	0.010	0.746	0.001	0.004
10 ft N	0.165	11.337	0.015	0.025
25 ft N	0.135	9.285	0.012	0.022
50 ft N	0.105	7.276	0.009	0.018
75 ft N	0.087	6.032	0.008	0.014
100 ft N	0.074	5.170	0.007	0.010
200 ft N	0.047	3.334	0.004	0.004
300 ft N	0.035	2.500	0.003	0.003
400 ft N	0.028	2.032	0.002	0.003
500 ft N	0.024	1.734	0.002	0.003
750 ft N	0.018	1.300	0.001	0.002
1000 ft N	0.014	1.062	0.001	0.002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10170
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G9844
15485
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Bradford Dr
Kwood Dr
Felton Ave
Calvert Ave
Duval Dr
Hilton Ave
Conrad Ct
Crown Cir
Gibbs Way
Kipling Ave
Newman Dr
Junipero Serra Blvd
Camarillas Ave
Camarillas Cir
MacDonell Dr
Isabelle
Lawndale Blvd
McLellan Drive
El Camino
Link 33 (6ft elevation)
PM2.5 Risk Chron.HI Acute.HI
10 ft S 0.130 9.009 0.012 0.013
25 ft S 0.107 7.404 0.010 0.013
50 ft S 0.084 5.848 0.007 0.012
75 ft S 0.070 4.910 0.006 0.012
100 ft S 0.061 4.278 0.005 0.011
200 ft S 0.042 2.945 0.004 0.007
300 ft S 0.032 2.275 0.003 0.004
400 ft S 0.026 1.844 0.002 0.004
500 ft S 0.022 1.532 0.002 0.004
750 ft S 0.014 1.018 0.001 0.003
1000 ft S 0.010 0.746 0.001 0.004
10 ft N 0.165 11.337 0.015 0.025
25 ft N 0.135 9.285 0.012 0.022
50 ft N 0.105 7.276 0.009 0.018
75 ft N 0.087 6.032 0.008 0.014
100 ft N 0.074 5.170 0.007 0.010
200 ft N 0.047 3.334 0.004 0.004
300 ft N 0.035 2.500 0.003 0.003
400 ft N 0.028 2.032 0.002 0.003
500 ft N 0.024 1.734 0.002 0.003
750 ft N 0.018 1.300 0.001 0.002
1000 ft N 0.014 1.062 0.001 0.002
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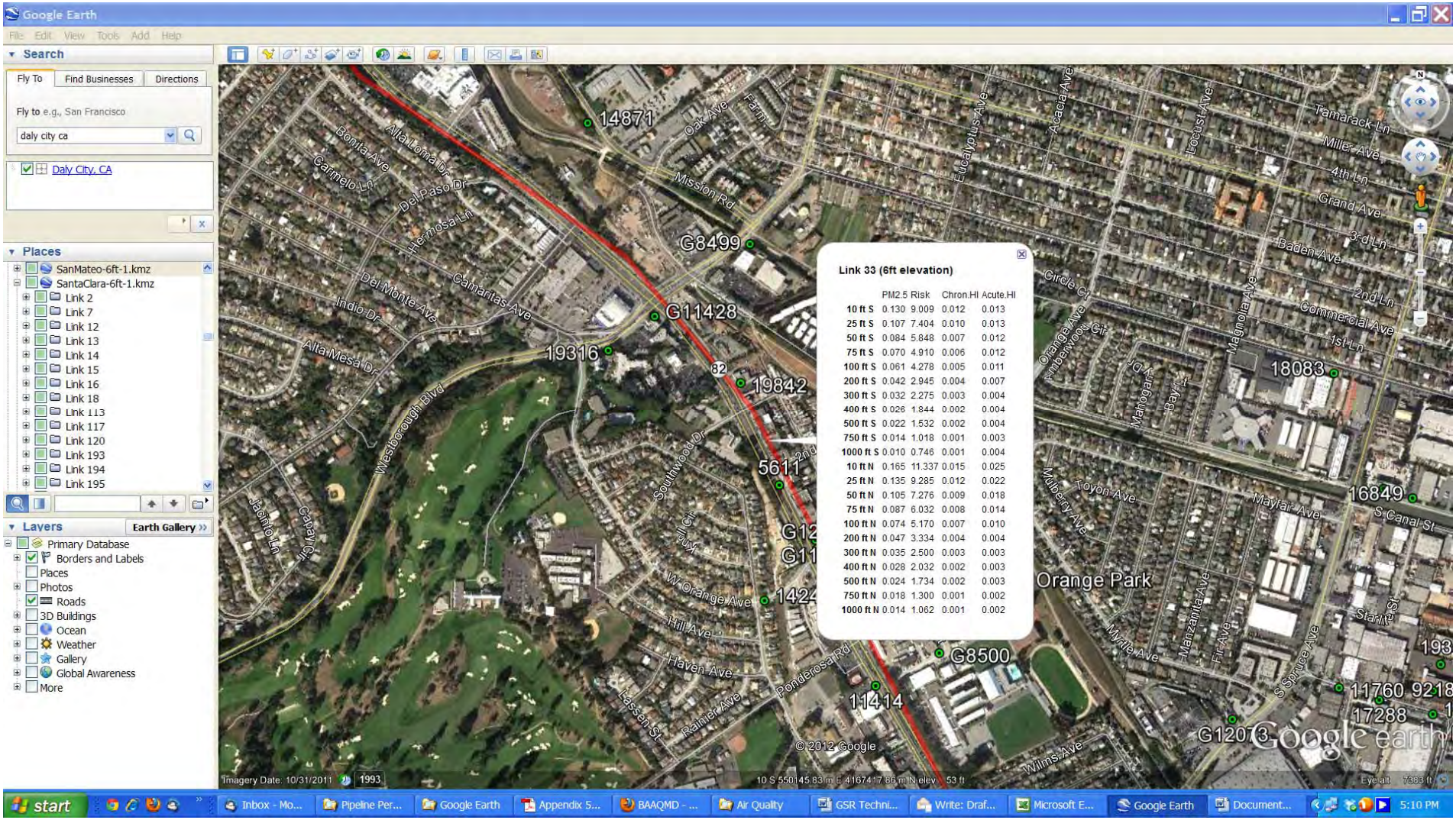
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SantaClara-6ft-1.kmz
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Gallery
Global Awareness
More
Link 33 (6ft elevation)
PM2.5 Risk Chron.HI Acute.HI
10 ft S 0.130 9.009 0.012 0.013
25 ft S 0.107 7.404 0.010 0.013
50 ft S 0.084 5.848 0.007 0.012
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300 ft S 0.032 2.275 0.003 0.004
400 ft S 0.026 1.844 0.002 0.004
500 ft S 0.022 1.532 0.002 0.004
750 ft S 0.014 1.018 0.001 0.003
1000 ft S 0.010 0.746 0.001 0.004
10 ft N 0.165 11.337 0.015 0.025
25 ft N 0.135 9.285 0.012 0.022
50 ft N 0.105 7.276 0.009 0.018
75 ft N 0.087 6.032 0.008 0.014
100 ft N 0.074 5.170 0.007 0.010
200 ft N 0.047 3.334 0.004 0.004
300 ft N 0.035 2.500 0.003 0.003
400 ft N 0.028 2.032 0.002 0.003
500 ft N 0.024 1.734 0.002 0.003
750 ft N 0.018 1.300 0.001 0.002
1000 ft N 0.014 1.062 0.001 0.002
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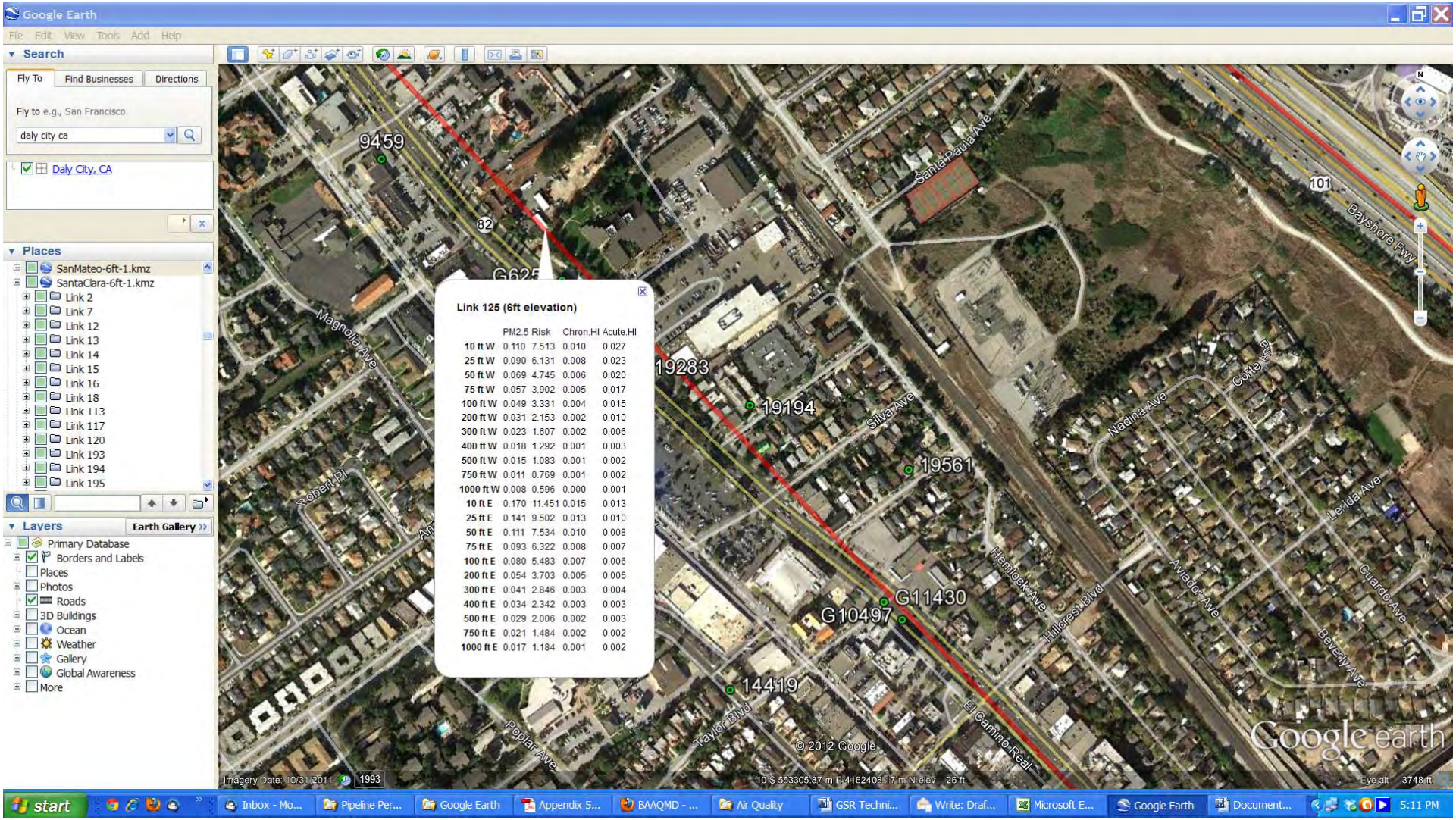
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Layers
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Primary Database
Borders and Labels
Places
Photos
Roads
3D Buildings
Ocean
Weather
Gallery
Global Awareness
More
Link 125 (6ft elevation)
PM2.5 Risk Chron.HI Acute.HI
10 ft W 0.110 7.513 0.010 0.027
25 ft W 0.090 6.131 0.008 0.023
50 ft W 0.069 4.745 0.006 0.020
75 ft W 0.057 3.902 0.005 0.017
100 ft W 0.049 3.331 0.004 0.015
200 ft W 0.031 2.153 0.002 0.010
300 ft W 0.023 1.607 0.002 0.006
400 ft W 0.018 1.292 0.001 0.003
500 ft W 0.015 1.083 0.001 0.002
750 ft W 0.011 0.769 0.001 0.002
1000 ft W 0.008 0.596 0.000 0.001
10 ft E 0.170 11.451 0.015 0.013
25 ft E 0.141 9.502 0.013 0.010
50 ft E 0.111 7.534 0.010 0.008
75 ft E 0.093 6.322 0.008 0.007
100 ft E 0.080 5.483 0.007 0.006
200 ft E 0.054 3.703 0.005 0.005
300 ft E 0.041 2.846 0.003 0.004
400 ft E 0.034 2.342 0.003 0.003
500 ft E 0.029 2.006 0.002 0.003
750 ft E 0.021 1.484 0.002 0.002
1000 ft E 0.017 1.184 0.001 0.002
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Hillcrest Blvd
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Beverly Ave
Taylor Blvd
Poplar Ave
El Camino Real
Bayshore Fwy
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San Mateo County
PM2.5 Concentrations and Cancer Risks
Generated from Surface Streets

How to use the screening tables:

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

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

NORTH-SOUTH DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance East or West of Surface Street - PM2.5 Concentration (ug/m^3)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	0.117	0.098	0.068	0.029	0.014	0.012	0.000
20,000	0.147	0.137	0.117	0.078	0.022	0.018	0.014
30,000	0.215	0.205	0.186	0.127	0.047	0.027	0.018
40,000	0.264	0.254	0.245	0.166	0.059	0.047	0.031
50,000	0.372	0.362	0.323	0.215	0.078	0.056	0.040
60,000	0.499	0.489	0.411	0.269	0.098	0.069	0.047
70,000	0.626	0.616	0.499	0.323	0.117	0.083	0.055
80,000	0.716	0.704	0.570	0.369	0.134	0.095	0.063
90,000	0.805	0.792	0.641	0.415	0.151	0.107	0.070
100,000	0.894	0.880	0.713	0.461	0.168	0.119	0.078

EAST-WEST DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance North or South of Surface Street - PM2.5 Concentration (ug/m^3)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	0.098	0.088	0.064	0.020	0.014	0.012	0.000
20,000	0.186	0.166	0.117	0.059	0.022	0.018	0.010
30,000	0.205	0.176	0.147	0.088	0.034	0.023	0.017
40,000	0.323	0.313	0.235	0.108	0.047	0.032	0.023
50,000	0.558	0.489	0.382	0.176	0.063	0.042	0.032
60,000	0.597	0.523	0.421	0.201	0.072	0.049	0.038
70,000	0.636	0.558	0.460	0.225	0.081	0.057	0.043
80,000	0.727	0.637	0.525	0.257	0.093	0.065	0.049
90,000	0.818	0.717	0.591	0.289	0.104	0.073	0.055
100,000	0.908	0.797	0.657	0.321	0.116	0.081	0.061

LIFETIME CANCER RISK

NORTH-SOUTH DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance East or West of Surface Street - Cancer Risk (per million)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	3.79	3.34	2.46	1.05	0.57	0.44	0.32
20,000	4.33	4.24	3.70	2.64	1.04	0.78	0.55
30,000	6.03	5.93	5.31	3.72	1.50	1.09	0.74
40,000	7.61	7.52	7.00	5.12	2.02	1.50	1.06
50,000	10.80	10.70	9.29	6.45	2.38	1.85	1.32
60,000	14.30	14.20	11.73	7.66	2.96	2.20	1.58
70,000	17.80	17.71	14.17	8.87	3.53	2.56	1.85
80,000	20.35	20.24	16.20	10.14	4.04	2.93	2.11
90,000	22.89	22.77	18.22	11.40	4.54	3.29	2.38
100,000	25.43	25.29	20.25	12.67	5.05	3.66	2.64

EAST-WEST DIRECTIONAL ROADWAY

Annual Average Daily Traffic	Distance North or South of Surface Street - Cancer Risk (per million)						
	10 feet	50 feet	100 feet	200 feet	500 feet	700 feet	1,000 feet
1,000	No analysis required						
5,000							
10,000	2.75	2.48	1.86	0.96	0.53	0.42	0.33
20,000	4.91	4.78	3.79	1.68	0.96	0.75	0.56
30,000	4.97	4.88	4.25	2.57	1.14	0.87	0.61
40,000	9.04	8.94	6.81	3.18	1.50	1.14	0.83
50,000	16.19	13.91	10.64	5.13	1.94	1.41	1.06
60,000	17.09	14.92	11.96	6.09	2.29	1.67	1.23
70,000	17.98	15.94	13.28	7.06	2.64	1.93	1.41
80,000	20.55	18.22	15.17	8.07	3.02	2.21	1.61
90,000	23.12	20.49	17.07	9.07	3.40	2.49	1.81
100,000	25.69	22.77	18.97	10.08	3.78	2.76	2.01

- Screening tables based on meteorological data collected from San Mateo Sewage Treatment Plant in 2005.
- The maximum acute and chronic hazard index for the distances and AADT shown in the table will be less than 0.02.
- Cancer risk were estimated based on exposure from 2014 through 2084. PM2.5 concentrations were based on emissions in 2014.

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

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Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

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Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Alison Kirk at 415-749-5169, or akirk@baaqmd.gov.

Map A: Snapshot of Google Earth with Plant 20248 Information Table Selected

Table B: Stationary Sources Within 1,000 feet of Receptor that say "Contact District Staff"

Table B Section 1: Requestor fills out these columns based on Google Earth data				Table B Section 2: BAAQMD returns form with additional information in these columns as needed																		
Distance from Receptor (feet)	**Plant # or Gas Dispensary #**	**Facility Name**	**Street Address**	**Screening Level Cancer Risk (1)**	**Screening Level Hazard Index (1)**	**Screening Level PM2.5 (1)**	**Adjusted Screening Risk**	**Adjusted Screening Hazard**	**Adjusted Screening PM2.5**	**Type**	**Permit #s (2)**	**Source #s (2)**	**Fuel Code (3)**	**Type of Source(s) (4)**	**HRSA Ap # (5)**	**HRSA Date (6)**	**HRSA Engineer (7)**	**HRSA Cancer Risk in a million**	**Age Sensitivity Factor (8)**	**HRSA Adjusted Cancer Risk**	**HRSA Chronic Health (9)**	**HRSA PM2.5 Risk**	**Status/Comments**
900	G11629	Mayfair 76	101 So Mayfair Avenue Daly City	50.814	0.084	na	**0.91**	**0.00**	**0.00**	Gas Station												0	
1000	13221	DB Real Estate Pacific Plaza Partners LP	2001 Juniperro Serra Blvd Daly City	16.68	0.006	0.004	**0.67**	**0.00**	**0.00**	Generator												0	
700	13420	Digidesign	2001 Juniperro Serra Blvd Daly City	5.27	0.002	0.001	**0.42**	**0.00**	**0.00**	Generator												0	
700	14852	Genesys Telecommunications Laboratories	JUNIPERO SERRA BLVD, SUITE 700 Daly City	14.7	0.005	0.026	**1.18**	**0.00**	**0.00**	Generator												0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
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2. Each plant may have multiple permits and sources.
3. Fuel codes: 98 = diesel, 189 = Natural Gas.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
6. The date that the HRSA was completed.
7. Engineer who completed the HRSA. For District purposes only.
8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 i
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead should reflect the number of years perc use will continue after t
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

For guidance on conducting a risk & hazard screening, including for roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

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Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

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Site 2																							
730	16794	The Home Depot (Store# 1092	303 E LAKE MERCED BLVD Daly City	50.99	0.018	0.012	**4.08**	**0.00**	**0.00**	Generator												0	
900	G10657	Arco Facility #00465 - MICHAEL J MONTE	151 Southgate Avenue Daly City	26.878	0.044	na	**0.48**	**0.00**	**0.00**	Gasoline Station												0	
590	12568	Calclean Inc	151 SOUTHGATE AVENUE Daly City	5.03	0.002	0.00	**5.03**	**0.00**	**0.00**	Cleaners (no Adjustment)												0	
1000	12876	City of Daly City	295 CORONADO AVENUE Daly City	51.32	0.018	0.012	**2.05**	**0.00**	**0.00**	Generator												0	
Site 3																						0	
590	12568	Calclean Inc	151 SOUTHGATE AVENUE Daly City	5.03	0.002	0.00	**5.03**	**0.00**	**0.00**	Cleaners (no Adjustment)												0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	

Footnotes:

1. These Cancer Risk, Hazard Index, and PM2.5 columns represent the rows in the Google Earth Plant Information Table that say "Contact District Staff" (Map A above). BAAQMD will return this form to you with this screening level information entered in thes
2. Each plant may have multiple permits and sources.
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7. Engineer who completed the HRSA. For District purposes only.
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9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
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    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
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Date last updated:
3/12/12

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

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Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reuff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreuff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:
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Find the project site in Google Earth by inputting the site's address in the Google Earth search box.
Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).
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Site 5																							
>1,000	G2810	**ARCO Facility #02090 - COPOWER INC**	295 Washington Street Daly City	24.391	0.032	na																0	
580	G9309	R K Chan #2611202	3001 Junipero Serra Daly City	8.009	0.01	na	**0.29**	**0.00**	**0.00**	Gasoline Station												0	
>>1,000	9640	AT&T	359 Washington St Colma	0.27	0.012	0.012																0	
>1,000	G10514	Sullivan Valero	1690 Sullivan Avenue Daly City	13.931	0.023	na																0	
~200	9577	D'Garcis Auto Body	254 SAN PEDRO ROAD Daly City	0.00	0.009	0.00																0	
600	18205	Collision Specialists Auto Center(CST Co	250 SAN PEDRO ROAD Daly City	0.00	0.00	0.00																	
660	14102	City of Daly City	280 A STREET Daly City	79.01	0.028	0.018	**6.32**	**0.00**	**0.00**	Generator													
>1000	G6665	Pacific Gas and Electric Company	450 Eastmoor Avenue Daly City	0.098	0.00	na																0	
>1000	18205	Collision Specialists Auto Center(CST Co	250 SAN PEDRO ROAD Daly City	0.00	0.00	0.00																0	
>1000	9577	D'Garcis Auto Body	254 SAN PEDRO ROAD Daly City	0.00	0.009	0.00																0	
>1000	13349	S F Bay Area Rapid Transit District	255 D STREET Colma	0.00	0.00	0.015																0	
>1000	14072	S F Bay Area Rapid Transit District	365 D STREET Colma	20.46	0.007	0.005																0	
>1000	14095	North San Mateo County Sanitation Distri	300 F STREET Daly City	33.77	0.012	0.008																0	
>1000	G9706	Woodlawn Memorial Park	1000 El Camino Colma	0.05	0.00	na																0	
																						0	
																						0	

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Date last updated:
3/12/12

Bay Area Air Quality Management District

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Table A: Requestor Contact Information	
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Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

If the stationary source is within 1,000 feet of the project's fenceline and the stationary source's information table does not list the cancer risk, hazard index, and PM2.5 concentration, and instead says to "Contact District Staff", list the stationary source information in Table B Section 1 below.

Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Alison Kirk at 415-749-5169, or akirk@baaqmd.gov.

Map A: Snapshot of Google Earth with Plant 20248 Information Table Selected

Table B: Stationary Sources within 1,000 feet of Receptor that say "Contact District Staff"

Table B Section 1: Requestor fills out these columns based on Google Earth data				Table B Section 2: BAAQMD returns form with additional information in these columns as needed																			
Distance from Receptor (feet)	**Plant # or Gas Dispensary #**	**Facility Name**	**Street Address**	**Screening Level Cancer Risk (1)**	**Screening Level Hazard Index (1)**	**Screening Level PM2.5 (1)**	**Adjusted Screening Risk**	**Adjusted Screening Hazard**	**Adjusted Screening PM2.5**	**Type**	**Permit #s (2)**	**Source #s (2)**	**Fuel Code (3)**	**Type of Source(s) (4)**	**HRSA Ap # (5)**	**HRSA Date (6)**	**HRSA Engineer (7)**	**HRSA Cancer Risk in a million**	**Age Sensitivity Factor (8)**	**HRSA Adjusted Cancer Risk**	**HRSA Chronic Health (9)**	**HRSA PM2.5 Risk**	**Status/Comments**
900	1364	Cypress Amloc Land Co , Inc	1 SAND HILL ROAD	9.08	0.349	5.13	**0.45**	**0.02**	**0.26**	Generator												0	
950	G11198	Lexus of Serramonte - Attn: Ray Chin	700 Serramonte Blvd Colma	8.722	0.012	na	**0.14**	**0.00**		Gasoline Station												0	
	G11126	Christy Vault Company, Inc	1000 Collins Ave Colma	108.802	0.144	na																0	
	8758	Serramonte Ford Body Shop	500 COLLINS AVE Colma	0.00	0.00	0.018																0	
	12251	G & M Auto Body	245 COLLINS AVE Colma	0.04	0.00	0.00																0	
	G8650	Home of Peace Cemetery	1299 El Camino Real Colma	0.222	0.00	na																0	
																						0	
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2. Each plant may have multiple permits and sources.
3. Fuel codes: 98 = diesel, 189 = Natural Gas.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
6. The date that the HRSA was completed.
7. Engineer who completed the HRSA. For District purposes only.
8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 i
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead should reflect the number of years perc use will continue after t
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

For guidance on conducting a risk & hazard screening, including for roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

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Map A: Snapshot of Google Earth with Plant 20248 Information Table Selected

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Distance from Receptor (feet)	**Plant # or Gas Dispensary #**	**Facility Name**	**Street Address**	**Screening Level Cancer Risk (1)**	**Screening Level Hazard Index (1)**	**Screening Level PM2.5 (1)**	**Adjusted Screening Risk**	**Adjusted Screening Hazard**	**Adjusted Screening PM2.5**	**Type**	**Permit #s (2)**	**Source #s (2)**	**Fuel Code (3)**	**Type of Source(s) (4)**	**HRSA Ap # (5)**	**HRSA Date (6)**	**HRSA Engineer (7)**	**HRSA Cancer Risk in a million**	**Age Sensitivity Factor (8)**	**HRSA Adjusted Cancer Risk**	**HRSA Chronic Health (9)**	**HRSA PM2.5 Risk**	**Status/Comments**
870	G3305	Xtra Oil Company	110 Hickey Boulevard Sougth San Francisco	71.457	0.118	na	1.43	0.00		Gasoline Station												0	
20	11016	Image Auto Body	1687 MISSION ROAD South San Francisco	0.00	0.00	0.00																0	
																						0	
																						0	
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8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
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10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
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    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
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Date last updated:
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Bay Area Air Quality Management District
Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

For guidance on conducting a risk & hazard screening, including for roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:
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The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.
Find the project site in Google Earth by inputting the site's address in the Google Earth search box.
Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and thestationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).
If the stationary source is within 1,000 feet of the project's fenceline and the stationary source's information table does<u>not</u> list the cancer risk, hazard index, and PM2.5 concentration, and instead says to "Contact District Staff", list the stationary source information in Table B Section 1 below.
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>1000	G11573	Grand Avenue Olympic	1086 Grand Avenue South San Francisco	na	na	na																0	
>1000	14871	County of San Mateo	1040 OLD MISSION ROAD South San Fransico	18.06	0.006	0.004																0	
>1000	G8499	California Water Service Company	80 Chestnut Avenue South San Francisco	na	na	na																0	
600	G11428	Westborough Chevron	1 Westborough Boulevard South San Fransico	22.056	0.037	na	**0.73**	**0.00**		Gasoline Station												0	
500	19316	Access Properties LLC	91 WESTBOROUGH BOULEVARD South San Francisco	na	na	na																0	
>1000	19842	Chestnut Cleaners	26 CHESTNUT AVENUE South San Francisco	7.49	0.02	0.00																0	
	5611	Daland Body Shop	890 EL CAMINO REAL South San Francisco	0.00	0.00	0.00																0	
>1000	G11391	Camino Petroleum	698 El Camino Real South San Francisco	14.285	0.019	na																0	
>1000	G12394	Orange Avenue Shell	710 El Camino Real South San Francisco	9.902	0.013	na																0	
>1000	14240	SFPUC Water Supply and Treatment Divsio	609 W ORANGE AVENUE South San Francisco	58.80	0.021	0.104																0	
>1000	11414	Holiday Cleaners	675 EL CAMINO REAL South San Francisco	11.20	0.03	0.00																0	
																						0	
																						0	
																						0	
																						0	
																						0	
																						0	
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2. Each plant may have multiple permits and sources.
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9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:

a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 i

c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010.
Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
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e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
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Date last updated:
3/12/12

Bay Area Air Quality Management District

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Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

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Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

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700	G12073	Spruce Street Car Wash	246 So Spruce Avenue South San Francisco	6.193	0.010	na	0.167211	0.00027		Gasoline Station												0	
400	2483	Bimbo Bakeries USA	264 SO SPRUCE AVENUE South San Francisco	0.19	0.001	14.300																0	
																						0	
																						0	
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Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx.

The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

If the stationary source is within 1,000 feet of the project's fenceline and the stationary source's information table does not list the cancer risk, hazard index, and PM2.5 concentration, and instead says to "Contact District Staff", list the stationary source information in Table B Section 1 below.

Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Alison Kirk at 415-749-5169, or akirk@baaqmd.gov .

Map A: Snapshot of Google Earth with Plant 20248 Information Table Selected

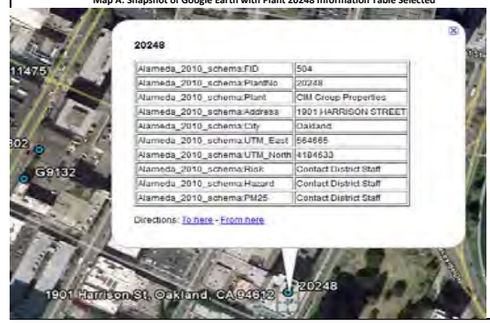

Table B: Stationary Sources within 1,000 feet of Receptor that say "Contact District Staff"

Table B Section 1: Requestor fills out these columns based on Google Earth data				Table B Section 2: BAAQMD returns form with additional information in these columns as needed														
Distance from Receptor (feet)	**Plant # or Gas Dispensary #**	**Facility Name**	**Street Address**	**Screening Level Cancer Risk (1)**	**Screening Level Hazard Index (1)**	**Screening Level PM2.5 (1)**	**Permit #s (2)**	**Source #s (2)**	**Fuel Code (3)**	**Type of Source(s) (4)**	**HRSA Ap # (5)**	**HRSA Date (6)**	**HRSA Engineer (7)**	**HRSA Cancer Risk in a million**	**Age Sensitivity Factor (8)**	**HRSA Adjusted Cancer Risk**	**HRSA Chronic Health (9)**	**HRSA PM2.5 Risk**	**Status/Comments**
	19262	DaVita	1178 CHERRY AVENUE San Bruno	4.02	0.001	0.001												0	
																		0	
																		0	
																		0	
																		0	
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																		0	
																		0	
																		0	
																		0	
																		0	

Footnotes:

1. These Cancer Risk, Hazard Index, and PM2.5 columns represent the rows in the Google Earth Plant Information Table that say "Contact District Staff" (Map A above). BAAQMD will return this form to you with this screening level information entered in thes
2. Each plant may have multiple permits and sources.
3. Fuel codes: 98 = diesel, 189 = Natural Gas.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
6. The date that the HRSA was completed.
7. Engineer who completed the HRSA. For District purposes only.
8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 i
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead should reflect the number of years perc use will continue after t
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

Bay Area Air Quality Management District

Risk & Hazard Stationary Source Inquiry Form

This form is required when users request stationary source data from BAAQMD. This form is to be used with the BAAQMD's Google Earth stationary source screening tables.

For guidance on conducting a risk & hazard screening, including for roadways & freeways, refer to the District's Risk & Hazard Analysis flow chart.

Also see the District's Recommended Methods for Screening and Modeling Local Risks and Hazards document.

Table A: Requestor Contact Information	
Contact Name:	James A. Reyff
Affiliation:	Illingworth & Rodkin, Inc.
Phone:	707-766-7700
Email:	jreyff@illingworthrodkin.com
Date of Request	4/9/2012
Project Name:	Regional Groundwater Storage and
Address:	various
City:	
County:	
Type (residential, commercial, mixed use, industrial, etc.):	Public Works - Pump Stations
Project size (# of units, or building square feet):	<3,000 sf
Comments:	

For Air District assistance, the following steps must be completed:

Complete all the contact and project information requested in Table A. Incomplete forms will not be processed. Please include a project site map.

Download and install the free program Google Earth, http://www.google.com/earth/download/ge/, and then download the county specific Google Earth stationary source application files from the District's website, http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Tools-and-Methodology.aspx. The small points on the map represent stationary sources permitted by the District (Map A on right). These permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc. Click on a point to view the source's Information Table, including the name, location, and preliminary estimated cancer risk, hazard index, and PM2.5 concentration.

Find the project site in Google Earth by inputting the site's address in the Google Earth search box.

Using the Google Earth ruler function, measure the distance in feet between the project's fenceline and the stationary source's fenceline for all the sources that are within 1,000 feet of the project's fenceline. Verify that the location of the source on the map matches with the source's address in the Information Table, by using the Google Earth address search box to confirm that the source is within 1,000 feet of the project. Please report any mapping errors to the District (District contact information in Step 9).

If the stationary source is within 1,000 feet of the project's fenceline and the stationary source's information table does not list the cancer risk, hazard index, and PM2.5 concentration, and instead says to "Contact District Staff", list the stationary source information in Table B Section 1 below.

Note that a small percentage of the stationary sources have Health Risk Screening Assessment (HRSA) data INSTEAD of screening level data. These sources will be noted by an asterisk next to the Plant Name (Map B on right). If HRSA values are presented, these values have already been modeled and cannot be adjusted further.

Email this completed form to District staff (Step 9). District staff will provide the most recent risk, hazard, and PM2.5 data that are available for the source(s). If this information or data are not available, source emissions data will be provided. Staff will respond to inquiries within three weeks.

Note that a public records request received for the same stationary source information will cancel the processing of your SSIF request.

Submit forms, maps, and questions to Alison Kirk at 415-749-5169, or akirk@baaqmd.gov.

Map A: Snapshot of Google Earth with Plant 20248 Information Table Selected

Table B: Stationary Sources within 1,000 feet of Receptor that say "Contact District Staff"

Table B Section 1: Requestor fills out these columns based on Google Earth data				Table B Section 2: BAAQMD returns form with additional information in these columns as needed																		
Distance from Receptor (feet)	**Plant # or Gas Dispensary #**	**Facility Name**	**Street Address**	**Screening Level Cancer Risk (1)**	**Screening Level Hazard Index (1)**	**Screening Level PM2.5 (1)**	**Adjusted Screening Risk**	**Adjusted Screening Hazard**	**Adjusted Screening PM2.5**	**Type**	**Permit #s (2)**	**Source #s (2)**	**Fuel Code (3)**	**Type of Source(s) (4)**	**HRSA Ap # (5)**	**HRSA Date (6)**	**HRSA Engineer (7)**	**HRSA Cancer Risk in a million**	**Age Sensitivity Factor (8)**	**HRSA Adjusted Cancer Risk**	**HRSA Chronic Health (9)**	**HRSA PM2.5 Risk**	**Status/Comments**
500	G6250	San Francisco Water Department	1000 El Camino Real Millbrae	0.361	0.001	na	0.02	0.00		Gasoline Station												0	
950	G2970	Olympic	1009 El Camino Real Millbrae	83.15	0.138	na	**2.25**	**0.00**		Gasoline Station												0	
130	19283	Orchard Supply Hardware	900 EL CAMINO REAL Millbrae	4.05	0.001	0.001	**2.35**	**0.00**	**0.00**	Generator												0	
	4998	Holiday Cleaners of America	1050 BROADWAY Millbrae	0.00	0.00	0.00																0	
500	19194	San Francisco Public Utilities Commissio	1000 EL CAMINO REAL Millbrae	No data	No data	No data																0	
700	19561	Verizon Wireless (SFO West)	1009A HEMLOCK DRIVE Millbrae	No data	No data	No data																0	
																						0	
																						0	
																						0	
																						0	
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Footnotes:

1. These Cancer Risk, Hazard Index, and PM2.5 columns represent the rows in the Google Earth Plant Information Table that say "Contact District Staff" (Map A above). BAAQMD will return this form to you with this screening level information entered in thes
2. Each plant may have multiple permits and sources.
3. Fuel codes: 98 = diesel, 189 = Natural Gas.
4. Permitted sources include diesel back-up generators, gas stations, dry cleaners, boilers, printers, auto spray booths, etc.
5. If a Health Risk Screening Assessment (HRSA) was completed for the source, the application number will be listed here.
6. The date that the HRSA was completed.
7. Engineer who completed the HRSA. For District purposes only.
8. All HRSA completed before 1/5/2010 need to be multiplied by an age sensitivity factor of 1.7.
9. The HRSA "Chronic Health" number represents the Hazard Index.
10. Further information about common sources:
    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
    b. The risk from natural gas boilers used for space heating when <25 MM BTU/hr would have an estimated cancer risk of one in a million or less, and a chronic hazard index of 0.003 or less. To be conservative, requestor should assume the cancer risk is 1 i
    c. BAAQMD Reg 11 Rule 16 required that all co-residential (sharing a wall, floor, ceiling or is in the same building as a residential unit) dry cleaners cease use of perc on July 1, 2010. Therefore, there is no cancer risk, hazard or PM2.5 concentrations from co-residential dry cleaning businesses in the BAAQMD.
    d. Non co-residential dry cleaners must phase out use of perc by Jan. 1, 2023. Therefore, the risk from these dry cleaners does not need to be factored in over a 70-year period, but instead should reflect the number of years perc use will continue after t
    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

Cancer Risk and Chronic Hazard Index Distance Adjustment Multiplier for Diesel IC Engines

Meters	Feet	Multiplier
25	83	0.85
30	99	0.73
35	116	0.64
40	132	0.58
50	165	0.5
60	198	0.41
70	231	0.31
80	264	0.28
90	297	0.25
100	330	0.22
110	363	0.18
120	396	0.16
130	429	0.15
140	462	0.14
150	495	0.12
160	528	0.1
180	594	0.09
200	661	0.08
220	727	0.07
240	793	0.06
260	859	0.05
280	925	0.04

Cancer Risk and Chronic Hazard Index Distance Adjustment Multiplier for Gasoline Dispensing Facilities

Meters	Feet	Multiplier	Meters	Feet	Multiplier
20	66	1	140	459	0.052
25	82	0.728	145	476	0.049
30	98	0.559	150	492	0.046
35	115	0.445	155	509	0.044
40	131	0.365	160	525	0.042
45	148	0.305	165	541	0.04
50	164	0.26	170	558	0.038
55	180	0.225	175	574	0.036
60	197	0.197	180	591	0.034
65	213	0.174	185	607	0.033
70	230	0.155	190	623	0.031
75	246	0.139	195	640	0.03
80	262	0.126	200	656	0.029
85	279	0.114	205	673	0.028
90	295	0.104	210	689	0.027
95	312	0.096	220	722	0.025
100	328	0.088	230	755	0.023
110	361	0.076	250	820	0.02
120	394	0.066	270	886	0.018
130	427	0.058	290	951	0.016

Table B: Stationary Sources within 1,000 feet of Receptor that say "Contact District Staff"																			
Table B Section 1: Requestor fills out these columns based on Google Earth data				Table B Section 2: BAAQMD returns form with additional information in these columns as needed															
Distance from Receptor (feet)	Plant # or Gas Dispensary #	Facility Name	Street Address	Screening Level Cancer Risk (1)	Screening Level Hazard Index (1)	Screening Level PM2.5 (1)	Permit #s (2)	Source #s (2)	Fuel Code (3)	Type of Source(s) (4)	HRSA Ap # (5)	HRSA Date (6)	HRSA Engineer (7)	HRSA Cancer Risk in a million	Age Sensitivity Factor (8)	HRSA Adjusted Cancer Risk	HRSA Chronic Health (9)	HRSA PM2.5 Risk	Status/Comments
Site 13																			
700	G12073	Spruce Street Car Wash	246 So Spruce Avenue South San Francisco	6.193	0.010	na												0	
400	2483	Bimbo Bakeries USA	264 SO SPRUCE AVENUE South San Francisco	0.19	0.001	14.300		various baking things										0	use screening level or see emissions data on next spreadsheet in workbook
Site 16																		0	
500	19194	San Francisco Public Utilities Commissio	1000 EL CAMINO REAL Millbrae	No data	No data	No data				1 Diesel engine -	18529	8/11/2008	ICS	1.3	1.7	2.21	7.8 E-4	0.0069279	use HRSA values
700	19561	Verizon Wireless (SFO West)	1009A HEMLOCK DRIVE Millbrae	No data	No data	No data				1 Diesel engine - generator	20184	4/15/2009	JAC	5.6	1.7	7.3	3.4 E-03	0.022884013	use HRSA values
																		0	
																		0	
																		0	
																		0	
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Footnotes:

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2. Each plant may have multiple permits and sources.
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    a. Sources that only include diesel internal combustion engines can be adjusted using the BAAQMD's Diesel Multiplier worksheet.
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    e. Gas stations can be adjusted using BAAQMD's Gas Station Distance Mulitplier worksheet.
    f. Unless otherwise noted, exempt sources are considered insignificant. See BAAQMD Reg 2 Rule 1 for a list of exempt sources.
    g. This spray booth is considered to be insignificant.

Date last updated:
3/12/12

Bimbo Bakeries USA (P# 2483)

S#	SOURCE NAME / MATERIAL / SOURCE CODE	THROUGHPUT	DATE	POLLUTANT	CODE	LBS/DAY
1	Peterson 100 Foot Tunnel Oven					
	C6250189					
				Benzene	41	7.01E-06
				Formaldehyde	124	8.24E-05
				Toluene	293	3.74E-06
				Organics (part not spec el	990	6.29E-03
				Particulates (portion of t	1990	6.59E-02
				Nitrous Oxide (N2O)	2030	5.08E-03
				Nitrogen Oxides (part not	2990	3.08E+00
				Sulfur Dioxide (SO2)	3990	1.25E-02
				Carbon Monoxide (CO) pollu	4990	7.69E-01
				Carbon Dioxide, non-biogen	6960	2.69E+03
				Methane (CH4)	6970	6.26E-03
	G1025109					
				Organics (part not spec el	990	2.54E-03
				Carbon Dioxide, non-biogen	6960	1.21E-01
3	Baking Oven					
	C6250189					
		0	0.00E+00			
	G1025319					
		0	0.00E+00			
4	Johnston Steam Boiler					
	C1240189					
				Benzene	41	6.52E-06
				Formaldehyde	124	2.33E-04
				Toluene	293	1.06E-05
				Organics (part not spec el	990	9.07E-03
				Particulates (portion of t	1990	9.32E-03
				Nitrous Oxide (N2O)	2030	7.18E-04
				Nitrogen Oxides (part not	2990	1.09E-01
				Sulfur Dioxide (SO2)	3990	1.77E-03
				Carbon Monoxide (CO) pollu	4990	1.09E-01
				Carbon Dioxide, non-biogen	6960	3.80E+02
				Methane (CH4)	6970	5.90E-03
5	Floor Silo Holding Tanks #4					
	G1999109					
				Particulates (portion of t	1990	3.72E+00
6	Floor Silo Holding Tanks #3					
	G1999109					
				Particulates (portion of t	1990	3.74E+00
7	Floor Silo Holding Tanks #2					

G1999350

Particulates (portion of t 1990 9.34E-02

8 Flour Silo Holding Tanks #1

G1999350

Particulates (portion of t 1990 9.34E-02

9 APV Baker Tray Oven

C1650189

Benzene 41 1.23E-05
Formaldehyde 124 1.44E-04
Toluene 293 6.54E-06
Organics (part not spec el 990 1.10E-02
Particulates (portion of t 1990 1.15E-01
Nitrous Oxide (N2O) 2030 8.89E-03
Nitrogen Oxides (part not 2990 5.39E+00
Sulfur Dioxide (SO2) 3990 2.19E-02
Carbon Monoxide (CO) pollu 4990 1.35E+00
Carbon Dioxide, non-biogen 6960 4.71E+03
Methane (CH4) 6970 1.10E-02

-6 Catalytic Oxidation System

C8360189

Benzene 41 6.16E-05
Formaldehyde 124 7.24E-04
Toluene 293 3.28E-05
Organics (part not spec el 990 5.52E-02
Particulates (portion of t 1990 2.90E-02
Nitrous Oxide (N2O) 2030 2.23E-03
Nitrogen Oxides (part not 2990 1.35E+00
Sulfur Dioxide (SO2) 3990 5.49E-03
Carbon Monoxide (CO) pollu 4990 3.38E-01
Carbon Dioxide, non-biogen 6960 1.18E+03
Methane (CH4) 6970 1.83E-02

PLANT TOTAL:

lbs/day Pollutant

8.74E-05 Benzene (41)
8.97E+03 Carbon Dioxide, non-biogenic CO2 (6960)
2.56E+00 Carbon Monoxide (CO) pollutant (4990)
1.18E-03 Formaldehyde (124)
4.15E-02 Methane (CH4) (6970)
9.93E+00 Nitrogen Oxides (part not spec elsewhere) (2990)
1.69E-02 Nitrous Oxide (N2O) (2030)
8.41E-02 Organics (part not spec elsewhere) -- including Methane (990)
7.86E+00 Particulates (portion of total not spec elsewhere) (1990)
4.16E-02 Sulfur Dioxide (SO2) (3990)
5.37E-05 Toluene (293)

GSR - Site 16 MEI Location
Cumulative Analysis
ISCST3 Railroad DPM Risk Modeling Parameters and Maximum Cancer Risk at MEI

Receptor Information

Number of Receptors	3
Receptor Height =	1.5 m
Receptor distances =	NA

Meteorological Conditions

San Francisco Airport Hourly Met Dat	1991 - 1995
Land Use Classification	Urban
Wind speed =	variable
Wind direction =	variable

Cancer Risk Calculation Method

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air (µg/m^3)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Inhalation Dose Factors

	Value[1]							
Exposure Type	**DBR (L/kg BW-day)**	**A (-)**	**Exposure (hr/day)**	**Exposure (days/week)**	**Exposure (week/year)**	**EF (days/yr)**	**ED (Years)**	**AT (days)**
Residential (70-Year)	302	1	24	7	50	350	70	25,550

[1] Default values recommended by OEHHA& Bay Area Air Quality Management District

Cancer Risk (per million) = Inhalation Dose x CRAF x CPF x 10^6
= URF x Cair
Where: CPF = Cancer potency factor (mg/kg-day)$^{-1}$
URF =Unit risk factor (cancer risk per µg/m^3)

Unit Risk Factors (unadjusted for age sensitivity) for DPM

Exposure Type	**CPF (mg/kg-day)$^{-1}$**	***DPM***
Residential (70-Yr Exposure)	1.10E+00	318.5

MEI Cancer Risk Calculations

Meteorological Data Year	**Maximum Annual DPM Concentration (µg/m^3)**		
	2014-2025		**2025***
1991 - 1995	0.0259		0.0000
Cancer Risk[a]	8.24		0.00
Sensitivity Weighting Factors	0.696		0.993
Contribution to Total Cancer Risk	5.74		0.0
70-yr Cumulative Risk [b]	***5.7***		

Notes:
* DPM concentration expected to be negligible due to train electrification
Receptor Heights = 1.5 m
Maximum DPM & PM2.5 concentrations occur at the residences closest to the rail line
a Cancer risk (per million) calculated assuming a 70-year exposure to concentration for year of analysis.
b Cumulative cancer risk (per million) calculated assuming variable exposure over a 70-year period due to decreased concentrations over time.

Exposure Period Sensitivity Weighting Factors for Modeling Periods

Calendar Year	Exposure Year	Age Sensitivity Factors 10	3	1	Sensitivity Weighting Factor	Emissions Period Weighting Factor
2014	1	1.0	0.0	0.0	0.143	
2015	2	1.0			0.143	
2016	3	0.25	0.75		0.068	
2017	4		1.0		0.043	
2018	5		1.0		0.043	
2019	6		1.0		0.043	
2020	7		1.0		0.043	
2021	8		1.0		0.043	
2022	9		1.0		0.043	
2023	10		1.0		0.043	
2024	11		1.0		0.043	**0.696**
2025	12		1.0		0.043	
2026	13		1.0		0.043	
2027	14		1.0		0.043	
2028	15		1.0		0.043	
2029	16		1.0		0.043	
2030	17		0.25	0.75	0.021	
2031	18			1.0	0.014	
2032	19			1.0	0.014	
2033	20			1.0	0.014	
2034	21			1.0	0.014	
2035	22			1.0	0.014	
2036	23			1.0	0.014	
2037	24			1.0	0.014	
2038	25			1.0	0.014	
2039	26			1.0	0.014	
2040	27			1.0	0.014	
2041	28			1.0	0.014	
2042	29			1.0	0.014	
2043	30			1.0	0.014	
2044	31			1.0	0.014	
2045	32			1.0	0.014	
2046	33			1.0	0.014	
2047	34			1.0	0.014	
2048	35			1.0	0.014	
2049	36			1.0	0.014	
2050	37			1.0	0.014	
2051	38			1.0	0.014	
2052	39			1.0	0.014	
2053	40			1.0	0.014	
2054	41			1.0	0.014	
2055	42			1.0	0.014	
2056	43			1.0	0.014	
2057	44			1.0	0.014	
2058	45			1.0	0.014	

2059	46	1.0	0.014		
2060	47	1.0	0.014		
2061	48	1.0	0.014		
2062	49	1.0	0.014		
2063	50	1.0	0.014		
2064	51	1.0	0.014		
2065	52	1.0	0.014		
2066	53	1.0	0.014		
2067	54	1.0	0.014		
2068	55	1.0	0.014		
2069	56	1.0	0.014		
2070	57	1.0	0.014		
2071	58	1.0	0.014		
2072	59	1.0	0.014		
2073	60	1.0	0.014		
2074	61	1.0	0.014		
2075	62	1.0	0.014		
2076	63	1.0	0.014		
2077	64	1.0	0.014		
2078	65	1.0	0.014		
2079	66	1.0	0.014		
2080	67	1.0	0.014		
2081	68	1.0	0.014		
2082	69	1.0	0.014		
2083	70	1.0	0.014	**0.993**	2025 - 2084
Total			1.689	1.689	

Acute Health Effects from Rail Line Emissions at Site 16 MEI Location

			Site 16 MEI	
Chemical	**Fraction of VOC**	**Acute REL (ug/m3)**	**Chemical Concentration (ug/m^3)**	**Hazard Index**
Acetaldehyde	0.15942	470	0.174	0.0004
Acrolein	0.01297	2.5	0.014	0.0057
Benzene	0.01045	1,300	0.011	0.0000
Formaldehyde	0.08505	55	0.093	0.0017
Methyl Ethyl Ketone (2-butanone)	0.02860	13,000	0.031	0.0000
Toluene	0.01579	37,000	0.017	0.0000
Xylenes	0.012052	2,200	0.013	0.0000
		Total Hazard Index		**0.008**

Note: Speciation fractions from USEPA Speciation Profile 4674 for Medium Duty Trucks

Max 1-hr ROG Conc. (ug/m^3) = 1.09

Appendix 6
Communications with BAAQMD

Subject: FW: Fwd: Public Records Request Number. 2012-06-0072
From: Alison Kirk <AKirk@baaqmd.gov>
Date: 6/20/2012 10:23 AM
To: "jreyff@illingworthrodkin.com" <jreyff@illingworthrodkin.com>

Hello,

Attached please find your completed SSIF request. Please let me know if you have any questions. I'm in until Friday and then out for 2 weeks.

Alison Kirk
415-749-5169

From: Andrea Gordon
Sent: Thursday, June 14, 2012 3:24 PM
To: Alison Kirk
Cc: jreyff@illingworthrodkin.com
Subject: FW: Fwd: Public Records Request Number. 2012-06-0072

Alison,

Here's a SSIF received today from James Reyff, please process as necessary.

Thank you.

Andrea

From: jreyff@illingworthrodkin.com [mailto:jreyff@illingworthrodkin.com]
Sent: Thursday, June 14, 2012 12:19 PM
To: Andrea Gordon
Subject: Fwd: Fwd: Public Records Request Number. 2012-06-0072

Hi Andrea,
Please disregard the previous SSIF form request (sent yesterday) and use this one. I found two other sources that there were no data included in the database, but it appears there are electronic copies of the HRSAs. This should do it.

Thanks.

James A. Reyff
Illingworth Rodkin, Inc.
505 Petaluma Blvd South
Petaluma CA 94952
707-766-7700x24

-------- Original Message --------
Subject: Fwd: Public Records Request Number. 2012-06-0072
Date: Wed, 13 Jun 2012 17:35:07 -0700
From:jreyff@illingworthrodkin.com <jreyff@illingworthrodkin.com>

To: Andrea Gordon <AGordon@baaqmd.gov>

Hi Andrea,
I went through the database of BAAQMD screening stationary sources and found this source to be a potential problem for our project because of the super high PM2.5 concentration = 14 ug/m**3.

Attached is a SSIF form with the source and I am hoping you might find more information. Also, I did a public records request for the site, as you can see from the link below.

Thanks.

James A. Reyff
Illingworth Rodkin, Inc.
505 Petaluma Blvd South
Petaluma CA 94952
707-766-7700x24

-------- Original Message --------
Subject: Public Records Request Number. 2012-06-0072
Date:13 Jun 2012 20:27:03 -0400
From:publicrecords@baaqmd.gov
To:jreyff@illingworthrodkin.com

Dear James Reyff:

We have received your public records request of 6/13/2012 5:27:02 PM PST. We have assigned 2012-06-0072 as your Request Number in order to track your request. You requested the following:

Facility Information
Facility ID: 2483
Facility Name: Bimbo Bakeries USA
Facility Street: 264 SO SPRUCE AVENUE
Facility City: South San Francisco
Facility State: CA
Period Covered: 2009-2012

Print Outs Requested

- Permit Application

Other Requests: Permit evaluation and Permit We are trying to determine the PM2.5 emissions from the facility

Within 10 days we will determine whether you have requested disclosable records. If we need more time to make that determination, we will let you know within 10 days. If your request is unclear we will also contact you within the 10 days.

If you have requested disclosable records, and your request is simple, we may respond within 10 days by providingyou with the records requested or with our finding tht we have no records. If you have requested disclosable records and your request is more complicated, we will notify you promptly of our determination

and provide your with our estimate of when the records will be made available.

If you have requested records that are exempt from disclosure, we will explain why the records are being withheld.

You can follow our progress in responding to your request by using the PRA Login webpage.

Username: jreyff@illingworthrodkin.com
Password: b491e68f

Sincerely,
Rochelle Henderson Reed
Public Records Section
BAAQMD

Attachments:

GSR Site 13&16 SSIF Request.xls 630 KB

From: James Cordova [mailto:JCordova@baaqmd.gov]
Sent: Monday, April 23, 2012 12:35 PM
To: Bill Popenuck
Subject: RE:

Hi Bill,

I am finally back in the office after a week off.

Based on the locations of your sites, I would use Ft. Funston for Sites 1 – 7. For sites 8 through 16, I would use KSFO data. I have ISC formatted data for KSFO for the years 1991 through 1995. Just submit a Public Records Request for these data and I will send them to you.

I hope all is going well for you.

Jim

From: Bill Popenuck [mailto:popenuck@starband.net]
Sent: Monday, April 16, 2012 5:44 PM
To: James Cordova
Cc: James Reyff
Subject:

Hi Jim,

I'm working on a CEQA analysis for construction of a series of groundwater pumping facilities that will be constructed in Daly City, Colma, South San Francisco, San Bruno, Millbrae, and unincorporated San Mateo County. I'm evaluating 19 sites (16 proposed sites and 3 alternate sites) in these areas. The locations of these sites are shown in the attached figure, and the approximate UTM coordinates (NAD83) are listed below:

	UTM NAD83	
Site No.	UTM - East	UTM - North
1	546500.00 m E	4172900.00 m N
2	545859.00 m E	4172158.00 m N
3	545742.00 m E	4172027.00 m N
4	545847.00 m E	4171936.00 m N
5	546760.00 m E	4171020.00 m N
6	546986.00 m E	4170786.00 m N
7	547298.00 m E	4170351.00 m N
8	547644.00 m E	4169883.00 m N
8a	547790.00 m E	4169717.00 m N
9	548652.00 m E	4169020.00 m N
10	548188.00 m E	4168872.00 m N
10a	548253.00 m E	4168550.00 m N
11	549682.00 m E	4167979.00 m N
12	550095.00 m E	4167377.00 m N
12a	549948.00 m E	4167438.00 m N
13	551032.00 m E	4166632.00 m N
14	550353.00 m E	4165656.00 m N
15	550579.00 m E	4165422.00 m N
16	553509.00 m E	4162308.00 m N

I will be evaluating potential health risks associated with facility construction at each site. Construction of each site is

expected to take a little more than one year. I will be modeling toxic air contaminant (TAC) emissions during construction of each site in order to evaluate cancer and non-cancer health risks to nearby sensitive receptors. Currently, I plan on using the ISCST3 model for the dispersion modeling. However, use of the AERMOD model is also possible depending on available meteorological data for use with this model.

Based on the District's Meteorological Data web page, meteorological data in the project region for use with the ISCST3 model is available for the San Francisco Sewage Treatment Plant (STP), Fort Funston, and the San Mateo STP. In reviewing the District's County Surface Street Screening Tables for computing cancer risk and PM2.5 from traffic for San Francisco and San Mateo County roadways, meteorological data from the San Francisco STP was used in developing the screening table values for San Francisco County roads and meteorological data from the San Mateo STP was used for the screening table values for San Mateo roads.

Given that many of the project sites, in particular Sites 1 - 10a, are closer to Fort Funston than the San Francisco STP, use of the Fort Funston meteorological data appears more appropriate for use in modeling these sites. For the remaining sites, Sites 11 - 16, the San Mateo STP meteorological data would appear to be the most appropriate to use for modeling given the available data.

What meteorological data would the District recommend for use in modeling the project sites? Also, are other meteorological data available from the District (e.g., San Francisco Airport) for use with the ISCST3 model or the AERMOD model that would be more appropriate than the data discussed above.

Thanks,
Bill Popenuck
(707) 488-3935

-------- Original Message --------
Subject: RE: Questions on TACs
Date: Wed, 30 Mar 2011 15:43:30 -0700
From: Virginia Lau <VLau@baaqmd.gov>
To: Sigalle Michael <smichael@baaqmd.gov>, "jreyff@illingworthrodkin.com" <jreyff@illingworthrodkin.com>

Hi Jeff - we do not recommend doing an acute hazard estimation from construction activities. You would need to evaluate TAC emissions from construction activities for cancer and chronic hazard - the speciation table that was used in our construction calculator is attached. When noted with Uk, it is unknown the speciation factor and was not included in the calculation.

TAC Name	Speciation Factor
DPM	NA
PM2.5	NA
acetaldehyde	0.07353
acrolein	0.01297
benzaldehyde	0.00699
benzene	0.02001
ethanol	0.00009
ethylbenzene	0.00305
ethylene	0.14377
ethylene dibromide (1,2-dibromoethane)	Uk
ethylene dichloride (1,2-dichloroethane)	Uk
ethylene glycol	Uk
ethylene oxide (1,2-epoxyethane)	Uk
ethylene thiourea	Uk
ethylene glycol butyl ether	Uk
ethylene glycol ethyl ether	Uk
ethylene glycol ethyl ether acetate	Uk
ethylene glycol methyl ether	Uk
ethylene glycol methyl ether acetate	Uk
formaldehyde	0.14714
isobutane	0.01222
isopentane	0.00602
methane	0.04084
methyl ethyl ketone (mek) (2-butanone)	0.01477
methylcyclopentane	0.00149
m-xylene	0.00611
n-butane	0.00104
n-hexane	0.00157
n-pentane	0.00175
o-xylene	0.00335
propionaldehyde	0.0097
propylene	0.02597
propylene glycol monomethyl ether	uk
propylene oxide	uk
toluene	0.01473

Virginia Lau
Bay Area Air Quality Management District
939 Ellis Street

San Francisco, CA 94109
Phone: (415) 749-4696
Fax: (415) 749-4741
E-mail: vlau@baaqmd.gov

-----Original Message-----
From: Sigalle Michael
Sent: Wednesday, March 30, 2011 12:22 PM
To: jreyff@illingworthrodkin.com
Cc: Virginia Lau
Subject: RE: Questions on TACs

HI James,
We do not yet have screening tables for railroads, but will let you know once they are available. I cc'ed Virginia Lau on this email, she should be able to help you with your acrolein question.
~sigalle

Sigalle Michael
Senior Environmental Planner
smichael@baaqmd.gov | 415-749-4683

-----Original Message-----
From: jreyff@illingworthrodkin.com [mailto:jreyff@illingworthrodkin.com]
Sent: Wednesday, March 30, 2011 11:58 AM
To: Sigalle Michael
Subject: Questions on TACs

Hi Sigalle,
Hope you are getting a chance to enjoy some of this long awaited spring weather. Sorry to bug you with a few questions:

I'm checking in to see if the District has developed any guidance on train impacts. I believe there was some mention of this a while ago.
We have some clients who are wondering if this is an issue for them to develop near tracks. We have modeled some train activity south of San Jose, but have found that train assumptions are difficult to determine (i.e., number of locomotives, types, age, power setting, and speed).
The impacts look pretty substantial. In addition, we are not sure what CalTrain status is for electrifying the line.

Also, the issue of addressing acute exposures associated with acrolein from construction has come up. The District's Jan 2010 Health Risk Analysis Guidelines do not address acrolein, because of the lack of reliable emissions data. The questions is - should we be looking at acolein for construction and if so, what speciation factors should we use for EMFAC diesel emissions?

I appreciate any guidance you can provide.

--
James A. Reyff
Illingworth& Rodkin, Inc.
505 Petaluma Blvd. South
Petaluma, CA 94952
ph 707.766.7700x24
fx 707.766.7790

Appendix 7
Site Specific Facility Characteristics

TABLE 3-3
Site-Specific Facility Characteristics

Site ID	Site Name	Facility Type[(a)]	Pump Type/ Capacity (gpm)[(b)]	Proposed Connection Point	Alternate Connection Point	Proposed On-Site Water Treatment	Disinfection Location	Method for Achieving Water Quality Goals for Iron/Manganese
Site 1	Lake Merced Golf Club	Well plus chemical treatment, 4 rooms	Aboveground Vertical Turbine/ 300-600	SFPUC	Daly City	Disinfection, pH adjustment, (if needed), fluoridation	At site	Treatment not required.
Site 2	Park Plaza Meter	Well with fenced enclosure	Submersible Vertical Turbine/ 300-600	Daly City	None	Treatment not required	Westlake Pump Station	Treatment not required.
Site 3	Ben Franklin Intermediate School	Well with fenced enclosure	Submersible Vertical Turbine/ 300-600	Daly City	None	Treatment not required	Westlake Pump Station	Treatment not required.
Site 4	Garden Village Elementary School	Well with fenced enclosure	Submersible Vertical Turbine/ 300-600	Daly City	None	Treatment not required	Westlake Pump Station	Treatment not required.
Westlake Pump Station	Westlake Pump Station	Pump station and treatment upgrade	Up to 3 new booster pumps	Daly City	None	Disinfection, fluoridation	At site	Treatment not required.
Site 5 (Consolidated Treatment at Site 6)	Right-of-Way at Serra Bowl	Well with fenced enclosure	Submersible Vertical Turbine/ 300-600	SFPUC	None	Treatment not required	At Site 6	Treatment at Site 6
Site 6 (Consolidated Treatment at Site 6)	Right-of-Way at Colma BART	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 300-600	SFPUC	Cal Water	Disinfection, pH adjustment fluoridation, iron/manganese removal	At Site 6	Treatment

TABLE 3-3
Site-Specific Facility Characteristics

Site ID	Site Name	Facility Type[(a)]	Pump Type/ Capacity (gpm)[(b)]	Proposed Connection Point	Alternate Connection Point	Proposed On-Site Water Treatment	Disinfection Location	Method for Achieving Water Quality Goals for Iron/Manganese
Site 7 (Consolidated Treatment at Site 6)	Right-of-Way at Colma Boulevard	Well with fenced enclosure	Submersible Vertical Turbine/ 300-600	SFPUC	None	Treatment not required	At Site 6	Treatment at Site 6
Site 5 (On-Site Treatment)	Right-of-Way at Serra Bowl	Well plus chemical treatment, 5 rooms	Aboveground Vertical Turbine/ 300-600	SFPUC	Daly City	Disinfection, pH adjustment, fluoridation, iron/manganese removal	At site	Treatment not required.
Site 6 (On-Site Treatment)	Right-of-Way at Colma BART	Well plus chemical treatment, 5 rooms	Aboveground Vertical Turbine/ 300-600	SFPUC	Cal Water	Disinfection, pH adjustment, fluoridation, iron/manganese removal	At site	Treatment not required.
Site 7 (On-Site Treatment)	Right-of-Way at Colma Boulevard	Well plus chemical treatment, 5 rooms	Aboveground Vertical Turbine/ 300-600	SFPUC	Cal Water	Disinfection, pH adjustment, fluoridation, iron/manganese removal	At site	Treatment not required.
Site 8	Right-of-Way at Serramonte Boulevard	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine 300-600	Cal Water	SFPUC	Disinfection, pH adjustment (if needed[d]), fluoridation, iron/manganese removal	At site	Treatment

TABLE 3-3
Site-Specific Facility Characteristics

Site ID	Site Name	Facility Type[(a)]	Pump Type/ Capacity (gpm)[(b)]	Proposed Connection Point	Alternate Connection Point	Proposed On-Site Water Treatment	Disinfection Location	Method for Achieving Water Quality Goals for Iron/Manganese
Site 9	Treasure Island Trailer Court	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 200-500	SFPUC	None	Disinfection, pH adjustment fluoridation, iron/manganese removal	At site	Treatment
Site 10	Right-of-Way at Hickey Boulevard	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 200-500	Daly City	SFPUC	Disinfection, pH adjustment (if needed[d]), fluoridation, iron/manganese removal	At site	Treatment
Site 11	South San Francisco Main Area	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 200-500	Cal Water	SFPUC	Disinfection, pH adjustment (if needed[d]) fluoridation, iron/manganese removal	At site	Treatment
Site 12	Garden Chapel Funeral Home	Well plus chemical treatment, 3 rooms	Aboveground Vertical Turbine/ 200-500	SFPUC	Other SFPUC	Disinfection, pH adjustment	At site	Blending[(c)c]
Site 13	South San Francisco Linear Park	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 200-500	San Bruno	Cal Water	Disinfection, fluoridation, iron/manganese removal	At site	Treatment

TABLE 3-3
Site-Specific Facility Characteristics

Site ID	Site Name	Facility Type[a]	Pump Type/ Capacity (gpm)[b]	Proposed Connection Point	Alternate Connection Point	Proposed On-Site Water Treatment	Disinfection Location	Method for Achieving Water Quality Goals for Iron/Manganese
Site14	Golden Gate National Cemetery	Well with building enclosure	Submersible Vertical Turbine/ 300-600	San Bruno	SFPUC	Treatment not required	At Site 15	Treatment at Site 15
Site 15	Golden Gate National Cemetery	Well plus chemical treatment and filtration, 5 rooms	Aboveground Vertical Turbine/ 300-600	San Bruno	SFPUC	Disinfection, pH adjustment (if needed), fluoridation, iron/manganese removal	At site	Treatment
Site 16	Millbrae Corporation Yard	Well plus chemical treatment, 4 rooms	Aboveground Vertical Turbine/ 100-200	SFPUC	Other SFPUC	Disinfection, pH adjustment, fluoridation	At site	Treatment not required.
Site 17 (Alternate)	Standard Plumbing Supply	Well plus chemical treatment, 3 rooms	Aboveground Vertical Turbine/ 300-600	Cal Water	SFPUC	Disinfection, pH adjustment (if needed[d]) fluoridation	At site	Treatment not required.
Site 18 (Alternate)	Alta Loma Drive	Well plus chemical treatment, 3 rooms	Aboveground Vertical Turbine/ 200-500	SFPUC	Cal Water	Disinfection, pH adjustment (if needed) fluoridation	At site	Treatment not required.
Site 19 (Alternate)	Garden Chapel Funeral Home	Well with fenced enclosure	Submersible Vertical Turbine/ 200-500	SFPUC	Other SFPUC	Treatment not required	At Site 12	Blending[c]

a) Well station types are described in the text below and shown on the site plans
b) gpm is gallons per minute
c) Blending is mixing groundwater with other potable supply water
d pH adjustment only needed if alternate connection point is used