Impact Sciences, Inc., "Construction Health Risk Assessment for the Newhall Ranch Resource Management and Development Plan and Specific Plan" (April 2008)

Construction Health Risk Assessment
for the
Newhall Ranch Resource Management and Development Plan
and Specific Plan

Prepared for:

Newhall Land -
23823 Valencia Boulevard -
Valencia, California -

Prepared by:

Impact Sciences, Inc. -
3256 Penryn Road, Suite 220 -
Loomis, California 95650 -
Phone: (916) 652-6300 -
Fax: (916) 652-5335 -

With Assistance from:

Science Applications International Corporation -
600 South Lake Avenue, Suite 200 -
Pasadena, California 91106 -

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SUMMARY

The Newhall Land and Farming Company has proposed to build single-family residences, townhouses, condominiums, commercial and office buildings, a business park, and recreational areas under the Newhall Ranch Specific Plan (Specific Plan). Development of Newhall Ranch also includes the Newhall Ranch Resource Management and Development Plan (RMDP), which includes alteration of the Santa Clara River and several of its tributaries, installation of new and widened bridges across the Santa Clara River and several of its tributaries, installation of water quality control facilities, and other general improvements that would support the proposed development. Construction activities associated with the Specific Plan and RMDP would result in the generation of air pollutants during construction and operational activities. Approval of the Spineflower Conservation Plan would also facilitate construction of the remaining balance of the Valencia Commerce Center (VCC) planning area and the Entrada planning area and their associated air emissions.

This assessment evaluates the health impacts due to diesel exhaust particulate matter (DPM) emitted by diesel trucks and equipment associated with construction under the RMDP, and the Specific Plan, VCC, and Entrada planning areas. The sources of DPM include on-road heavy-duty trucks and diesel-powered construction equipment such as front-end loaders, bulldozers, and scrappers.

The South Coast Air Quality Management District (SCAQMD) recommends the following significance criteria for health risk assessments:

- Criterion 1: a greater than 10 in 1 million (10×10^{-6}) lifetime probability of contracting cancer; and
- Criterion 2: a health hazard index of 1.0 for evaluating the non-carcinogenic effects of toxic air contaminants.

Using SCAQMD's thresholds of significance, the health risk assessment finds that the maximum anticipated cancer risks associated with the construction of the proposed Project range from 0.7 to 4.6 in 1 million at maximally impacted residential, sensitive, and workplace receptors. The assessment also finds that the chronic hazard indices for noncancer health impacts are well below 1.0 at the maximally exposed receptors under this construction scenario. The health impacts associated with the construction of the proposed Project are below the significance criterion for cancer risk and are, therefore, less than significant.

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1.0 GENERAL

On August 27, 1998, the California Air Resources Board (CARB) designated particulate emissions from diesel-fueled engines or DPM as a toxic air contaminant. The proposed construction of the proposed Project will involve diesel trucks and diesel-powered equipment. This health risk assessment evaluates the health impacts from DPM to determine if such impacts are significant under CEQA.

1.1 Project Description

The proposed Newhall Ranch Specific Plan (Specific Plan), which was approved by the Los Angeles County Board of Supervisors in May 2003, includes the construction of a water reclamation plant and four "villages." These include (1) Landmark Village, (2) Mission Village, (3) Homestead Village, and (4) Potrero Village. Homestead Village is subdivided into development areas called Mesas West, Onion Field, Long Canyon, Potrero Ridge, and Chiquito Canyon. Furthermore, the project includes the Newhall Ranch Resource Management and Development Plan (RMDP), which covers the alteration of the Santa Clara River and several of its tributaries, installation of new and widened bridges across the Santa Clara River and several of its tributaries, installation of water quality control facilities, and other general improvements, that would support the proposed development. (Additional details regarding the RMDP are found in Section 2.0 of the EIS/EIR.) Approval of the Spineflower Conservation Plan would also facilitate construction of the remaining balance of the Valencia Commerce Center (VCC) planning area and the Entrada planning area. The proposed Project is anticipated to begin construction in 2008 and is scheduled for completion in 2030.

1.2 Thresholds of Significance

The SCAQMD *California Environmental Quality Act (CEQA) Air Quality Handbook*[1] recommends a lifetime probability of contracting cancer greater than 10 in 1 million (10×10^{-6}) as a significance threshold for evaluating health impacts from toxic air contaminants. The *CEQA Air Quality Handbook* further identifies a health hazard index of 1.0 as an additional significance threshold for evaluating non-carcinogenic effects of toxic air contaminants.

This analysis evaluates the ambient levels of DPM that would result from the construction under the RMDP and the Specific Plan, VCC, and Entrada planning areas and quantifies the potential health risk in the vicinity of the proposed Project due to the project's operations. A health risk assessment for both cancer risk and noncarcinogenic effects from DPM is presented below.

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1 CEQA Air Quality Handbook, South Coast Air Quality Management District, April 1993.

2.0 SOURCE DESCRIPTION

The on- and off-road vehicles and equipment that emit DPM and are associated with construction of the proposed Project include:

- Diesel-fueled construction equipment (e.g., scrapers, tractors, backhoes, rollers); and
- Heavy-duty diesel trucks (e.g., haul trucks and on-site water trucks).

These sources will travel through the proposed development area depending on the construction phases which include (1) earthwork and construction of structures under the RMDP and (2) grading, building construction, installation of infrastructure, and asphalt paving under the Specific Plan.

3.0 CALCULATION OF EMISSIONS

Unmitigated construction emissions during grading and other earthwork activities were estimated using spreadsheets based on emission factors obtained from the SCAQMD, OFFROAD2007 emission factors,[2] and other parameters provided in URBEMIS2007.[3] This approach was employed to analyze construction impacts using emission factors (i.e., off-road equipment and construction worker vehicles) specific to the SCAQMD, where construction activities would occur. Furthermore, URBEMIS2007 does not include construction subphases for installation of infrastructure improvements (e.g., roads, sewers and water lines) or the types of construction activities associated with the RMDP; therefore, spreadsheets also were used to estimate the equipment emissions and fugitive dust emissions associated with these activities. The emissions during the building construction phase (building construction, asphalt paving, and application of architectural coatings) were estimated using the URBEMIS2007 model directly. To estimate the building construction emissions for the villages that would be built over a period longer than five years, multiple URBEMIS runs were performed. Although URBEMIS2007 is capable of estimating construction emissions for periods longer than five years, the amount of construction throughout the period would vary. Therefore, because URBEMIS2007 estimates heavy-duty construction equipment based on the proposed land uses, multiple URBEMIS runs were conducted to achieve a more accurate representation of construction emissions. The emissions are estimated based on the information provided by the applicant and the assumptions discussed in the air quality section of the EIS/EIR.

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2 OFFROAD2007 is an emissions inventory model for various types of off-road equipment. The model can generate criteria air pollutant emission factors for various types of off-road equipment for different operational years.

3 URBEMIS2007 is a land use and transportation based air quality model developed and designed to estimate air emissions from new development projects, including construction emissions.

Newhall Ranch has a strategic alliance with the construction contractor Altfillisch Contractors, Inc. (ACI). As such, the specific heavy-duty construction equipment and respective horsepower ratings that would be likely to be used during grading operations was known at the time of this analysis. Emissions associated with development of basins and buried bank stabilization (i.e., direct RMDP activities) and overall Specific Plan, VCC, and Entrada grading (i.e., indirect RMDP and indirect SCP) were estimated using emissions factors obtained from the SCAQMD website.[4] The construction equipment emission factors developed by the SCAQMD from OFFROAD2007 are specific to the South Coast Air Basin. The SCAQMD provides a list of each type of construction equipment including various horsepower rating cut-points for each type of equipment. A corresponding South Coast Air Basin-specific emission factor is provided for each horsepower rating. Due to the specific heavy-duty construction equipment and respective horsepower ratings for grading activities being known, emission factors for all grading equipment (i.e., direct RMDP, indirect RMDP, and indirect SCP) were interpolated for specific horsepower ratings provided by ACI.

Emission factors used to estimate construction emissions associated with infrastructure improvements were also obtained from the SCAQMD website. However, due to the uncertainty of the contractor and horsepower ratings of equipment needed, nominal horsepower ratings provided by the applicant were used to interpolate South Coast-specific emission factors. As mentioned above, emissions associated with building construction (i.e., building construction, asphalt paving, architectural coating) were estimated using URBEMIS2007. URBEMIS2007 also uses emission factors from OFFROAD2007 specific to the South Coast Air Basin. However, URBEMIS2007 uses default horsepower ratings for construction equipment.

The sources of emissions will include on-road and off-road vehicles and equipment typical of those associated with construction activities. Construction emissions were estimated for each quarter of the entire construction period from 2008 to 2030. In most cases, concurrent construction activity could occur in multiple areas throughout the Newhall Ranch development. For this analysis, the total DPM emissions associated with grading, infrastructure improvements, and building construction for each subarea were calculated. For grading and infrastructure activities, the maximum daily emissions occurring within a particular year were multiplied by the corresponding number of days of activity to calculate annual emissions. For building construction emissions, URBEMIS2007 can calculate annual emissions in tons per year, which were then converted to pounds per year. Total DPM emissions for each subarea were calculated by adding the annual emissions that would occur each year throughout the complete construction period.

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4 South Coast Air Quality Management District, "Off-road Mobile Source Emission Factors," http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html. 2007.

This analysis also assumed that the maximum area under construction on any day would vary depending on the characteristics of the earthmoving required for each village. For instance, for areas with relatively high amounts of earthmoving, such as Potrero Village and Mission Village, the maximum area under construction on any day would be 20 acres since more soil must be moved to complete the earthmoving activity under the anticipated schedule. Areas with moderate amounts of earthmoving, such as Landmark Village, would be 12 acres and areas with less earthmoving, such as Entrada North Commercial and the Water Reclamation Plant, would be 5 acres. These acreage figures were obtained through discussions with the applicant.

The DPM emissions for each of the modeled years are included in **Appendix A**. Additional details regarding the estimated construction emissions are found in the air quality section of the EIS/EIR.

Residents of each subarea would be exposed to different amounts of DPM emissions based on their year of first occupancy. For instance, for subareas such as Landmark Village, which would begin occupation in 2010, residents would be exposed to 21 years (i.e., 2010 to 2030) of overall project construction emissions. However, for subareas such as Potrero Village, which would begin occupation in 2015, residents would only be exposed to 16 years (i.e., 2015 to 2030) of overall project construction emissions. Therefore, for the purpose of this analysis, a separate receptor exposure scenario was modeled for each subarea (i.e., Landmark Village, Homestead South, Homestead North, Potrero Village, Entrada, and VCC as well as existing and future receptors outside the boundary of the project site. The emission rates (i.e., pounds per day) used in each receptor scenario were time-adjusted to account for the different exposure periods. Therefore, because Potrero Village residents would not be exposed to emissions prior to 2015 (i.e., first occupancy), only those emissions occurring from 2015 to the completion of construction were modeled in the Potrero Village receptor scenario. Total emissions from each construction source occurring within that exposure period (i.e., 2015 to 2030) were divided by 70 years and 365 days to calculate the average daily emissions occurring over the construction period.[5] For the purposes of the dispersion modeling, the daily average emission rates were divided by 9 hours and the resultant values were applied to each construction hour of the day. Construction activities were assumed to occur for 9 hours per day. **Table 1, Average Hourly and Annual Emission Rates for Off-Site and VCC Receptor**

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5 Cancer risk calculations for residential receptors typically assume a 70-year (lifetime) exposure. For this assessment, the DPM emissions would occur for varying lengths of time (16 to 23 years) depending on the subarea. To adjust for the finite, but variable, time that emissions would occur, the total DPM emissions associated with construction in a given subarea were prorated by dividing them by 70 years to develop a 70-year-equivalent emission rate. The cancer risk calculations discussed in **Section 5.1**, then use 70 years as the exposure period. Accordingly, these mathematical calculations reflect the variable exposure to DPM emissions from several source areas over the construction period while preserving the cancer risk calculations, which assume a 70-year lifetime, to convert modeled DPM concentrations to cancer risk.

Scenario, summarizes the average hourly and annual emission rates for off-site and existing VCC receptors. Off-site receptors and those currently occupying VCC would be exposed to maximum amount of construction DPM emissions due to their exposure period. However, the combination of exposure period and other factors such as proximity to construction sources, wind direction, and level of construction activity ultimately influence the potential health risk on a receptor.

Receptors at each subarea or village were assumed to be exposed to the emissions presented in **Table 1** through **Table 5**. Thus, this assessment presents a hypothetical receptor scenario for each subarea or village in order to estimate a potential range of health impacts. The first occupancy date shown in these tables is the date of occupancy for the first hypothetical receptor in each village or subarea. The source of construction emissions is the location of construction activity (i.e., each village or subarea) and the associated emissions that would follow the first occupancy date until the completion of construction. Due to the changes in the location of construction activities, the types and numbers of motor vehicles and equipment, and the reductions in DPM emissions due to California and federal regulations throughout the 23-year construction period, a more accurate representation would require substantially more complexity than available using existing modeling tools. Accordingly, this approach overpredicts the potential health impacts in order to provide a conservative (i.e., health protective) assessment.

Table 1
Average Hourly and Annual Emission Rates for Off-Site and VCC Receptor Scenario

First Occupancy Year	Source of Construction Emissions	DPM (lbs/hr)	DPM (lbs/yr)
2008	Landmark	0.06	211.76
	WRP	0.01	22.43
	Mission	0.18	606.38
	South Homestead	0.19	612.43
	North Homestead	0.11	349.33
	Potrero	0.19	633.77
	Entrada	0.04	130.99
	Valencia Commerce Center	0.03	112.90

Source: *Impact Sciences, Inc. (2008).*
lbs/hr = pounds per hour
lbs/yr = pounds per year

Table 2
Average Hourly and Annual Emission Rates for Landmark Village Receptor Scenario

First Occupancy Year	Source of Construction Emissions	DPM (lbs/hr)	DPM (lbs/yr)
2010	Landmark	0.01	28.93
	Mission	0.17	558.92
	South Homestead	0.19	612.43
	North Homestead	0.11	349.33
	Potrero	0.19	633.77
	Entrada	0.04	130.99
	Valencia Commerce Center	0.03	112.90

Source: *Impact Sciences, Inc. (2008).*
lbs/hr = pounds per hour
lbs/yr = pounds per year

Table 3
Average Hourly and Annual Emission Rates for Mission Village Receptor Scenario

First Occupancy Year	Source of Construction Emissions	DPM (lbs/hr)	DPM (lbs/yr)
2011	Landmark	0.00	15.43
	Mission	0.14	451.75
	South Homestead	0.19	612.43
	North Homestead	0.11	349.33
	Potrero	0.19	633.77
	Entrada	0.04	130.99
	Valencia Commerce Center	0.03	112.90

Source: *Impact Sciences, Inc. (2008).*
lbs/hr = pounds per hour
lbs/yr = pounds per year

Table 4
Average Hourly and Annual Emission Rates for South Homestead and Entrada Receptor Scenario

First Occupancy Year	Source of Construction Emissions	DPM (lbs/hr)	DPM (lbs/yr)
2013	Landmark	0.00	4.29
	Mission	0.08	266.13
	South Homestead	0.13	417.40
	North Homestead	0.11	349.33
	Potrero	0.16	517.40
	Entrada	0.01	40.39
	Valencia Commerce Center	0.00	8.39

Source: *Impact Sciences, Inc. 2008*
lbs/hr = pounds per hour
lbs/yr = pounds per year

Table 5
Average Hourly and Annual Emission Rates for North Homestead and Potrero Village Receptor Scenario

First Occupancy Year	Source of Construction Emissions	DPM (lbs/hr)	DPM (lbs/yr)
2015	Mission	0.04	117.55
	South Homestead	0.03	92.48
	North Homestead	0.11	349.33
	Potrero	0.10	338.29
	Entrada	0.01	27.43

Source: *Impact Sciences, Inc. (2008).*
lbs/hr = pounds per hour
lbs/yr = pounds per year

4.0 MODELING METHODOLOGY

4.1 Modeling Approach

The dispersion model Industrial Source Complex – Short Term (ISCST3)[6] was used to model the air quality impacts of DPM emissions during construction under the RMDP and the Specific Plan, VCC, and Entrada planning areas. This model can estimate the air quality impacts of single or multiple point, area, or volume sources using actual meteorological conditions. Volume sources were used to represent the DPM emissions from trucks and heavy-duty construction equipment. Separate model runs were conducted for each village or subarea because occupation would occur at different times. For instance, since Landmark Village begins construction in 2008, occupation would begin in 2010. Therefore, occupants of Landmark Village would be exposed to a longer duration of DPM than occupants of other villages.

4.2 Emission Sources

A volume source was placed in the center of each village or subarea being modeled in each scenario. This location represented an average distance between the volume source and potential receptors outside of the village or subarea. That is, the distance between the volume sources and the outside receptors would fluctuate over time, being closer at times but sometimes greater. Thus, over the construction period, the center of the village or subarea represents the average or long-term conditions. The overall area covered by the volume sources on any day would vary depending on the characteristics of each village or subarea as discussed in Section 2.0. The areas covered by the volume source for each village are shown in **Table 6, Source Descriptions**.

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6 Lakes Environmental ISC-AERMOD VIEW Software (Version 5.8.1)

Table 6
Source Descriptions

Area Source ID	Village	Area in Acres
DPM_LMK	Landmark	12
DPM_MIS	Mission	20
DPM_ENT	Entrada	12
DPM_HSO	Homestead South	12
DPM_PTR	Potrero	20
DPM_CHI	Homestead North – Chiquito Canyon	5
DPM_HNC	Homestead North - Central	12
DPM_HNW	Homestead North - Western	12
DPM_VCC	Valencia Commerce Center	12

Source: Impact Sciences, Inc. (2008).

The volume sources were placed approximately 500 meters from the receptor grid within each village (see Section 4.3 for discussion of the receptor locations), based on the assumption that a buffer zone would exist between construction sites and existing residents or workplaces in the village.

The volume sources representing the emissions from the trucks and equipment were given an initial height of 5 meters to account for the height of the exhaust stack and initial plume rise of the heated exhaust. This value is used by the SCAQMD to characterize the construction equipment emissions under its Localized Significance Threshold methodology.[7] An initial vertical dimension of 1.16 meters was also applied to the volume sources.

4.3 Receptors Used for Evaluating Modeled Impacts

Discrete Cartesian receptors were used to determine air quality impacts in the vicinity of the project site. For each modeled scenario, receptors were placed throughout the entire village, except in areas within 500 meters of a volume source in the same village or an adjacent village. Since the HRA is based on long-term averages, it was assumed that there would be, in general, 500 meters between a receptor and an active grading or construction site. For purposes of this assessment, all receptors in the villages were assumed to be residential receptors, and the cancer risk calculations followed the methods identified in Section 5.0. Sensitive receptors, such as schools, would exist within the villages, but the exact locations are unknown at this time and the residential exposures are more conservative (i.e., they would occur for a

7 South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology*, June 2003, p. 2-2.

much longer period of time). Off-site sensitive receptors for this assessment were six existing schools located near the Project site. The nearest workplace receptors would be present in the existing and future portions of the VCC.

In order to model on-site receptors within each village, the receptors within each village were placed 100 meters apart. For those modeling scenarios concerned with offsite impacts, such as offsite worker or school receptors, the field receptors outside of the Newhall Ranch project site were spaced at 100 meters out to approximately 1.0 kilometer from the project boundary and 200 meters from 1.0 to 2.0 kilometers from the project boundary in order to cover areas of existing and future development.

Flagpole receptors with a height of 2 meters to represent breathing height were used for the dispersion modeling. Diagrams of the receptor locations for each modeled year are shown in **Appendix B**.

4.4 Meteorology and Monitoring Data

Newhall was identified as the nearest meteorological monitoring station for the proposed Project. Monitoring data were obtained from SCAQMD website.[8] For the vicinity of the site, the "Newhall 1981" meteorological data file was selected. In this data set, the surface wind speeds and directions were collected at the SCAQMD's Newhall Monitoring Station (Station ID 51115), while the upper air sounding data used to estimate hourly mixing heights were gathered from the Ontario International Airport. The surface wind directions are presented graphically in a polar diagram generated by the Wind Rose software. This diagram is shown in **Figure 1, Wind Rose for the Newhall Monitoring Station**.

4.5 Model Options:

The following SCAQMD model options were selected:

- Urban land use with simple, intermediate and complex terrain;
- No gradual plume rise;
- No stack-tip downwash (the HRA does not incorporate point sources);
- Buoyancy-induced dispersion;
- Default vertical wind profile exponents;
- Default vertical potential temperature gradients;
- No plume deposition (wet or dry) or plume depletion;
- No calms processing;
- No missing data processing; and
- Averaging period: annual.

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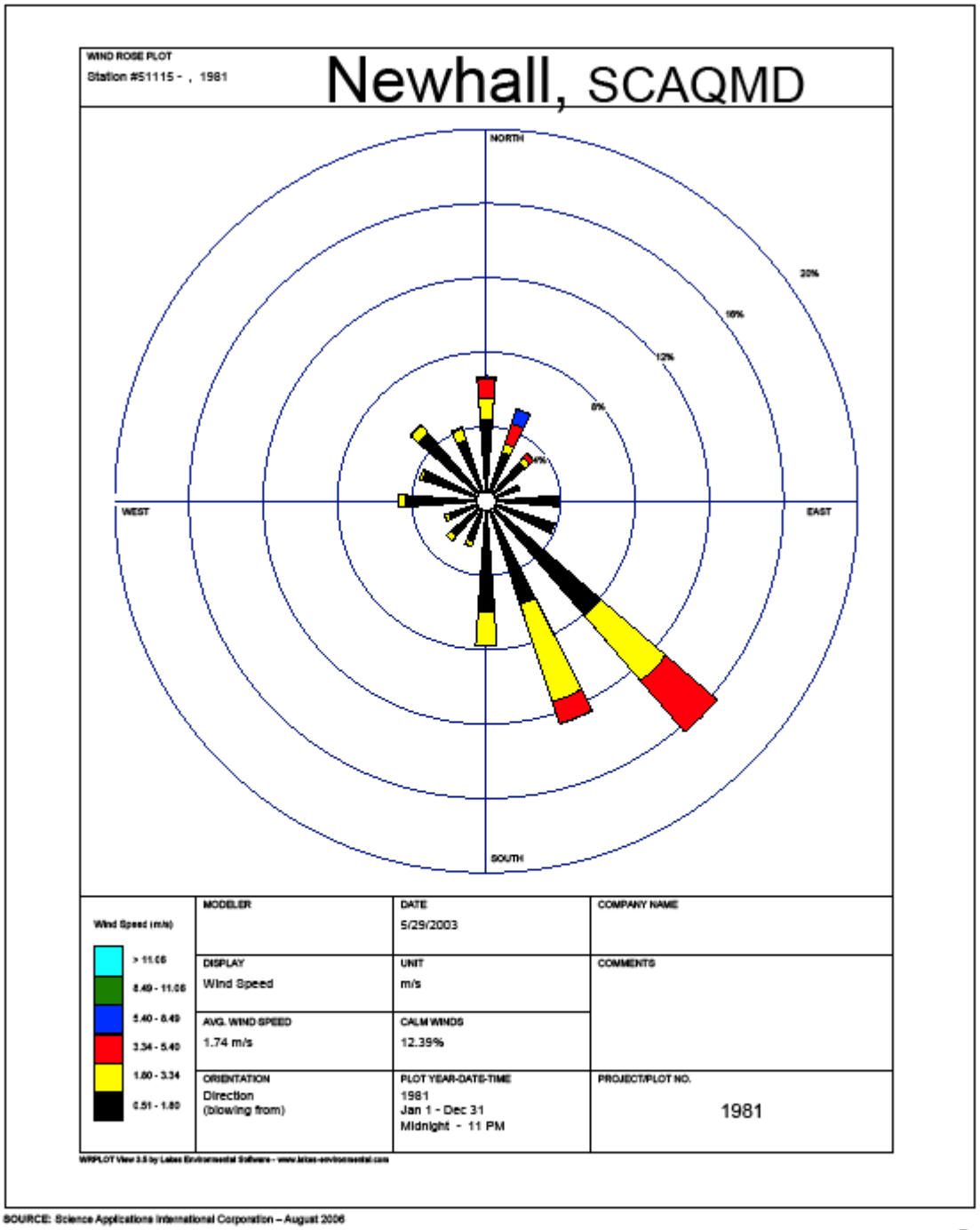
8 South Coast Air Quality Management District, "Meteorological Data for Dispersion Modeling," http://www.aqmd.gov/smog/metdata/MetDataTable1.html. 2005.

Figure 1
Wind Rose for the Newhall Monitoring Station



SOURCE: Science Applications International Corporation – August 2006

FIGURE 1

Wind Rose – Newhall Station

32-214-04/08

4.6 Terrain Data

Terrain heights for all receptors were derived from digital terrain elevations developed by the U.S. Geological Survey by using its Digital Elevation Model (DEM). The DEM data provides terrain elevations with 1-meter vertical resolution and 10-meter horizontal resolution based on a Universal Transverse Mercator (UTM) coordinate system. The UTM coordinates are referenced to either the North American Datum of 1927 (NAD 27) or NAD 83. For each receptor location, the terrain elevation was set to the elevation for the closest DEM grid point.

5.0 ESTIMATION OF EXPOSURE THROUGH INHALATION

5.1 Cancer Risk

This assessment considers exposure via inhalation only. The potential exposure through other pathways (e.g., ingestion) requires substance and site-specific data, and the specific parameters for DPM are not known for these pathways.[9] This assessment assumes that residential receptors are exposed to emissions continuously during the construction period, averaged over 70 years (see Footnote 5). The duration of exposure would vary depending on the village in which the receptor is located. Because not all villages are first occupied at the same time, some residential receptors would be exposed to DPM for a longer duration. For instance, Landmark Village would be occupied in 2010; thus, receptors in Landmark Village would be exposed to DPM emissions from 2010 through 2030. Receptors located in Potrero Village would be exposed to DPM emissions from 2015 through 2030. Existing offsite residential receptors would be exposed to DPM emissions during the entire construction period from 2008 through 2030.

This assessment assumes that workplace receptors are exposed to emissions continuously during the construction period, averaged over a 40-year working lifetime. Workplace receptors at the remaining area of the VCC would be exposed to DPM emissions from first occupancy in 2013 through 2030. Existing offsite workplace receptors would be exposed to DPM emissions during the entire construction period from 2008 through 2030. School receptors were assumed to be exposed to emissions during the first 9 years of the construction period since the total emissions are the greatest during that time. The Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance*

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9 "Report to the Air Resources Board on the Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Part A Exposure Assessment," Approved by the Scientific Review Panel, April 1998.

Manual for Preparation of Health Risk Assessments[10] (OEHHA Guidance) provides direction with respect to the evaluation of cancer risk calculations for shorter-term exposures (i.e., less than a maximum theoretical project life of 70 years). The OEHHA Guidance states:

> *"[A]s the exposure duration decreases the uncertainties introduced by applying cancer potency factors derived from very long term studies increases. Short-term high exposures are not necessarily equivalent to longer-term lower exposures even when the total dose is the same. OEHHA therefore does not support the use of current cancer potency factor to evaluate cancer risk for exposures of less than 9 years. If such risk must be evaluated, we recommend assuming that average daily dose for short-term exposure is assumed to last for a minimum of 9 years."*[11]

Exposure through inhalation is a function of the respiration rate and the concentration of a substance in the air and is calculated by using the following formulas:[12]

$$\text{Risk} = \text{Dose-inhalation} * \text{Inhalation cancer potency factor} \quad \text{(Equation 1)}$$

where:

$$\text{Inhalation cancer potency factor (CPF)} = 1.1 \text{ (milligram per kilogram per day)}^{-1} \text{ (for DPM)}$$

$$\text{Dose Inhalation} = C_{air} * DBR * A * EF * ED * 10^{-6} / AT \quad \text{(Equation 2)}$$

where:

C_{air} = concentration in microgram per cubic meter

DBR = breathing rate in liter per kilogram of body weight per day

A = inhalation absorption factor (1 for DPM)

EF = exposure frequency in days per year

ED = exposure duration in years

AT = averaging time period over which exposure is averaged in days (25,550 days for 70 years)

For modeling purposes, the default values suggested by the OEHHA Guidance were used for the dose inhalation calculation except for daily breathing rate. The default values used in the model for the different receptor types are as follows:

<u>Residential Receptor:</u>

DBR = 302 liters/kilogram of body weight/day

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10 "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments," California Environmental Protection Agency Office of Environmental Health Hazard Assessment, August 2003.

11 Ibid., p. 8-4.

12 Ibid., p. 5-16.

EF = 350 days/year

ED = 70 years

AT = 25,550 days

A = 1

Workplace Receptor:

DBR = 186 liters/kilogram of body weight/day

EF = 245 days/year

ED = 40 years

AT = 25,550 days

A = 1

School Receptor:

DBR = 581 liters/kilogram of body weight/day

EF = 261 days/year

ED = 9 years

AT = 25,550 days

A = 1

In accordance with CARB policy,[13] a breathing rate equal to the 80th percentile should be used in single-point risk management decisions, such as those subject to a threshold or standard, for which the cancer risk is entirely associated with inhalation and residential cancer risk is being evaluated. These two criteria are met for this assessment. Thus, a breathing rate of 302 liters per kilogram of body weight per day was used for the residential cancer risk calculations. The breathing rates for workplace and school receptors were also based on the OEHHA Guidance.

The risk is calculated by multiplying the dose by the inhalation potency factor. The inhalation potency factor for DPM is 1.1.[14] To calculate the cancer risk, a multiplying factor was derived based on the information discussed above. This multiplying factor, when multiplied by the concentration that the dispersion model calculates, results in risk in 1 million at a particular receptor. The multiplying factor for residential receptors was calculated as follows:

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13 California Air Resources Board and Office of Environmental Health Hazard Assessment, *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk*, October 9, 2003.

14 "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments," California Environmental Protection Agency Office of Environmental Health Hazard Assessment, p. 7-4, August 2003.

$$\text{Multiplying factor} = CPF * (DBR * A * EF * ED * 10^{-6}/AT) * 10^{6}$$

$$= 1.1 * (302 \text{ L/kg body weight-day} * 1 * 350 \text{ day/yr} * 70 \text{ yr} * 10^{-6}/25{,}550 \text{ days}) * 10^{6} = 318.55 (\mu g/m^3)^{-1}$$

The multiplying factor for workplace and school receptors were calculated using the same equation above. The factor for workplace receptors was calculated to be 78.48 $(\mu g/m^3)^{-1}$. The factor for school receptors was calculated to be 58.76 $(\mu g/m^3)^{-1}$.

Table 7, Summary of Maximum Modeled Cancer Risks of Diesel Particulate Matter from Construction, provides the modeled DPM concentrations and cancer risk values associated with each modeled year. Selected results of the dispersion modeling are shown in **Appendix C**. The modeled cancer risks would not exceed the SCAQMD significance threshold of 10 in 1 million for all receptor types.

Table 7
Summary of Maximum Modeled
Cancer Risks of Diesel Particulate Matter
from Construction

Receptor Type	Receptor Scenario	Maximum Annual Average DPM Concentration ($\mu g/m^3$)	Maximum Modeled Cancer Risk
Residential	Landmark Village	0.0084	2.7×10^{-6}
	Homestead North	0.0043	1.4×10^{-6}
	Homestead South	0.0145	4.6×10^{-6}
	Mission Village	0.0130	4.1×10^{-6}
	Potrero	0.0093	3.0×10^{-6}
	Entrada	0.0029	0.9×10^{-6}
	Off-Site	0.0053	1.7×10^{-6}
Workplace	VCC	0.0036	0.3×10^{-6}
	Off-Site	0.0095	0.7×10^{-6}
School	Live Oak[1]	0.00240	1.4×10^{-6}

Source: Impact Sciences, Inc. (2008).

[1] *Cancer risks at six existing schools were evaluated. The maximum impact would occur at Live Oak Elementary School. Estimated cancer risks at the other five schools ranged from 0.5 to 1.2 x 10^{-6}.*

5.2 Chronic Noncancer Health Impacts

In addition to the potential cancer risk, DPM has chronic (i.e., long-term) noncancer health impacts. The chronic noncancer health impacts are based on annual average DPM concentrations and were determined by modeling the four years with the highest DPM emissions.

The chronic noncancer inhalation hazard indices for the proposed Project were calculated by dividing the modeled annual average concentrations of DPM for each of the four years by the Reference Exposure Level (REL). The OEHHA has recommended an ambient concentration of 5 micrograms per cubic meter ($\mu g/m^3$) as the chronic inhalation REL for DPM. The REL is the concentration at or below which no adverse health effects are anticipated. No inhalation REL for acute (i.e., short-term) effects has been determined by the OEHHA.

The maximum DPM concentrations and chronic hazard indices associated with each modeled year at any receptor under any receptor scenario are shown in **Table 8, Summary of Maximum Modeled Noncancer Health Impacts of Diesel Exhaust Particulate Matter from Construction**. As shown, the net chronic hazard indices at the points of maximum impact are less than the SCAQMD significance threshold of 1.0 for noncancer health impacts for all modeled scenarios.

Table 8
Summary of Maximum Modeled Noncancer Health Impacts of Diesel Particulate Matter from Construction

Receptor	Maximum Annual Average DPM Concentration ($\mu g/m^3$)	Chronic Hazard Index
2011	0.202	0.040
2012	0.180	0.036
2013	0.489	0.098
2015	0.177	0.035

Source: Impact Sciences, Inc. (2008).

6.0 CONCLUSIONS

Based on this analysis, construction of the proposed Project would not exceed the SCAQMD significance threshold of a cancer risk of 10 in 1 million for all modeled scenarios because the maximum net anticipated cancer risks at the maximally impacted receptors range from 0.7 to 4.6 in 1 million. The chronic hazard indices for noncancer health impacts are below the significance threshold of 1.0 at the maximally exposed receptors. It should be noted that these health impacts do not reflect the reductions in diesel emissions from trucks and equipment that will occur during the construction period as a result of increasingly stringent emission standards, many of which will take effect in the next few years. The actual levels throughout the construction period are likely to be lower. Accordingly, the actual health impacts due to construction of the proposed Project may be less than those presented in this assessment.

Nevertheless, the health risk assessment has found the cancer risk and hazard indices for noncancer health impacts to be less than significant.

APPENDIX A

Newhall Ranch Construction DPM Emissions

Newhall Ranch Unmitigated Diesel Particulate Matter Annual Emissions

Construction Year	Areas of Activity	Emissions (lbs/year)	Emissions (tons/year)
2008			
	Landmark Village	5,794.71	2.897
	Total	5,794.71	2.897
2009			
	Landmark Village	7,003.13	3.502
	Mission Village	3,322.07	1.661
	WRP	1,570.11	0.785
	Total	11,895.32	5.948
2010			
	Landmark Village	945.41	0.473
	Mission Village	7,502.02	3.751
	Total	8,447.43	4.224
2011			
	Adobe Canyon	3,059.87	1.530
	Entrada North Commercial	1,398.74	0.699
	Entrada Terrazo	2,381.78	1.191
	Landmark	400.00	0.200
	Mesas West	3,856.85	1.928
	Mission Village	6,838.20	3.419
	VCC	4,276.24	2.138
	Total	22,211.68	11.106
2012			
	Entrada North Commercial	36.15	0.018
	Entrada Terrazo	2,525.71	1.263
	Landmark Village	380.00	0.190
	Long Canyon North	3,794.78	1.897
	Mesas West	2,940.97	1.470
	Mission Village	6,155.04	3.078
	Potrero Village	8,145.71	4.073
	VCC	3,040.06	1.520
	Total	27,018.42	13.509

Newhall Ranch Unmitigated Diesel Particulate Matter Annual Emissions

Construction Year	Areas of Activity	Emissions (lbs/year)	Emissions (tons/year)
2013			
	Entrada Terrazo	613.47	0.307
	Homestead	460.00	0.230
	Landmark	300.00	0.150
	Long Canyon North	1,216.05	0.608
	Long Canyon South	5,162.02	2.581
	Mesas West	2,320.54	1.160
	Mission Village	5,642.69	2.821
	Onion Field	3,918.28	1.959
	Potrero Ridge	2,449.51	1.225
	Potrero Village	6,562.52	3.281
	VCC	466.98	0.233
	Total	29,112.05	14.556
2014			
	Entrada Terrazo	293.75	0.147
	Homestead	280.00	0.140
	Long Canyon North	79.56	0.040
	Long Canyon South	3,735.95	1.868
	Mission Village	4,758.46	2.379
	Onion Field	666.37	0.333
	Potrero Ridge	2,455.99	1.228
	Potrero Village	5,975.47	2.988
	VCC	120.00	0.060
	Total	18,365.54	9.183
2015			
	Chiquito Canyon	5,575.92	2.788
	Entrada North Commercial	280.00	0.140
	Entrada Terrazo	260.00	0.130
	Homestead	260.00	0.130
	Homestead Central	5,575.92	2.788
	Long Canyon South	3,402.55	1.701
	Mission Village	4,340.03	2.170
	Onion Field	53.34	0.027
	Potrero Ridge	796.46	0.398
	Potrero Village	5,584.66	2.792
	Total	26,128.89	13.064

Newhall Ranch Unmitigated Diesel Particulate Matter Annual Emissions

Construction Year	Areas of Activity	Emissions (lbs/year)	Emissions (tons/year)
2016			
	Chiquita Estates	787.54	0.394
	Chiquito Canyon	1,512.31	0.756
	Entrada North Commercial	180.00	0.090
	Entrada Terrazo	240.00	0.120
	Homestead	220.00	0.110
	Homestead Central	3,428.12	1.714
	Homestead West	2,841.73	1.421
	Long Canyon South	720.95	0.360
	Mission Village	2,528.20	1.264
	Potrero Village	4,852.60	2.426
	Total	17,311.45	8.656
2017			
	Chiquito Canyon	163.64	0.082
	Entrada North Commercial	160.00	0.080
	Entrada Terrazo	160.00	0.080
	Homestead	200.00	0.100
	Homestead West	3,357.57	1.679
	Mission Village	200.00	0.100
	Potrero Village	4,396.96	2.198
	Total	8,638.17	4.319
2018			
	Chiquito Canyon	139.00	0.069
	Entrada North Commercial	140.00	0.070
	Entrada Terrazo	140.00	0.070
	Homestead	260.00	0.130
	Homestead West	151.75	0.076
	Mission Village	180.00	0.090
	Potrero Village	4,053.76	2.027
	Total	5,064.51	2.532
2019			
	Homestead	140	0.070
	Entrada North Commercial	120	0.060
	Entrada Terrazo	120	0.060
	Mission Village	140	0.070
	Potrero Village	3,352.06	1.676
	Total	3,872.06	1.936

Newhall Ranch Unmitigated Diesel Particulate Matter Annual Emissions

Construction Year	Areas of Activity	Emissions (lbs/year)	Emissions (tons/year)
2020			
	Homestead	140.00	0.070
	Entrada North Commercial	60.00	0.030
	Entrada Terrazo	60.00	0.030
	Mission Village	140.00	0.070
	Potrero Village	140.00	0.070
	Total	540.00	0.270
2021			
	Homestead	120.00	0.060
	Mission Village	180.00	0.090
	Potrero Village	120.00	0.060
	Total	420.00	0.210
2022			
	Homestead	120.00	0.060
	Mission Village	120.00	0.060
	Potrero Village	180.00	0.090
	Total	420.00	0.210
2023			
	Homestead	180.00	0.090
	Mission Village	120.00	0.060
	Potrero Village	120.00	0.060
	Total	420.00	0.210

Newhall Ranch Unmitigated Diesel Particulate Matter Annual Emissions

Construction Year	Areas of Activity	Emissions (lbs/year)	Emissions (tons/year)
2024			
	Homestead	140.00	0.070
	Mission Village	140.00	0.070
	Potrero Village	140.00	0.070
	Total	420.00	0.210
2025			
	Homestead	120.00	0.060
	Mission Village	120.00	0.060
	Potrero Village	120.00	0.060
	Total	360.00	0.180
2026			
	Homestead	120.00	0.060
	Mission Village	20.00	0.010
	Potrero Village	120.00	0.060
	Total	260.00	0.130
2027			
	Homestead	140.00	0.070
	Potrero Village	180.00	0.090
	Total	320.00	0.160
2028			
	Homestead	100.00	0.050
	Potrero Village	120.00	0.060
	Total	220.00	0.110
2029			
	Homestead	100.00	0.050
	Potrero Village	120.00	0.060
	Total	220.00	0.110
2030			
	Homestead	60.00	0.030
	Potrero Village	80.00	0.040
	Total	140.00	0.070

OFF-SITE/VALENCIA COMMERCE CENTER RECEPTORS

First Occupancy Present

Unmitigated

	Average Emissions			(lbs/year)																							
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**211.76**	**0.06**	**0.0081**	5,794.71	7,003.13	945.41	400.00	380.00	300.00																		
WRP	**22.43**	**0.01**	**0.0009**		1,570.11																						
Mission Village	**606.38**	**0.18**	**0.0233**		3,322.07	7,502.02	6,838.20	6,155.04	5,642.69	4,758.46	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00					
Homestead South	**612.43**	**0.19**	**0.0235**																								
Adobe Canyon	43.71		0.0017				3,059.87																				
Homestead South Construction	32.01		0.0012						460.00	280.00	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	72.72		0.0028					3,794.78	1,216.05	79.56																	
Long Canyon South	186.02		0.0071						5,162.02	3,735.95	3,402.55	720.95															
Mesas West	130.26		0.0050				3,856.85	2,940.97	2,320.54																		
Onion Field	66.26		0.0025						3,918.28	666.37	53.34																
Potrero Ridge	81.46		0.0031						2,449.51	2,455.99	796.46																
Homestead North	**349.33**	**0.11**	**0.0134**																								
Chiquita Estates	11.25		0.0004									787.54															
Chiquito Canyon	105.58		0.0040								5,575.92	1,512.31	163.64	139.00													
Homestead North Construction	13.14		0.0005								98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049								5,575.92	3,428.12															
Homestead West	90.73		0.0035									2,841.73	3,357.57	151.75													
Potrero Canyon (Village)	**633.77**	**0.19**	**0.0243**					8,145.71	6,562.52	5,975.47	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**130.99**	**0.04**	**0.0050**																								
Entrada North Commercial	33.93		0.0013				1,398.74	36.15			280.00	180.00	160.00	140.00	120.00	60.00											
Entrada Terrazo	97.07		0.0037				2,381.78	2,525.71	613.47	293.75	260.00	240.00	160.00	140.00	120.00	60.00											
Valencia Commerce Center	**112.90**	**0.03**	**0.0043**				4,276.24	3,040.06	466.98	120.00																	
	Total Emissions			5,794.71	11,895.32	8,447.43	22,211.68	27,018.42	29,112.05	18,365.54	26,128.89	17,311.45	8,638.17	5,064.51	3,872.06	540.00	420.00	420.00	420.00	420.00	360.00	260.00	320.00	220.00	220.00	140.00

LANDMARK RECEPTORS
First Occupancy 7/1/2010
Unmitigated

	Average Emissions			(lbs/day)																			
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**28.93**	**0.01**	**0.0011**	945.41	400.00	380.00	300.00																	
WRP	**0.00**	**0.00**	**0.0000**																					
Mission Village	**558.92**	**0.17**	**0.0214**	7,502.02	6,838.20	6,155.04	5,642.69	4,758.46	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**612.43**	**0.19**	**0.0235**																					
Adobe Canyon	43.71		0.0017		3,059.87																			
Homestead South Construction	32.01		0.0012				460.00	280.00	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	72.72		0.0028			3,794.78	1,216.05	79.56																
Long Canyon South	186.02		0.0071				5,162.02	3,735.95	3,402.55	720.95														
Mesas West	130.26		0.0050		3,856.85	2,940.97	2,320.54																	
Onion Field	66.26		0.0025				3,918.28	666.37	53.34															
Potrero Ridge	81.46		0.0031				2,449.51	2,455.99	796.46															
Homestead North	**349.33**	**0.11**	**0.0134**																					
Chiquita Estates	11.25		0.0004							787.54														
Chiquito Canyon	105.58		0.0040						5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.0005						98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049						5,575.92	3,428.12														
Homestead West	90.73		0.0035							2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**633.77**	**0.19**	**0.0243**			8,145.71	6,562.52	5,975.47	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**130.99**	**0.04**	**0.0050**																					
Entrada North Commercial	33.93		0.0013		1,398.74	36.15			280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	97.07		0.0037		2,381.78	2,525.71	613.47	293.75	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**112.90**	**0.03**	**0.0043**		4,276.24	3,040.06	466.98	120.00																

MISSION VILLAGE RECEPTORS
First Occupancy 7/1/2011
Unmitigated

	Average Emissions			(lbs/day)																	
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**15.43**	**0.00**	**0.0006**	400.00	380.00	300.00																	
WRP	**0.00**	**0.00**	**0.0000**																				
Mission Village	**451.75**	**0.14**	**0.0173**	6,838.20	6,155.04	5,642.69	4,758.46	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**612.43**	**0.19**	**0.0235**																				
Adobe Canyon	43.71		0.0017	3,059.87																			
Homestead South Construction	32.01		0.0012			460.00	280.00	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	72.72		0.0028		3,794.78	1,216.05	79.56																
Long Canyon South	186.02		0.0071			5,162.02	3,735.95	3,402.55	720.95														
Mesas West	130.26		0.0050	3,856.85	2,940.97	2,320.54																	
Onion Field	66.26		0.0025			3,918.28	666.37	53.34															
Potrero Ridge	81.46		0.0031			2,449.51	2,455.99	796.46															
Homestead North	**349.33**	**0.11**	**0.0134**																				
Chiquita Estates	11.25		0.0004						787.54														
Chiquito Canyon	105.58		0.0040					5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.0005					98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049					5,575.92	3,428.12														
Homestead West	90.73		0.0035						2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**633.77**	**0.19**	**0.0243**		8,145.71	6,562.52	5,975.47	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**130.99**	**0.04**	**0.0050**																				
Entrada North Commercial	33.93		0.0013	1,398.74	36.15			280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	97.07		0.0037	2,381.78	2,525.71	613.47	293.75	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**112.90**	**0.03**	**0.0043**	4,276.24	3,040.06	466.98	120.00																

HOMESTEAD NORTH RECEPTORS

First Occupancy 7/1/2015

Unmitigated

	Average Emissions			(lbs/day)														
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**0.00**	**0.00**	**0.0000**																
WRP	**0.00**	**0.00**	**0.0000**																
Mission Village	**117.55**	**0.04**	**0.0045**	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**92.48**	**0.03**	**0.0035**																
Adobe Canyon	0.00		0.0000																
Homestead South Construction	21.43		0.0008	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	0.00		0.0000																
Long Canyon South	58.91		0.0023	3,402.55	720.95														
Mesas West	0.00		0.0000																
Onion Field	0.76		0.0000	53.34															
Potrero Ridge	11.38		0.0004	796.46															
Homestead North	**349.33**	**0.11**	**0.0134**																
Chiquita Estates	11.25		0.0004		787.54														
Chiquito Canyon	105.58		0.0040	5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.0005	98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049	5,575.92	3,428.12														
Homestead West	90.73		0.0035		2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**338.29**	**0.10**	**0.0130**	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**27.43**	**0.01**	**0.0011**																
Entrada North Commercial	13.43		0.0005	280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	14.00		0.0005	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**0.00**	**0.00**	**0.0000**																

HOMESTEAD SOUTH RECEPTORS
First Occupancy 7/1/2013
Unmitigated

	Average Emissions			(lbs/day)																
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**4.29**	**0.00**	**0.0002**	300.00																	
WRP	**0.00**	**0.00**	**0.0000**																		
Mission Village	**266.13**	**0.08**	**0.0102**	5,642.69	4,758.46	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**417.40**	**0.13**	**0.0160**																		
Adobe Canyon	0.00		0.0000																		
Homestead South Construction	32.01		0.0012	460.00	280.00	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	18.51		0.0007	1,216.05	79.56																
Long Canyon South	186.02		0.0071	5,162.02	3,735.95	3,402.55	720.95														
Mesas West	33.15		0.0013	2,320.54																	
Onion Field	66.26		0.0025	3,918.28	666.37	53.34															
Potrero Ridge	81.46		0.0031	2,449.51	2,455.99	796.46															
Homestead North	**349.33**	**0.11**	**0.0134**																		
Chiquita Estates	11.25		0.0004				787.54														
Chiquito Canyon	105.58		0.0040			5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.0005			98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049			5,575.92	3,428.12														
Homestead West	90.73		0.0035				2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**517.40**	**0.16**	**0.0198**	6,562.52	5,975.47	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**40.39**	**0.01**	**0.0015**																		
Entrada North Commercial	13.43		0.0005			280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	26.96		0.0010	613.47	293.75	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**8.39**	**0.00**	**0.0003**	466.98	120.00																

POTRERO VILLAGE RECEPTORS

First Occupancy 7/1/2015

Unmitigated

	Average Emissions			(lbs/day)														
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**0.00**	**0.00**	**0.0000**																
WRP	**0.00**	**0.00**	**0.0000**																
Mission Village	**117.55**	**0.04**	**0.0045**	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**92.48**	**0.03**	**0.0035**																
Adobe Canyon	0.00		0.0000																
Homestead South Construction	21.43		0.0008	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	0.00		0.0000																
Long Canyon South	58.91		0.0023	3,402.55	720.95														
Mesas West	0.00		0.0000																
Onion Field	0.76		0.0000	53.34															
Potrero Ridge	11.38		0.0004	796.46															
Homestead North	**349.33**	**0.11**	**0.0134**																
Chiquita Estates	11.25		0.0004		787.54														
Chiquito Canyon	105.58		0.0040	5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.0005	98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.0049	5,575.92	3,428.12														
Homestead West	90.73		0.0035		2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**338.29**	**0.10**	**0.0130**	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**27.43**	**0.01**	**0.0011**																
Entrada North Commercial	13.43		0.0005	280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	14.00		0.0005	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**0.00**	**0.00**	**0.0000**																

ENTRADA RECEPTORS
First Occupancy 7/1/2013
Unmitigated

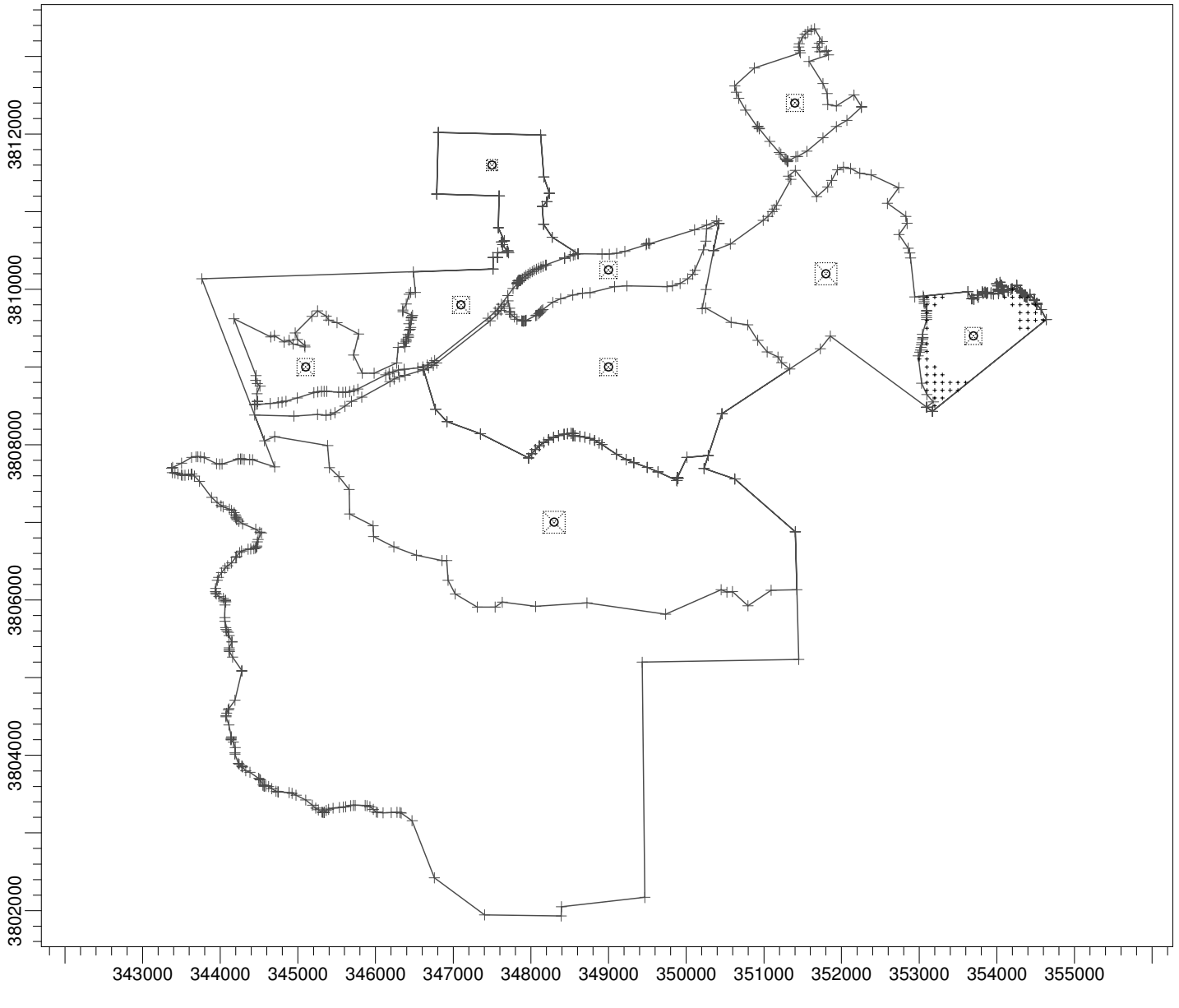
	Average Emissions			(lbs/day)																
Construction Area	**(lbs/year)**	**(lbs/hr)**	**(g/s)**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Landmark	**4.29**	**0.00**	**0.00016**	300.00																	
WRP	**0.00**	**0.00**	**0.00000**																		
Mission Village	**266.13**	**0.08**	**0.01021**	5,642.69	4,758.46	4,340.03	2,528.20	200.00	180.00	140.00	140.00	180.00	120.00	120.00	140.00	120.00	20.00				
Homestead South	**417.40**	**0.13**	**0.01601**																		
Adobe Canyon	0.00		0.00000																		
Homestead South Construction	32.01		0.00123	460.00	280.00	161.20	136.40	124.00	161.20	86.80	86.80	74.40	74.40	111.60	86.80	74.40	74.40	86.80	62.00	62.00	37.20
Long Canyon North	18.51		0.00071	1,216.05	79.56																
Long Canyon South	186.02		0.00714	5,162.02	3,735.95	3,402.55	720.95														
Mesas West	33.15		0.00127	2,320.54																	
Onion Field	66.26		0.00254	3,918.28	666.37	53.34															
Potrero Ridge	81.46		0.00312	2,449.51	2,455.99	796.46															
Homestead North	**349.33**	**0.11**	**0.01340**																		
Chiquita Estates	11.25		0.00043				787.54														
Chiquito Canyon	105.58		0.00405			5,575.92	1,512.31	163.64	139.00												
Homestead North Construction	13.14		0.00050			98.80	83.60	76.00	98.80	53.20	53.20	45.60	45.60	68.40	53.20	45.60	45.60	53.20	38.00	38.00	22.80
Homestead Central	128.63		0.00493			5,575.92	3,428.12														
Homestead West	90.73		0.00348				2,841.73	3,357.57	151.75												
Potrero Canyon (Village)	**517.40**	**0.16**	**0.01985**	6,562.52	5,975.47	5,584.66	4,852.60	4,396.96	4,053.76	3,352.06	140.00	120.00	180.00	120.00	140.00	120.00	120.00	180.00	120.00	120.00	80.00
Entrada	**40.39**	**0.01**	**0.00155**																		
Entrada North Commercial	13.43		0.00052			280.00	180.00	160.00	140.00	120.00	60.00										
Entrada Terrazo	26.96		0.00103	613.47	293.75	260.00	240.00	160.00	140.00	120.00	60.00										
Valencia Commerce Center	**8.39**	**0.00**	**0.00032**	466.98	120.00																

APPENDIX B

Receptor Location Diagrams for Each Modeled Year

PROJECT TITLE:

Appendix B: Newhall Ranch
Entrada Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

786

SCALE: 1:80,000

0 2 km

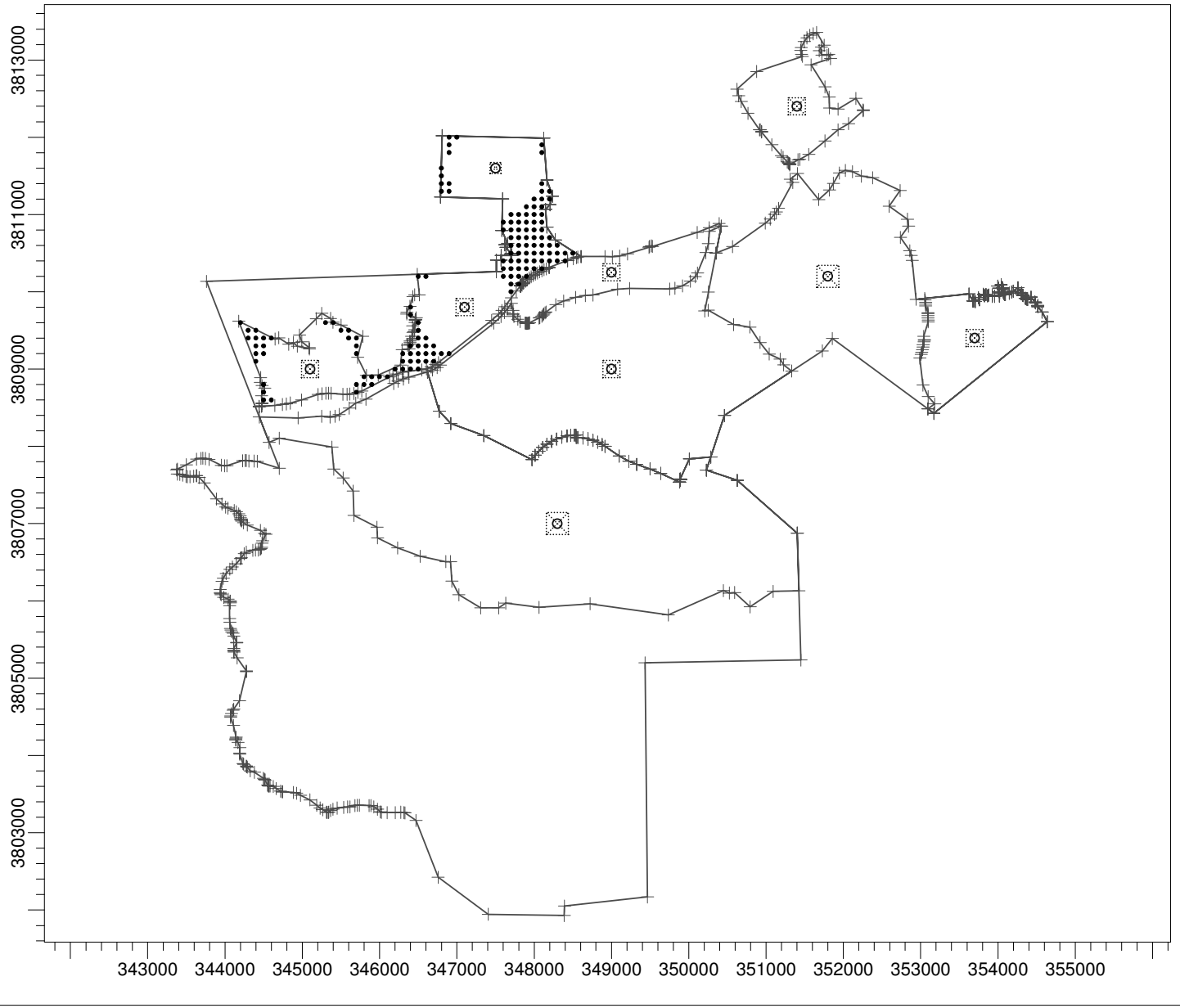
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Homestead North Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

879

SCALE: 1:80,000

0 2 km

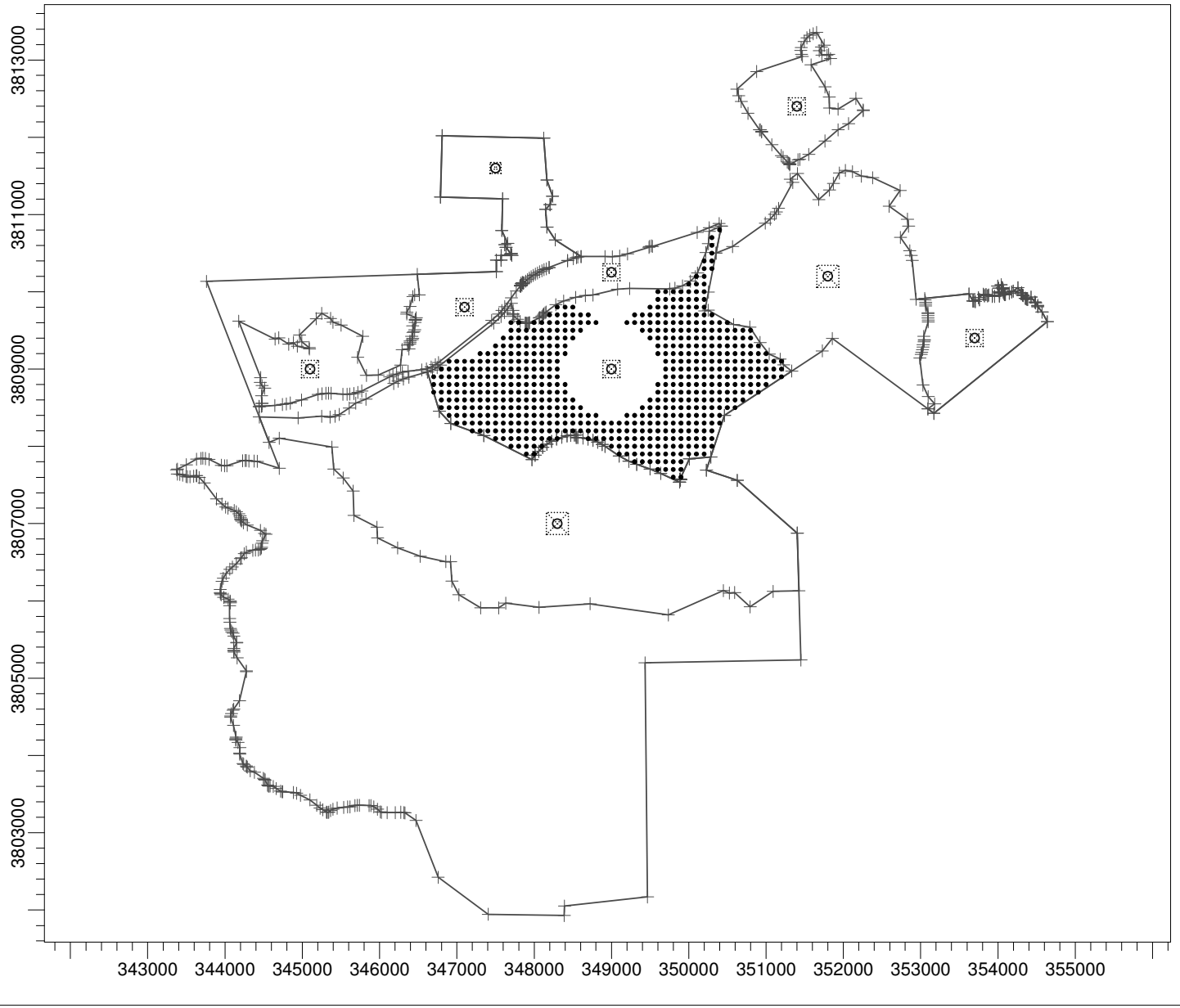
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Homestead South Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

1313

SCALE: 1:80,000

0 2 km

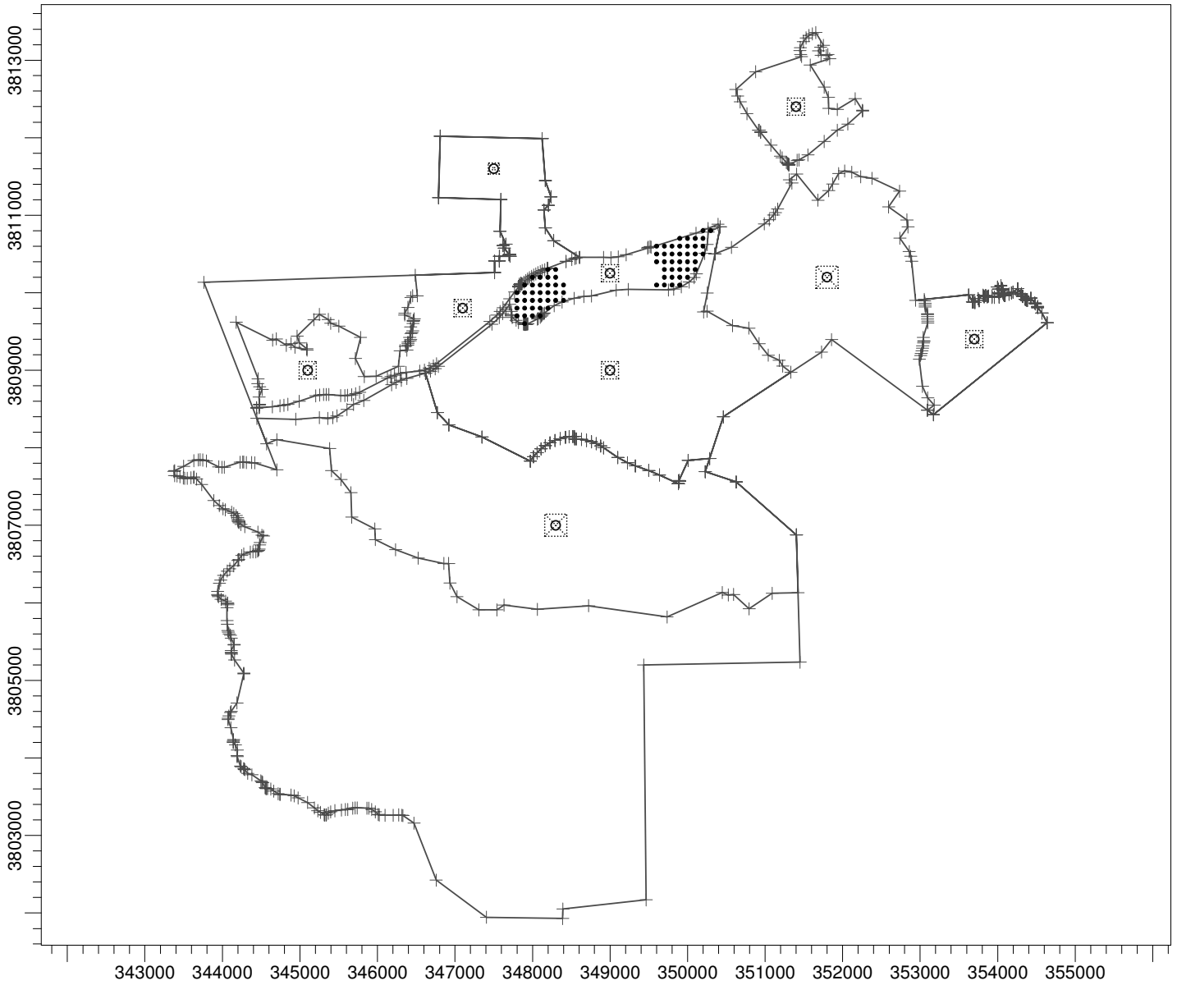
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Landmark Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

812

SCALE: 1:80,000

0 2 km

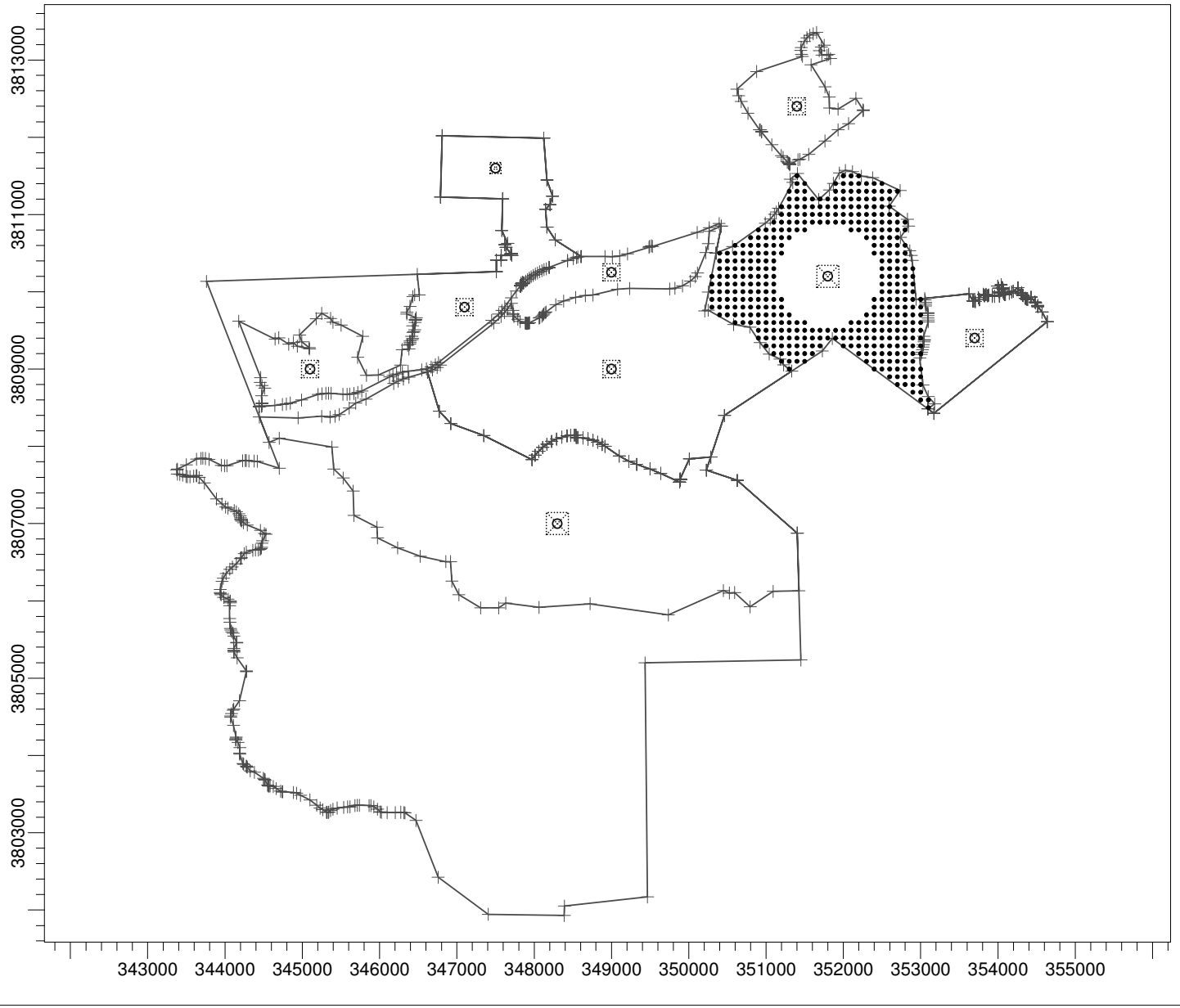
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Mission Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

1127

SCALE: 1:80,000

0 2 km

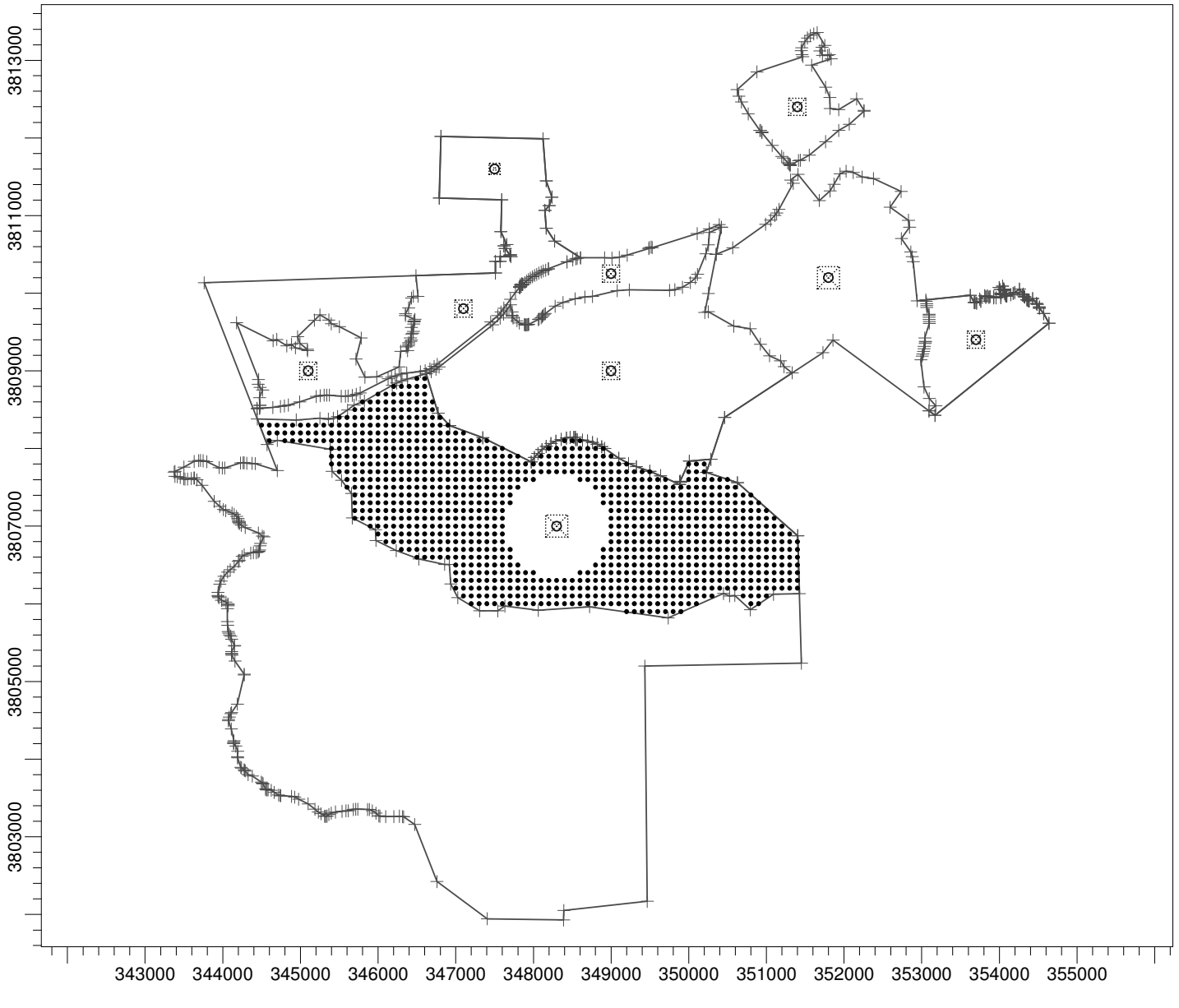
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Potrero Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

1717

SCALE: 1:80,000

0 2 km

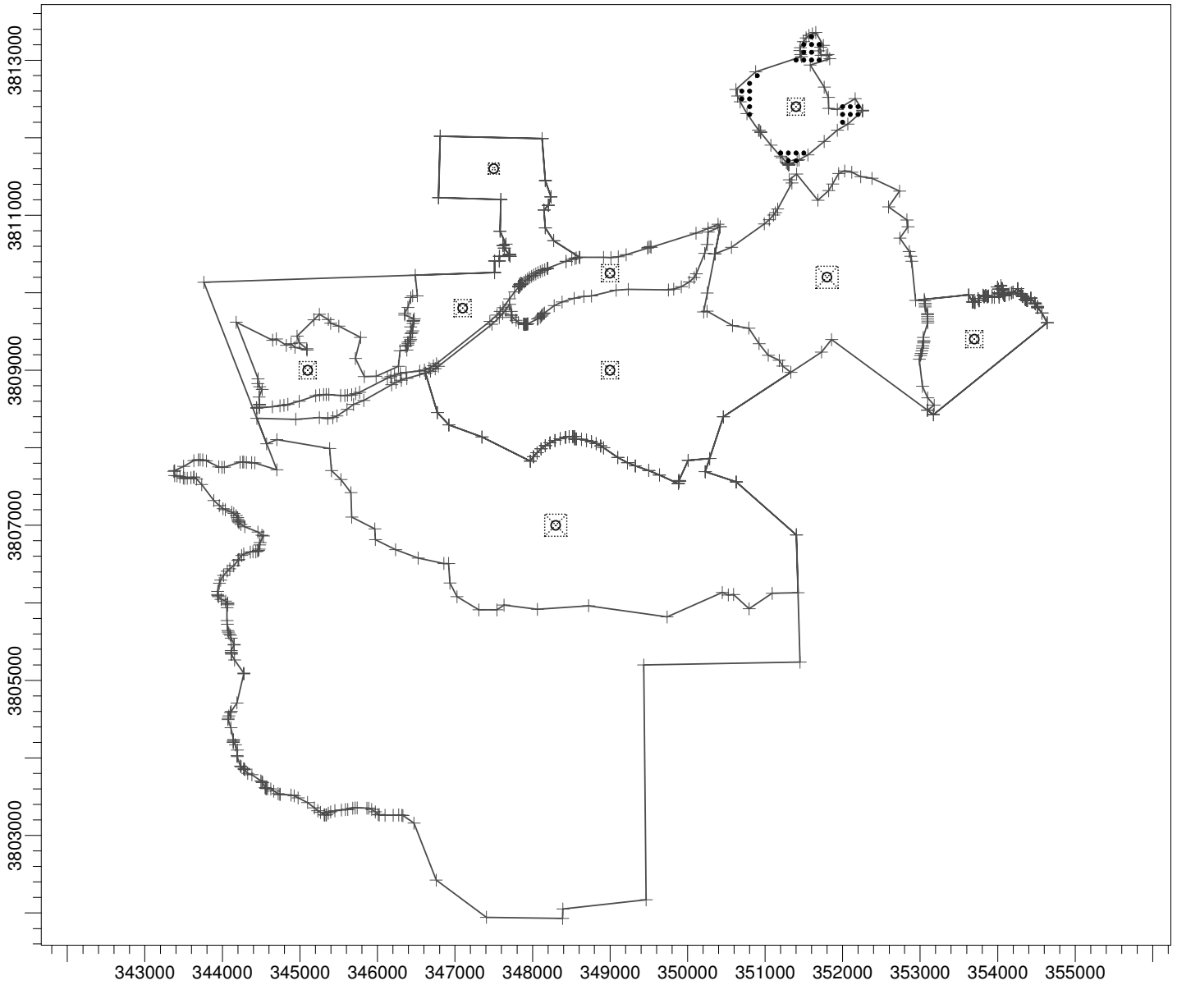
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Valencia Commerce Center Receptors



COMMENTS:

SOURCES:

9

RECEPTORS:

768

SCALE: 1:80,000

0 2 km

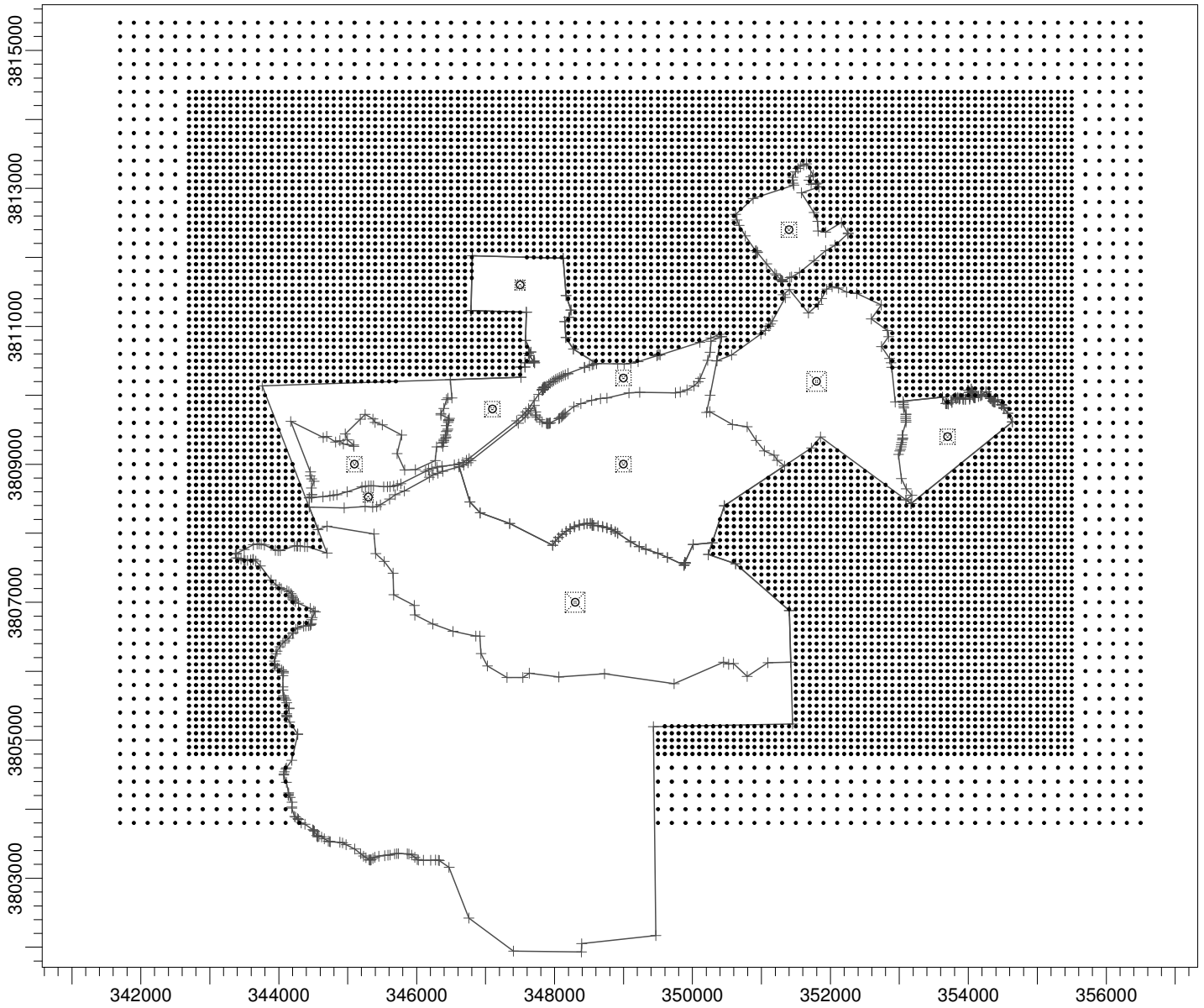
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Offsite Receptors



COMMENTS:

SOURCES:

10

RECEPTORS:

9666

SCALE: 1:92,000

0 3 km

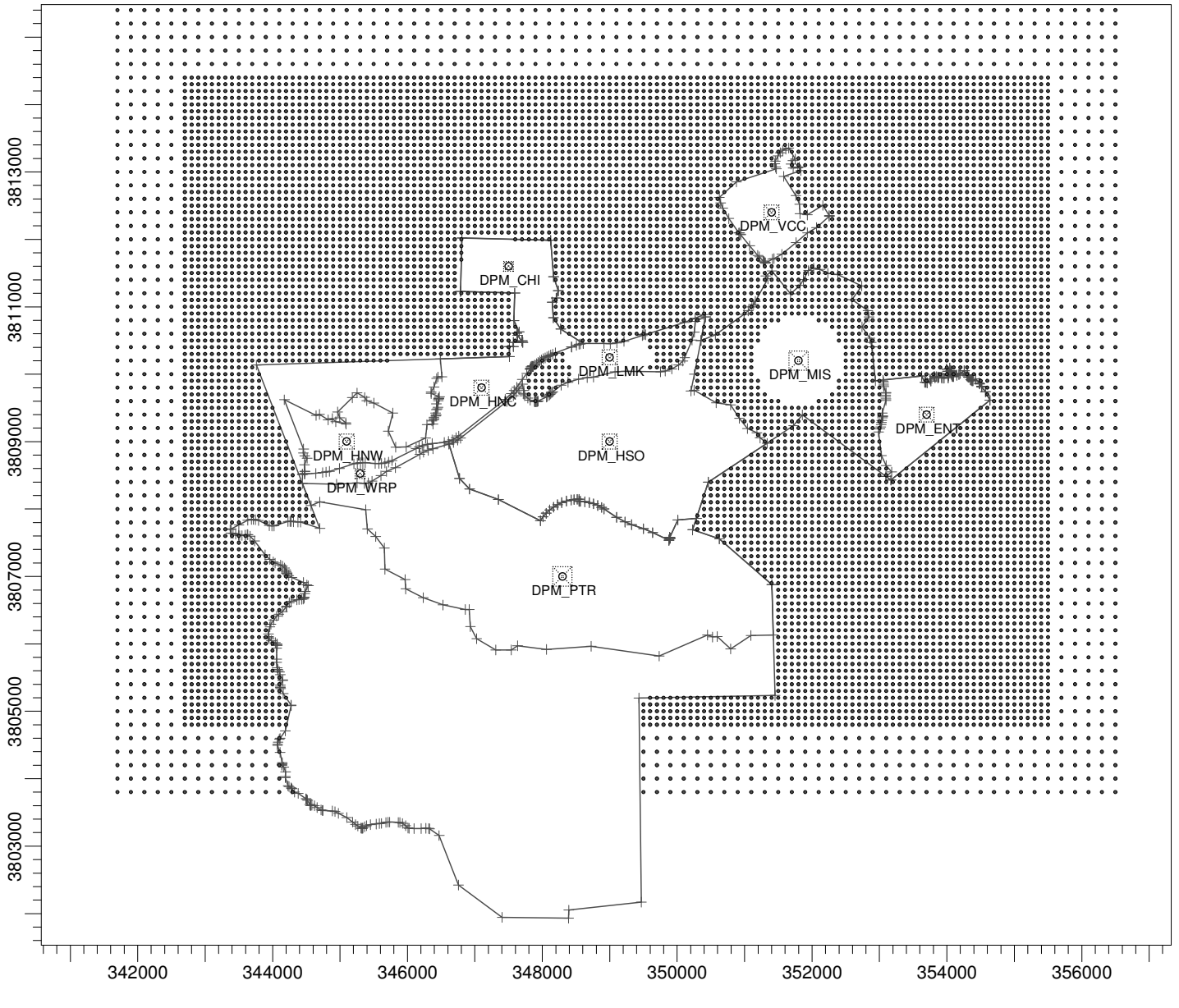
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Year 2011 Receptors (Chronic)



COMMENTS:

SOURCES:

10

RECEPTORS:

10131

SCALE: 1:92,000

0 3 km

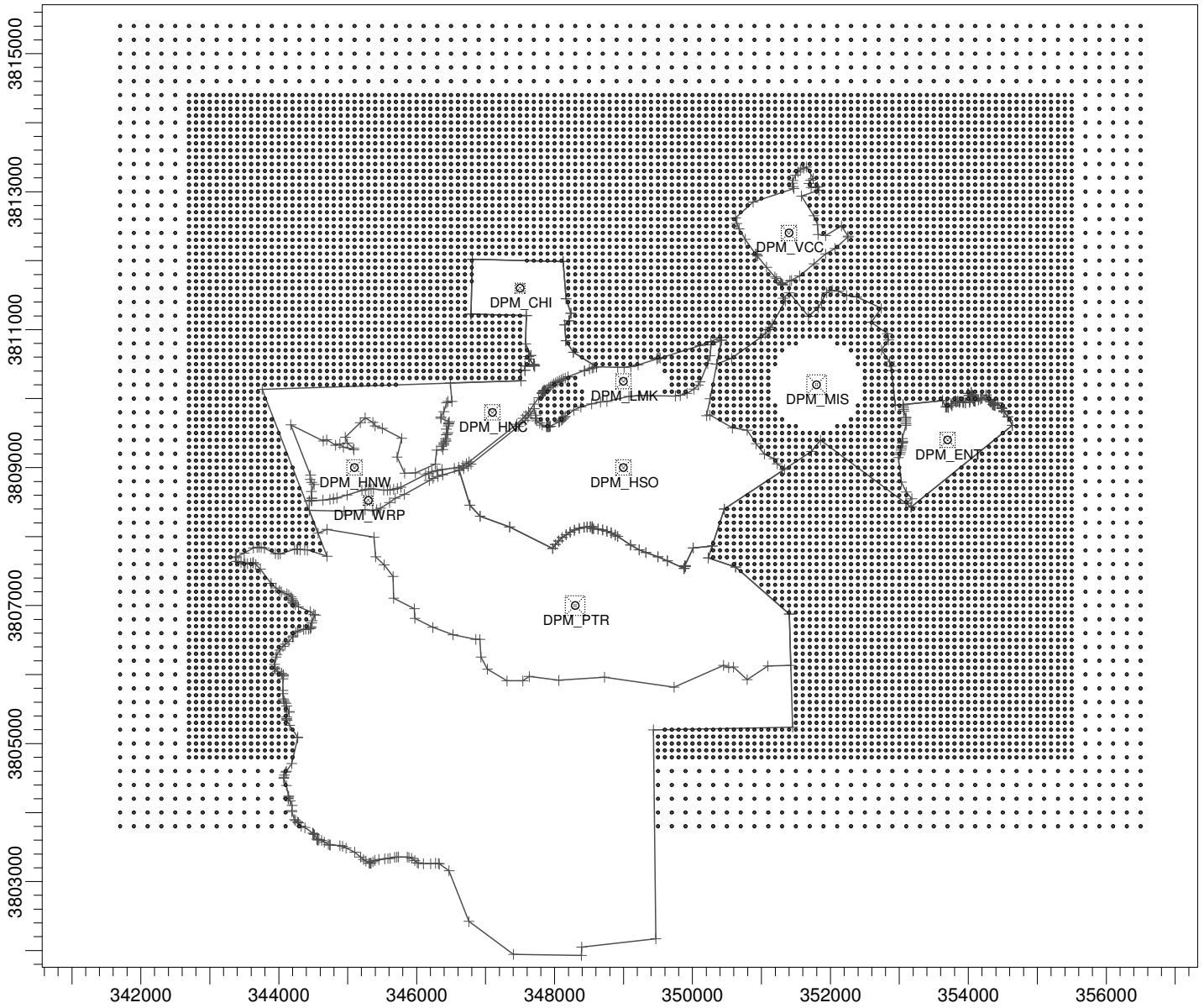
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Year 2012 Receptors (Chronic)



COMMENTS:

SOURCES:

10

RECEPTORS:

10131

SCALE: 1:92,000

0 3 km

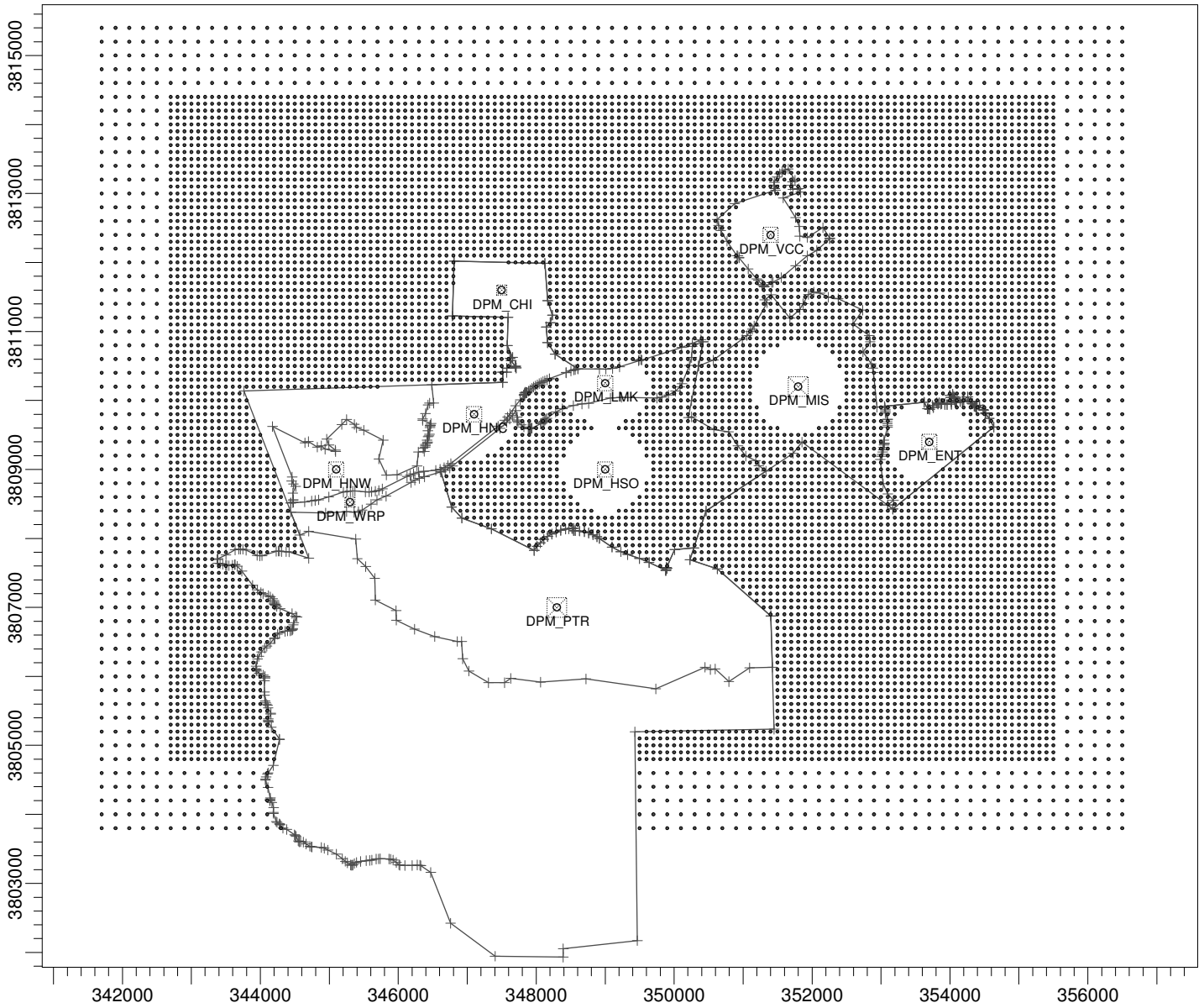
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Year 2013 Receptors (Chronic)



COMMENTS:

SOURCES:

10

RECEPTORS:

10787

SCALE: 1:92,000

0 3 km

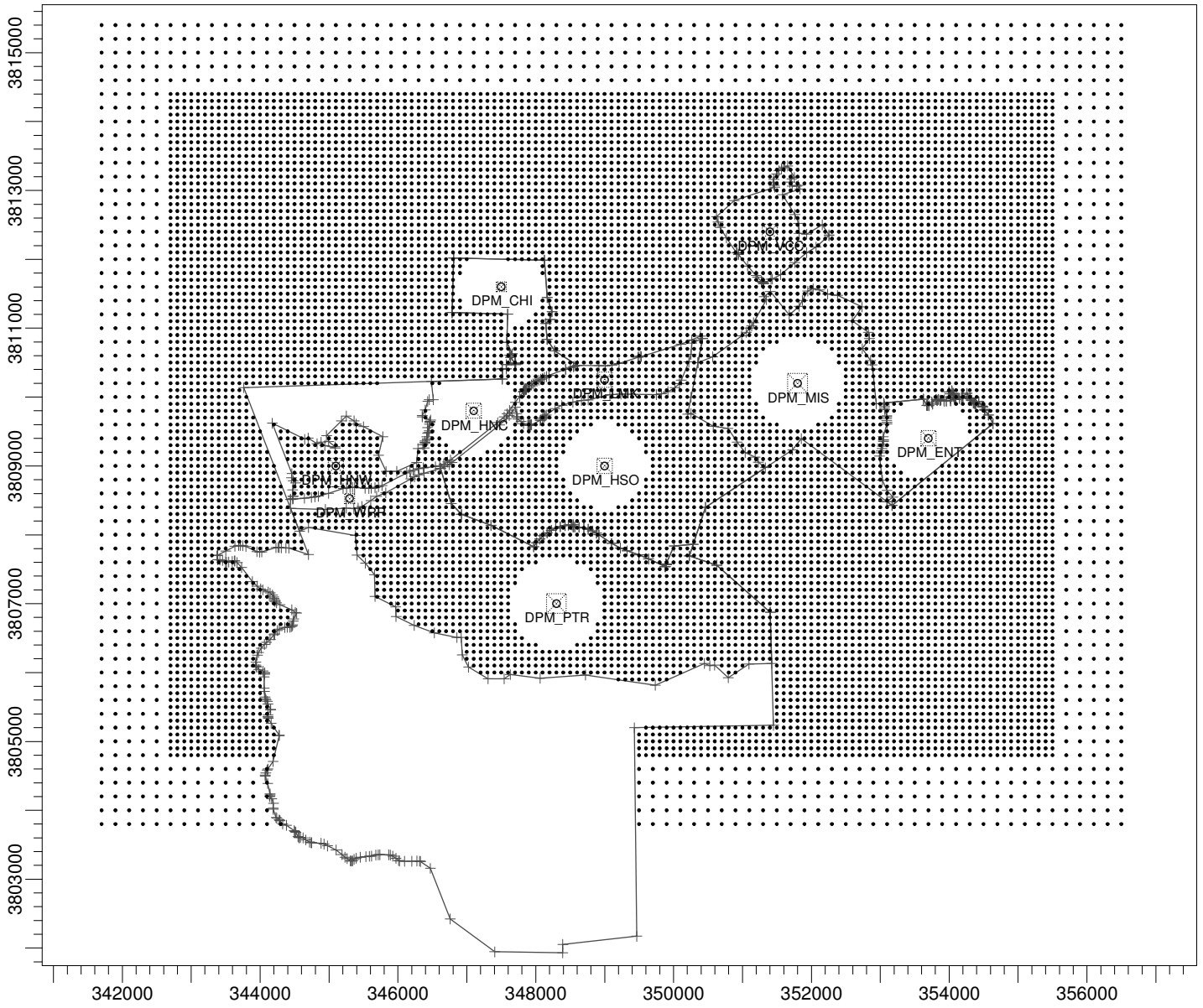
PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

PROJECT TITLE:

Appendix B: Newhall Ranch
Year 2015 Receptors (Chronic)



COMMENTS:

SOURCES:

10

RECEPTORS:

12193

SCALE: 1:92,000

0 3 km

PROJECT NO.:

32.214

ISC-AERMOD View - Lakes Environmental Software

APPENDIX C

Health Risk Assessment Calculations

Newhall Ranch EIS/EIR
Maximum Individual Cancer Risk and Noncarcinogenic Hazards

Maximum Individual Cancer Risk (MICR)

Receptor	Pollutant	CPF	$C_{AIR,ANN}$	DBR	A	EF	ED	AT	Mult Factor	MICR	Threshold	Over?
Residential (Landmark)	DPM	1.10E+00	8.44E-03	302	1	350	70	25550	318.55	2.7	10	NO
Residential (Homestead N.)	DPM	1.10E+00	4.28E-03	302	1	350	70	25550	318.55	1.4	10	NO
Residential (Homestead S.)	DPM	1.10E+00	1.45E-02	302	1	350	70	25550	318.55	4.6	10	NO
Residential (Mission)	DPM	1.10E+00	1.30E-02	302	1	350	70	25550	318.55	4.1	10	NO
Residential (Potrero)	DPM	1.10E+00	9.32E-03	302	1	350	70	25550	318.55	3.0	10	NO
Residential (Entrada)	DPM	1.10E+00	2.91E-03	302	1	350	70	25550	318.55	0.9	10	NO
Residential (Offsite)	DPM	1.10E+00	5.25E-03	302	1	350	70	25550	318.55	1.7	10	NO
Worker (VCC)	DPM	1.10E+00	3.55E-03	186	1	245	40	25550	78.48	0.3	10	NO
Worker (Offsite)	DPM	1.10E+00	9.47E-03	186	1	245	40	25550	78.48	0.7	10	NO
Student (Live Oak)	DPM	1.10E+00	2.40E-02	581	1	261	9	25550	58.76	1.4	10	NO
Student (West Ranch)	DPM	1.10E+00	2.04E-02	581	1	261	9	25550	58.76	1.2	10	NO
Student (Oak Hills)	DPM	1.10E+00	2.02E-02	581	1	261	9	25550	58.76	1.2	10	NO
Student (Rancho Pico)	DPM	1.10E+00	1.88E-02	581	1	261	9	25550	58.76	1.1	10	NO
Student (Stevenson)	DPM	1.10E+00	1.28E-02	581	1	261	9	25550	58.76	0.8	10	NO
Student (Pico Canyon)	DPM	1.10E+00	8.94E-03	581	1	261	9	25550	58.76	0.5	10	NO

Exposure factors used to calculate cancer risk:

CPF	Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$
DBR	Daily breathing rate (L/kg (body weight) per day)
A	Inhalation absorption factor (default = 1)
EF	Exposure frequency (day/year)
ED	Exposure duration (year)
AT	Average time period over which exposure is averaged in days (day)
Mult Factor	Multiplying Factor = $CPF \times (DBR \times A \times EF \times ED \times 10^{-6} / AT) \times 10^{6}$
$C_{AIR,ANN}$	Annual concentration of compound ($\mu g/m^3$)

Noncarcinogenic (Chronic) Hazards / Toxicological Endpoints*

Top 3 Annual Emission Years		CREL	$C_{AIR,ANN}$	HQ	RESP	CNS/PNS	CV/BL	IMMUN	KIDN	GI/LV	REPRO	EYES	Threshold	Over?
2011 (Any Receptor)	DPM	5.00E+00	2.02E-01	4.04E-02	4.04E-02								1	NO
2012 (Any Receptor)	DPM	5.00E+00	1.80E-01	3.60E-02	3.60E-02								1	NO
2013 (Any Receptor)	DPM	5.00E+00	4.89E-01	9.78E-02	9.78E-02								1	NO
2015 (Any Receptor)	DPM	5.00E+00	1.77E-01	3.54E-02	3.54E-02								1	NO

* Key to Toxicological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System
EYES	Eye irritation and/or other effects

APPENDIX D

ISCST3 Dispersion Modeling Files
(Available Upon Request)