

## **Appendix 1.D. Human Population Proximity analysis**

### **1.D.1 Overview**

#### Methods

##### **Storage well inventory**

We obtained data for California wells from the California Division of Oil, Gas, and Geothermal Resources (DOGGR) using their dataset titled “All Wells.” We intentionally used an older well dataset from 2015 (DOGGR, 2015; see reference list at end of this appendix) to reflect storage-well conditions before the incident at Aliso Canyon that started in October 2015. This was done with the goal of exploring the state of gas storage wells in California before changes brought on by the 2015 Aliso Canyon incident went into effect, including issuance of emergency regulations that would likely make 2016 and later well data unrepresentative of business as usual. We included all well data covering the 10-year time period up to dataset’s end, which included years 2006–2015.

We categorized wells as either “open” or “closed” to evaluate the likelihood of a well acting as a conduit for underground gas to reach the surface. This distinction is based on the presence or absence of an unplugged well. An “open” status reflects wells that have been drilled and completed, but have not been plugged. These correspond to well status values of “Active,” “Idle,” or “Buried” in DOGGR’s records (DOGGR, 2014), and include both wells that are currently being used as well as abandoned wells. A “closed” status reflects all other wells, these either being wells that have been plugged, wells that were never drilled and completed in the first place, or wells with unknown status. In DOGGR’s records, these correspond to well status values of “Plugged,” “New,” “Cancelled,” or “Unknown” (DOGGR, 2014). We chose to include unplugged abandoned wells, but exclude plugged wells, because the literature to date suggests that while plugged wells can leak, they generally have leak rates that are significantly smaller than unplugged abandoned wells (Townsend-Small et al., 2016; Kang et al., 2016). Wells that were never spudded do not present any leakage pathways and thus pose no risk of gas migration.

To examine the risk of public health risks from multiple angles, we split the well dataset into two partially overlapping datasets which we labeled Tier 1 and Tier 2.

The Tier 1 dataset is focused specifically on the storage pool around each underground gas storage facility. It includes any open well that is located within a gas storage pool, defined as any pool into which gas was injected via a well with DOGGR’s GS type designation indicating a gas storage injector or producer well (DOGGR, 2014), and determined through examination of annual injection databases (DOGGR, 2017). Since the wells within the Tier 1 designation are drilled directly into the gas storage pool, they post the most likely conduit for gas from the storage pool to migrate to the earth’s surface. A loss of wellbore integrity is the most common cause of unintended gas migration, with common causes including casing

failure or cement failure (Ingraffea et al., 2014; Davies et al., 2014; Michanowicz et al., 2017).

The Tier 2 dataset represents a more conservative approach for public health and includes a broader set of criteria. This dataset includes all wells from Tier 1, and in addition it also includes any open well that is located within the same field area as the gas storage pool. While these wells are located outside of the storage pool, there is evidence from past gas storage events that wells within the same field area can provide a conduit for escaping gas. For instance, in 2001, in one of the most serious underground gas storage incidents to have occurred in the U.S., natural gas leaked from the Yaggy underground storage facility and migrated laterally underground over seven miles through geological units until it reached an abandoned well shaft in Hutchinson, Kansas, where the gas was able to migrate to the ground surface and cause a fatal explosion (Evans, 2009; Miyazaki, 2009; Yang et al., 2013). Pathways and failure modes are discussed further in Section 1.2 of this report. In addition, the set of Tier 2 wells serves as a proxy for where new storage wells might be located if future natural gas storage wells are drilled.

### **Population data**

We obtained demographic information for the California general, youth, and elderly population from the United States Census Bureau. We downloaded age data from the 2010 Decennial Census at the block level (U.S. Census Bureau, 2011) to determine population counts for the following variables: total population, under five years of age, and 75 years and older. The under-five population was tallied by summing the male and female under five population counts. The 75 years of age and older population was tallied by summing the male and female counts for the age ranges 75 – 79, 80 – 84, and 85 years and over.

### **Sensitive receptors**

We also collected data for a series of point locations we are calling “sensitive receptors,” which are places where vulnerable subgroups congregate: schools and daycare centers for the youth population; residential elderly care facilities for the elderly population; and hospitals for the sick. These locations represent sites where a hazard may pose elevated risk to people, because of their vulnerability.

We obtained data for California schools and their enrollment from the California Department of Education (CDE). This included aggregating data for public schools (CDE, 2017a), private schools, (CDE, 2017b), and nonpublic, nonsectarian schools (CDE, 2017c). In California, nonpublic nonsectarian schools are a type of private school that provide specialized services to students with disabilities (CDE, 2016). With the goal of limiting the dataset to locations where children ages 5 to 18 congregate regularly, we delete all closed facilities and any other locations that did not fit this definition, including district or agency headquarters, adult education centers, preschools, medical facility education options, and virtual schools. We deleted any schools listed in multiple datasets or with duplicate

physical locations, in addition to any schools with a physical location outside of the state of California. The final dataset had 12,490 schools. All schools found in proximity to gas storage facilities in this analysis are currently open; none are pending.

Nonpublic nonsectarian schools and some private and public schools were missing enrollment data. We calculated the percentage of schools with enrollment data out of the total number of schools within each buffer distance for each facility, with a resulting range of 97.8–100% of the in-buffer schools with enrollment data. 86.4% of the storage facility buffer areas had 100% enrollment data for the schools within their boundaries. We obtained data for daycare centers from both the California Department of Social Services (CDSS) and the CDE. We defined daycares as sites that catered to care of groups of children less than five years of age, although we included sites that also included care for older children as long as the site was not also included in our schools dataset. From the California Department of Social Services (CDSS), we obtained datasets for child care centers and family child care homes (CDSS, 2017a). These are distinguished by building type: child care centers are locations within commercial buildings, while family child care homes are located within parents' private homes (CDSS, 2017b). Within the schools datasets from the Department of Education, there were a number of sites that limited their enrollment to children of pre-school age. This was determined by a maximum grade level of Pre-K in the case of nonpublic nonsectarian schools (CDE, 2017c). With public school data, preschools were determined by the educational instruction level code, which listed grade levels taught and the school ownership code that described the type of school (CDE, 2017a). We deleted any duplicate daycares and/or preschools, as well as any facilities that were closed or had a status of inactive, leaving 26,799 remaining facilities. This dataset includes both currently open and pending daycare sites. Using the 5000 m buffer as a proxy to estimate the ratio of pending facilities, we estimate that 2.1% of daycare facilities have a pending status and are not currently open.

We downloaded residential elderly care locations from the CDSS (2017a). We deleted all closed sites. There were 8,056 remaining sites. Using the 5000 m buffer as a proxy to estimate the ratio of pending facilities, we estimate that 10.7% of residential elderly care locations have a pending status and are not currently open.

We obtained data for hospitals from the California Office of Statewide Health Planning and Development (OSHPD) from a dataset titled "Healthcare Facilities" (California OSHPD, 2017). To exclude other types of healthcare sites, we limited the dataset to only include facilities with a "Type" value of hospital. There were 629 facilities remaining. All of the hospitals in proximity to underground storage facilities are currently open.

### **Spatial analysis**

Using ESRI ArcGIS 10.3 software, we created geodesic buffers at 0, 100, 200, 400, 600, 800, 1000, 1600, 2000, 5000, and 8000 meters around the storage facility boundaries. The 0 m buffer is the same thing as the storage facility boundary layer. The buffers used in this analysis are designed to encompass populations within various proximities to natural gas storage and associated emissions, with the assumption that exposure to emissions will be the highest at the 0 m buffer and will continue at decreasing exposures through the remaining buffers as distance from development increases. This assumption is supported by analysis of resident complaint calls summarized by the Los Angeles County Department of Public Health (LACDPH) in response to the Aliso Canyon incident, which found that the likelihood of reported health symptoms, including headache, nausea, nosebleeds, and respiratory problems, among other symptoms, was substantially greater for residents that lived  $\leq 3$  miles from the gas leak (55.8% of complaints) compared with residents that lived  $> 5$  miles from the gas leak (16.8% of complaints) (LACDPH, 2016). For risk in particular of well blowouts, there is evidence that, in the case of breach blowouts, the emission points to atmosphere (surface fractures or craters) typically do not exceed a distance of 600 m from the wellhead of the well that sustained the subsurface blowout (Jordan and Benson, 2009).

We added a final buffer utilizing results from the air dispersion data. This buffer represents the largest distance the 0.50 quantile level reaches outwards from the edge of each storage facility well boundary. Since the area around each UGS facility has different wind patterns, the maximum distance varies from site to site. To calculate this distance for each UGS, we calculated the minimum bounding geometry of each 0.50 quantile level polygon produced from the air dispersion modeling. We then measured the distance from the outermost wells to the minimum bounding geometry and determined which distance (from which outermost well) was the greatest at each facility. Over the facilities, these distances ranged from 7,977 m at Lodi Gas to 12,037 m at Montebello. We applied these distances to radial buffers, with each site having a unique buffer distance to produce the QL50 buffer layer. We only calculated the total number of people for this buffer; we did not calculate vulnerable population counts or sensitive receptors.

To calculate the number of total people, under five, and 75 years of age and older living within each buffer distance, we intersected the Census block polygons with each of the ten buffers, and then allocated block-level counts to areas within each buffer polygon by calculating the percentage of each census block residing with each aggregated buffer polygon, applying these percentages to population counts. This method is commonly known as areal estimation. We summed the calculated population counts over each buffer distance and over each oil and gas variable of interest.

There were 11,736 family child care homes from the daycare centers dataset that lacked either xy coordinates or street addresses, but did include spatial location data at the zip code level. To calculate the number of daycares for which we had zip-code level counts, we needed to take a different approach than was used to calculate the rest of the facility

counts. For these sites, we performed linear regressions with daycare count as the dependent variable, and total population, under five, and age fourteen and younger, and land area in turn as the independent variables to determine which variable is the most strongly correlated with number of daycares within a zip code. Total population was the most strongly correlated with daycare count; therefore, we weighted daycare counts by population counts to estimate the number of daycares within each buffer.

For all sensitive receptor locations with xy coordinates, we imported them into ArcGIS using these coordinates. We geocoded all sites with street addresses using the World Geocode Service through ArcGIS Online. We then spatially joined schools, daycare facilities, elderly care facilities, and hospitals with each storage facility buffer which resulted in counts for each population aggregation site that are located within each buffer distance around each gas storage facility. We summed enrollment counts for all schools located within each storage facility buffer to calculate the total number of children enrolled in schools in proximity to each UGS facility.

To evaluate populations downwind of the gas storage facilities, we calculated spatial extents for the downwind areas that would capture air emissions from the gas facilities. These spatial extents were divided into six quantile levels (0.65, 0.75, 0.85, 0.95, 0.99, and 0.999) with each quantile level representing the percentage of the cumulative distribution that would fall *outside* of its spatial extent. For example, the 0.65 quantile level polygon shows the area for which 65% of the cumulative distribution would fall outside of, therefore 35% of the cumulative distribution would fall within. Like with the radial buffers, we intersected Census block polygons with each of the quantile level polygons and used areal estimation to estimate the total population residing within each quantile level for each storage facility.

### Full results tables

Tables 1.4.C-1 through 1.4.C-3 provide population and sensitive receptor results for each individual facility and buffer distance or quantile level area.

Table 1.D-1. Tier 1 proximal population and sensitive receptor counts

ND indicates no data available. Gill Ranch Gas does not have values for the eastern and western portions of the facility split out for buffers larger than 800 meters, because at those distances the buffers overlapped, which would have caused double-accounting of population counts.

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)	
Aliso Canyon	0m	25	1	2	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	100m	33	2	2	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	200m	46	2	3	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	400m	72	3	6	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	600m	98	5	8	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	800m	189	9	13	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	1000m	916	42	43	0	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	1600m	6,479	295	334	1	1	0	735	0	0	0	0	1	1	0	0
Aliso Canyon	2000m	9,305	420	471	2	2	0	1,857	0	0	0	0	2	2	0	0
Aliso Canyon	5000m	59,021	2,689	4,244	14	14	0	7,592	22	21	1	0	20	20	0	0
Aliso Canyon	8000m	232,202	12,502	14,692	77	77	0	48,000	104	93	11	2	75	74	1	1
Aliso Canyon	9116m (50% QL)	325,330	18,711	19,269	102	102	0	60,241	144	130	14	4	108	107	1	1
Gill Ranch Gas, East	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	800m	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, East	1000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, East	1600m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, East	2000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0

Chapter 1

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Gill Ranch Gas, East	5000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, West	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	800m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, West	1000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, West	1600m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, West	2000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, West	5000m	ND	ND	ND	0	0	0	0	0	0	0	0	ND	0	0	0
Gill Ranch Gas, Combined	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	800m	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	1000m	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	1600m	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

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Gill Ranch Gas, Combined	2000m	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	5000m	106	12	3	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	8000m	545	55	18	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas, Combined	9124m (50% QL)	909	82	29	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	200m	0	0	0	2	2	0	1,028	0	0	0	0	0	0	0	0
Honor Rancho	400m	118	5	0	2	2	0	1,028	1	1	0	0	0	0	0	0
Honor Rancho	600m	439	25	3	2	2	0	1,028	1	1	0	0	0	0	0	0
Honor Rancho	800m	754	61	7	2	2	0	1,028	1	1	0	0	0	0	0	0
Honor Rancho	1000m	1,502	138	16	2	2	0	1,028	1	1	0	0	0	0	0	0
Honor Rancho	1600m	10,951	476	76	6	6	0	5,954	1	1	0	0	2	2	0	0
Honor Rancho	2000m	15,897	752	163	7	7	0	6,917	1	1	0	0	3	3	0	0
Honor Rancho	5000m	79,887	4,782	2,008	26	26	0	22,071	16	16	0	0	14	14	0	0
Honor Rancho	8000m	156,688	9,495	4,963	45	45	0	35,369	55	52	3	1	27	27	0	0
Honor Rancho	8998m (50% QL)	180,359	11,139	5,807	54	54	0	38,631	65	61	4	1	31	31	0	0
Kirby Hill Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	400m	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	600m	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	800m	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0



Chapter 1

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Kirby Hill Gas	1000m	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	1600m	11	0	1	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	2000m	15	0	1	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	5000m	89	6	6	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	8000m	291	11	14	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	9813m (50% QL)	401	17	18	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	0m	39	1	3	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	100m	67	1	5	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	200m	111	2	7	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	400m	280	3	17	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	600m	791	16	50	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	800m	2,105	26	64	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	1000m	2,855	27	70	0	0	0	0	0	0	0	0	1	1	0
La Goleta Gas	1600m	7,875	71	119	0	0	0	0	0	0	0	0	1	1	0
La Goleta Gas	2000m	17,794	377	314	2	2	0	229	0	0	0	1	3	3	0
La Goleta Gas	5000m	67,731	2,515	3,841	15	15	0	8,242	33	33	0	2	15	14	1
La Goleta Gas	8000m	94,421	3,734	6,719	26	26	0	12,132	40	39	1	3	21	20	1
La Goleta Gas	8608m (50% QL)	101,371	4,040	7,611	32	32	0	13,991	42	41	1	3	22	21	1
Lodi Gas	0m	242	12	9	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	100m	310	16	12	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	200m	376	19	14	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	400m	512	27	20	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	600m	658	34	26	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	800m	809	41	32	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	1000m	963	49	40	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	1600m	1,521	81	69	1	1	0	402	0	0	0	0	0	0	0

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Lodi Gas	2000m	1,836	98	92	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	5000m	7,303	404	419	1	1	0	402	0	0	0	0	1	1	0
Lodi Gas	7977m (50% QL)	23,771	1,600	1,576	9	9	0	2,851	2	2	0	0	4	4	0
Lodi Gas	8000m	24,114	1,625	1,595	9	9	0	2,851	2	2	0	0	4	4	0
Los Medanos Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	800m	5	0	0	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	1000m	8	0	0	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	1600m	740	51	21	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	2000m	1,533	105	34	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	5000m	46,312	3,479	1,929	15	15	0	5,311	19	16	3	1	11	11	0
Los Medanos Gas	8000m	139,902	9,981	6,457	43	43	0	15,551	66	60	6	2	40	39	0
Los Medanos Gas	9743m (50% QL)	223,069	15,640	10,407	63	63	0	29,169	99	92	7	3	70	69	1
McDonald Island Gas	0m	24	4	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	100m	29	4	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	200m	34	5	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	400m	44	6	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	600m	55	7	0	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
McDonald Island Gas	800m	66	9	1	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	1000m	75	10	1	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	1600m	106	13	1	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	2000m	124	14	2	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	5000m	315	28	9	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	8000m	646	51	17	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	9282m (50% QL)	6,473	388	244	0	0	0	0	0	0	0	0	2	2	0
Montebello	0m	1,470	75	149	0	0	0	0	0	0	0	0	0	0	0
Montebello	100m	2,875	175	250	0	0	0	0	0	0	0	0	1	1	0
Montebello	200m	4,338	267	400	0	0	0	0	1	1	0	0	1	1	0
Montebello	400m	7,563	427	849	0	0	0	0	1	1	0	0	2	2	0
Montebello	600m	10,820	612	1,153	3	3	0	1,620	1	1	0	0	3	3	0
Montebello	800m	15,053	830	1,496	4	4	0	2,108	1	1	0	0	5	5	0
Montebello	1000m	20,661	1,194	1,931	6	6	0	5,700	1	1	0	1	6	6	0
Montebello	1600m	41,170	2,611	3,246	14	14	0	12,129	2	1	1	1	13	13	0
Montebello	2000m	58,953	3,889	4,423	17	17	0	14,185	2	1	1	1	18	18	0
Montebello	5000m	274,813	18,079	19,039	77	77	0	47,471	5	3	2	4	75	74	1
Montebello	8000m	734,877	51,768	42,119	198	198	0	117,402	20	17	3	10	201	200	1
Montebello	12037m (50% QL)	1,594,128	113,206	81,789	483	482	1	273,453	70	59	11	26	389	387	2
Playa del Rey	0m	3,782	165	193	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Playa del Rey	100m	4,858	210	272	0	0	0	0	0	0	0	0	0	0	0
Playa del Rey	200m	6,529	273	364	1	1	0	18	0	0	0	0	0	0	0
Playa del Rey	400m	9,780	405	542	1	1	0	18	0	0	0	0	0	0	0
Playa del Rey	600m	15,275	610	817	3	3	0	649	0	0	0	0	1	1	0
Playa del Rey	800m	21,495	867	1,090	4	4	0	1,686	0	0	0	0	1	1	0
Playa del Rey	1000m	27,113	1,136	1,355	7	7	0	2,633	0	0	0	0	1	1	0
Playa del Rey	1600m	44,816	1,924	2,407	9	9	0	3,604	1	1	0	1	4	4	0
Playa del Rey	2000m	55,833	2,392	2,961	12	12	0	5,067	1	1	0	1	6	6	0
Playa del Rey	5000m	200,561	10,091	11,517	59	59	0	24,611	27	20	7	1	63	62	1
Playa del Rey	8000m	493,459	26,787	27,065	158	158	0	65,306	81	69	12	5	171	169	2
Playa del Rey	9506m (50% QL)	691,757	39,352	38,121	218	218	0	93,325	97	85	12	9	263	259	3
Pleasant Creek	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	200m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	400m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	800m	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	1000m	8	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	1600m	16	1	1	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	2000m	25	1	1	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	5000m	7,082	442	280	4	4	0	0	0	0	0	0	2	2	0
Pleasant Creek	8000m	8,270	522	342	4	4	0	0	0	0	0	0	2	2	0
Pleasant Creek	9553m (50% QL)	8,821	545	373	4	4	0	0	0	0	0	0	2	2	0
Princeton Gas	0m	3	0	0	0	0	0	0	0	0	0	0	0	0	0

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Princeton Gas	100m	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	200m	8	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	400m	13	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	600m	15	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	800m	16	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	1000m	18	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	1600m	29	0	3	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	2000m	43	1	4	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	5000m	425	14	26	2	2	0	169	0	0	0	0	0	0	0
Princeton Gas	8000m	642	30	47	2	2	0	169	0	0	0	0	0	0	0
Princeton Gas	9686m (50% QL)	848	41	59	2	2	0	169	0	0	0	0	0	0	0
Wild Goose Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	800m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	1000m	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	1600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	2000m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	5000m	32	1	2	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	8000m	116	4	6	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	9102m (50% QL)	195	9	11	0	0	0	0	0	0	0	0	0	0	0

Table 1.D-2. Tier 2 proximal population and sensitive receptor counts.

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Aliso Canyon	0m	25	1	2	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	100m	34	2	2	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	200m	46	2	3	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	400m	72	3	6	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	600m	98	5	8	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	800m	190	9	13	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	1000m	917	42	43	0	0	0	0	0	0	0	0	0	0	0
Aliso Canyon	1600m	6,479	295	334	1	1	0	735	0	0	0	0	1	1	0
Aliso Canyon	2000m	9,305	420	471	2	2	0	1,857	0	0	0	0	2	2	0
Aliso Canyon	5000m	59,142	2,696	4,248	14	14	0	7,592	22	21	1	0	20	20	0
Aliso Canyon	8000m	236,235	12,760	14,823	79	79	0	49,267	107	96	11	2	75	74	1
Aliso Canyon	9116m (50% QL)	327,500	18,817	19,371	103	103	0	61,206	145	131	14	4	108	107	1
Gill Ranch Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	800m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	1000m	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	1600m	4	1	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	2000m	6	1	0	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	5000m	114	13	3	0	0	0	0	0	0	0	0	0	0	0
Gill Ranch Gas	8000m	556	56	18	0	0	0	0	0	0	0	0	0	0	0

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)	
Gill Ranch Gas	9124m (50% QL)	930	85	29	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Honor Rancho	200m	0	0	0	2	2	1,028	0	0	0	0	0	0	0	0	0
Honor Rancho	400m	118	5	0	2	2	1,028	1	1	1	0	0	0	0	0	0
Honor Rancho	600m	439	25	3	2	2	1,028	1	1	1	0	0	0	0	0	0
Honor Rancho	800m	754	61	7	2	2	1,028	1	1	1	0	0	0	0	0	0
Honor Rancho	1000m	1,502	138	16	2	2	1,028	1	1	1	0	0	0	0	0	0
Honor Rancho	1600m	10,951	476	76	6	6	5,954	1	1	1	0	0	2	2	0	0
Honor Rancho	2000m	15,900	752	163	7	7	6,917	1	1	1	0	0	3	3	0	0
Honor Rancho	5000m	79,937	4,785	2,010	26	26	22,071	16	16	16	0	0	14	14	0	0
Honor Rancho	8000m	156,868	9,506	4,968	45	45	35,369	55	52	52	3	1	27	27	0	0
Honor Rancho	8998m (50% QL)	180,429	11,144	5,810	54	54	38,631	65	61	61	4	1	31	31	0	0
Kirby Hill Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	100m	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	200m	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	400m	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	600m	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	800m	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	1000m	8	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	1600m	16	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	2000m	22	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	5000m	101	7	7	0	0	0	0	0	0	0	0	0	0	0	0
Kirby Hill Gas	8000m	758	44	23	0	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Kirby Hill Gas	9813m (50% QL)	13,608	944	433	2	2	0	0	0	8	0	0	7	7	0
La Goleta Gas	0m	39	1	3	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	100m	67	1	5	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	200m	111	2	7	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	400m	280	3	17	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	600m	791	16	50	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	800m	2,105	26	64	0	0	0	0	0	0	0	0	0	0	0
La Goleta Gas	1000m	2,855	27	70	0	0	0	0	0	0	0	0	1	1	0
La Goleta Gas	1600m	7,875	71	119	0	0	0	0	0	0	0	0	1	1	0
La Goleta Gas	2000m	17,794	377	314	2	2	0	229	0	0	0	1	3	3	0
La Goleta Gas	5000m	67,731	2,515	3,841	15	15	0	8,242	33	33	0	2	15	14	1
La Goleta Gas	8000m	94,421	3,734	6,719	26	26	0	12,132	40	39	1	3	21	20	1
La Goleta Gas	8608m (50% QL)	101,369	4,041	7,611	32	32	0	13,991	42	41	1	3	22	21	1
Lodi Gas	0m	242	12	9	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	100m	310	16	12	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	200m	376	19	14	0	0	0	0	0	0	0	0	0	0	0
Lodi Gas	400m	512	27	20	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	600m	658	34	26	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	800m	809	41	32	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	1000m	963	49	40	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	1600m	1,521	81	69	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	2000m	1,836	98	92	1	1	0	402	0	0	0	0	0	0	0
Lodi Gas	5000m	7,303	404	419	1	1	0	402	0	0	0	0	1	1	0
Lodi Gas	8000m	24,114	1,625	1,595	9	9	0	2,851	2	2	0	0	4	4	0



Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Lodi Gas	7977m (50% QL)	23,759	1,601	1,575	9	9	0	2,851	2	2	0	0	4	4	0
Los Medanos Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Los Medanos Gas	800m	118	6	7	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	1000m	742	45	23	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	1600m	933	58	25	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	2000m	1,537	106	34	1	1	0	211	0	0	0	0	0	0	0
Los Medanos Gas	5000m	47,273	3,545	1,965	15	15	0	5,311	19	16	3	2	11	11	0
Los Medanos Gas	8000m	147,142	10,421	6,752	45	45	0	16,945	66	63	6	2	42	41	0
Los Medanos Gas	9743m (50% QL)	231,030	16,005	10,921	64	64	0	29,580	103	94	9	3	72	72	1
McDonald Island Gas	0m	24	4	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	100m	29	4	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	200m	34	5	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	400m	44	6	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	600m	55	7	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	800m	66	9	1	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	1000m	75	10	1	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)	
McDonald Island Gas	1600m	106	13	1	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	2000m	124	14	2	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	5000m	315	28	9	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	8000m	646	51	17	0	0	0	0	0	0	0	0	0	0	0	0
McDonald Island Gas	9282m (50% QL)	6,373	383	238	0	0	0	0	0	0	0	0	2	2	0	0
Montebello	0m	3,380	210	258	0	0	0	0	0	0	0	0	1	1	0	0
Montebello	100m	4,719	275	389	0	0	0	0	0	0	0	0	1	1	0	0
Montebello	200m	6,247	344	588	0	0	0	0	1	1	0	0	2	2	0	0
Montebello	400m	10,221	533	1,152	2	2	0	2,048	1	1	0	0	3	3	0	0
Montebello	600m	14,656	802	1,553	5	5	0	3,668	1	1	0	1	4	4	0	0
Montebello	800m	19,174	1,026	1,926	6	6	0	4,156	1	1	0	1	6	6	0	0
Montebello	1000m	25,363	1,432	2,384	8	8	0	7,748	1	1	0	1	8	8	0	0
Montebello	1600m	46,399	2,940	3,677	15	15	0	12,324	2	1	1	1	14	14	0	0
Montebello	2000m	66,373	4,356	4,960	19	19	0	14,756	2	1	1	1	20	20	0	0
Montebello	5000m	284,810	18,779	19,589	79	79	0	48,237	5	3	2	4	79	78	1	1
Montebello	8000m	763,179	54,008	43,450	210	210	0	120,267	21	18	3	10	207	206	1	1
Montebello	12037m (50% QL)	1,636,136	115,897	84,019	500	499	1	282,719	73	62	11	26	397	395	2	2
Playa del Rey	0m	3,782	165	193	0	0	0	0	0	0	0	0	0	0	0	0
Playa del Rey	100m	4,858	210	272	0	0	0	0	0	0	0	0	0	0	0	0
Playa del Rey	200m	6,529	273	364	1	1	0	18	0	0	0	0	0	0	0	0
Playa del Rey	400m	9,780	405	542	1	1	0	18	0	0	0	0	0	0	0	0
Playa del Rey	600m	15,275	610	817	3	3	0	649	0	0	0	0	1	1	0	0

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Playa del Rey	800m	21,495	867	1,090	4	4	0	1,686	0	0	0	0	1	1	0
Playa del Rey	1000m	27,113	1,136	1,355	7	7	0	2,633	0	0	0	0	1	1	0
Playa del Rey	1600m	44,816	1,924	2,407	9	9	0	3,604	1	1	0	1	4	4	0
Playa del Rey	2000m	55,833	2,392	2,961	12	12	0	5,067	1	1	0	1	6	6	0
Playa del Rey	5000m	200,561	10,091	11,517	59	59	0	24,611	27	20	7	1	63	62	1
Playa del Rey	8000m	493,459	26,787	27,065	158	158	0	65,306	81	69	12	5	171	169	2
Playa del Rey	9506m (50% QL)	692,222	39,386	38,144	218	218	0	93,325	97	85	12	9	263	260	3
Pleasant Creek	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	200m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	400m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	800m	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	1000m	8	0	0	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	1600m	16	1	1	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	2000m	25	1	1	0	0	0	0	0	0	0	0	0	0	0
Pleasant Creek	5000m	7,082	442	280	4	4	0	0	0	0	0	0	2	2	0
Pleasant Creek	8000m	8,270	522	342	4	4	0	0	0	0	0	0	2	2	0
Pleasant Creek	9553m (50% QL)	8,823	546	374	4	4	0	0	0	0	0	0	2	2	0
Princeton Gas	0m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	100m	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	200m	8	0	0	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	400m	13	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	600m	15	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	800m	16	0	1	0	0	0	0	0	0	0	0	0	0	0

Chapter 1

Facility Name	Buffer Distance	Total Population	Under 5	Age 75 & older	# School Total	# Open Schools	# Schools with Status Pending	# of Children Enrolled in School	# Elderly Care Facilities Total	# Open Elderly Care Facilities	# Elderly Care Facilities with Status Pending	# Hospitals	# Daycares Total (By zip code)	# Open Daycares (By zip code)	# Daycares with Status Pending (By zip code)
Princeton Gas	1000m	18	0	1	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	1600m	29	0	3	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	2000m	43	1	4	0	0	0	0	0	0	0	0	0	0	0
Princeton Gas	5000m	425	14	26	2	2	169	0	0	0	0	0	0	0	0
Princeton Gas	8000m	642	30	47	2	2	169	0	0	0	0	0	0	0	0
Princeton Gas	9686m (50% QL)	849	41	59	2	2	169	0	0	0	0	0	0	0	0
Wild Goose Gas	0m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	100m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	200m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	400m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	600m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	800m	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	1000m	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	1600m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	2000m	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	5000m	32	1	2	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	8000m	116	4	6	0	0	0	0	0	0	0	0	0	0	0
Wild Goose Gas	9102m (50% QL)	196	10	11	0	0	0	0	0	0	0	0	0	0	0

Table 1.D-3. Air dispersion contour quantile level area proximal population counts.

Facility Name	Quantile Level	Contour Level (ug/m3) / (ug/s)	Total population	Area_sqkm	Population density (people/sqkm)
Aliso Canyon	0.999	0.000003406	0	0.4	0.9
Aliso Canyon	0.99	0.000000913	38	4.1	9.3
Aliso Canyon	0.95	0.000000108	6,910	20.1	343.5
Aliso Canyon	0.85	0.000000033	37,027	60.3	613.6
Aliso Canyon	0.75	0.00000002	88,854	100.4	885.0
Aliso Canyon	0.65	0.000000014	144,290	140.7	1,025.8
Aliso Canyon	0.5	0.000000008	219,991	201.0	1,094.6
Aliso Canyon	0.3	0.000000004	291,814	280.9	1,038.8
Gill Ranch Gas	0.999	0.000005412	0	0.4	0.0
Gill Ranch Gas	0.99	0.000000827	0	4.1	0.0
Gill Ranch Gas	0.95	0.000000128	4	19.6	0.2
Gill Ranch Gas	0.85	0.00000004	60	58.9	1.0
Gill Ranch Gas	0.75	0.000000023	168	98.2	1.7
Gill Ranch Gas	0.65	0.000000015	279	137.6	2.0
Gill Ranch Gas	0.5	0.000000009	492	196.5	2.5
Gill Ranch Gas	0.3	0.000000005	730	274.7	2.7
Honor Rancho	0.999	0.000006752	0	0.4	0.2
Honor Rancho	0.99	0.000001172	256	4.0	64.8
Honor Rancho	0.95	0.000000155	8,248	19.7	419.0
Honor Rancho	0.85	0.000000049	23,776	58.9	403.3
Honor Rancho	0.75	0.00000003	41,099	98.2	418.6
Honor Rancho	0.65	0.000000022	61,410	137.6	446.1
Honor Rancho	0.5	0.000000015	90,520	196.5	460.7
Honor Rancho	0.3	0.000000007	144,537	275.1	525.3
Kirby Hill Gas	0.999	0.000007042	0	0.4	0.7
Kirby Hill Gas	0.99	0.000000718	4	3.7	1.2
Kirby Hill Gas	0.95	0.000000115	21	18.2	1.2
Kirby Hill Gas	0.85	0.00000004	129	54.4	2.4
Kirby Hill Gas	0.75	0.000000022	180	90.7	2.0
Kirby Hill Gas	0.65	0.000000014	218	126.9	1.7
Kirby Hill Gas	0.5	0.000000009	272	181.5	1.5
Kirby Hill Gas	0.3	0.000000005	334	253.8	1.3
La Goleta Gas	0.999	0.000009701	26	0.3	76.2
La Goleta Gas	0.99	0.000000782	695	3.5	196.6
La Goleta Gas	0.95	0.000000137	14,542	17.9	810.3
La Goleta Gas	0.85	0.000000047	57,823	53.6	1,079.6
La Goleta Gas	0.75	0.000000029	75,858	89.3	849.4
La Goleta Gas	0.65	0.000000021	89,830	125.1	718.3
La Goleta Gas	0.5	0.000000015	99,546	178.6	557.2

<b>Facility Name</b>	<b>Quantile Level</b>	<b>Contour Level (ug/m<sup>3</sup>) / (ug/s)</b>	<b>Total population</b>	<b>Area_sqkm</b>	<b>Population density (people/sqkm)</b>
La Goleta Gas	0.3	0.000000008	108,316	250.1	433.0
Facility Name	Quantile Level	Contour Level (ug/m <sup>3</sup> ) / (ug/s)	Total population	Area_sqkm	Population density (people/sqkm)
Lodi Gas	0.999	0.000009251	18	0.4	48.5
Lodi Gas	0.99	0.000000897	218	3.7	59.0
Lodi Gas	0.95	0.000000152	1,056	18.3	57.6
Lodi Gas	0.85	0.00000005	3,243	54.9	59.0
Lodi Gas	0.75	0.00000003	5,520	91.4	60.4
Lodi Gas	0.65	0.000000022	7,010	128.1	54.7
Lodi Gas	0.5	0.000000015	13,634	182.6	74.7
Lodi Gas	0.3	0.000000008	23,438	256.0	91.6
Los Medanos Gas	0.999	0.000005573	0	0.4	0.0
Los Medanos Gas	0.99	0.000000508	10	3.8	2.8
Los Medanos Gas	0.95	0.000000088	2,326	18.8	123.4
Los Medanos Gas	0.85	0.00000003	14,237	56.5	252.0
Los Medanos Gas	0.75	0.000000018	24,188	94.1	257.1
Los Medanos Gas	0.65	0.000000011	44,382	131.6	337.3
Los Medanos Gas	0.5	0.000000006	90,444	188.3	480.3
Los Medanos Gas	0.3	0.000000003	174,768	263.4	663.6
McDonald Island Gas	0.999	0.000007966	3	0.4	7.1
McDonald Island Gas	0.99	0.000000828	25	4.0	6.2
McDonald Island Gas	0.95	0.000000127	95	19.6	4.8
McDonald Island Gas	0.85	0.000000042	222	58.7	3.8
McDonald Island Gas	0.75	0.000000026	309	97.7	3.2
McDonald Island Gas	0.65	0.000000018	3,767	136.9	27.5
McDonald Island Gas	0.5	0.000000011	6,223	195.4	31.9
McDonald Island Gas	0.3	0.000000006	8,115	273.8	29.6
Montebello	0.999	0.000006407	133	0.4	366.5
Montebello	0.99	0.00000124	3,038	4.0	758.6
Montebello	0.95	0.000000173	30,779	20.0	1,538.4
Montebello	0.85	0.000000053	178,963	60.0	2,982.0
Montebello	0.75	0.000000031	313,758	99.9	3,140.6
Montebello	0.65	0.00000002	422,241	139.9	3,018.0
Montebello	0.5	0.000000012	607,185	199.6	3,041.9
Montebello	0.3	0.000000006	864,751	279.6	3,093.3
Playa del Rey	0.999	0.000010763	263	0.4	714.4
Playa del Rey	0.99	0.000000962	6,613	3.7	1,775.4
Playa del Rey	0.95	0.00000017	36,590	18.6	1,966.5
Playa del Rey	0.85	0.000000057	106,209	55.6	1,910.2
Playa del Rey	0.75	0.000000035	161,038	92.7	1,737.2
Playa del Rey	0.65	0.000000025	223,529	129.6	1,724.6

Chapter 1

<b>Facility Name</b>	<b>Quantile Level</b>	<b>Contour Level (ug/m3) / (ug/s)</b>	<b>Total population</b>	<b>Area_sqkm</b>	<b>Population density (people/sqkm)</b>
Playa del Rey	0.5	0.000000015	343,059	184.9	1,855.0
Playa del Rey	0.3	0.000000008	521,508	259.1	2,012.4
Pleasant Creek Gas	0.999	0.000008506	0	0.3	0.7
Pleasant Creek Gas	0.99	0.000000623	2	3.6	0.7
Pleasant Creek Gas	0.95	0.000000116	28	17.8	1.6
Pleasant Creek Gas	0.85	0.00000004	6,123	53.3	114.9
Pleasant Creek Gas	0.75	0.000000025	7,413	88.7	83.6
Pleasant Creek Gas	0.65	0.000000018	7,704	124.1	62.1
Pleasant Creek Gas	0.5	0.000000012	8,103	177.4	45.7
Pleasant Creek Gas	0.3	0.000000007	8,502	248.2	34.2
Princeton Gas	0.999	0.00000921	3	0.3	9.5
Princeton Gas	0.99	0.000000628	15	3.5	4.5
Princeton Gas	0.95	0.000000127	35	17.2	2.0
Princeton Gas	0.85	0.000000044	309	51.8	6.0
Princeton Gas	0.75	0.000000027	427	86.3	4.9
Princeton Gas	0.65	0.00000002	472	120.9	3.9
Princeton Gas	0.5	0.000000014	569	172.7	3.3
Princeton Gas	0.3	0.000000009	682	241.6	2.8
Wild Goose Gas	0.999	0.000010589	0	0.3	0.0
Wild Goose Gas	0.99	0.000000742	2	3.4	0.5
Wild Goose Gas	0.95	0.00000016	4	16.7	0.2
Wild Goose Gas	0.85	0.000000056	16	50.1	0.3
Wild Goose Gas	0.75	0.000000035	31	83.4	0.4
Wild Goose Gas	0.65	0.000000025	53	116.6	0.5
Wild Goose Gas	0.5	0.000000018	97	166.6	0.6
Wild Goose Gas	0.3	0.000000013	176	233.0	0.8

**References for Appendix 1.D.**

- California Department of Education, 2017a. Public schools and districts data files. <http://www.cde.ca.gov/ds/si/ds/pubschls.asp>. Accessed 11 May 2017
- California Department of Education, 2017b. Private Schools. <http://www.cde.ca.gov/ds/si/ps/index.asp>. Accessed 11 May 2017
- California Department of Education, 2017c. California nonpublic, nonsectarian schools and agencies certification data worksheet. In: Data collection & reporting. <http://www.cde.ca.gov/sp/se/ds/>. Accessed 11 May 2017
- California Department of Education, 2016. Private schools frequently asked questions. <http://www.cde.ca.gov/sp/ps/psfaq.asp#a10>. Accessed 9 Jul 2017
- California Department of Social Services, 2017a. Download data. In: Social Services - Community Care Facility search. <https://secure.dss.ca.gov/CareFacilitySearch/DownloadData>. Accessed 11 May 2017
- California Department of Social Services, 2017b. Types of child care in California. In: Resources for Parents. <http://www.cdss.ca.gov/inforesources/Child-Care-Licensing/Resources-for-Parents>. Accessed 10 Jul 2017
- California Office of Statewide Health Planning and Development, 2017. Healthcare facilities. In: Maps, GIS and Data. <https://www.oshpd.ca.gov/HWDD/Research-Policy-Planning-GIS.html>. Accessed 11 May 2017
- Davies RJ, Almond S, Ward RS, et al., 2014. Oil and gas wells and their integrity: Implications for shale and unconventional resource exploitation. *Marine and Petroleum Geology* 56:239–254. doi: 10.1016/j.marpetgeo.2014.03.001
- DOGGR, 2015. GIS mapping. <http://www.conservation.ca.gov/dog/maps/Pages/GISMapping2.aspx>. Accessed 7 Jul 2017
- DOGGR, 2014. Status and type codes. [ftp://ftp.consrv.ca.gov/pub/oil/new\\_database\\_format/Status%20and%20Type%20Codes.pdf](ftp://ftp.consrv.ca.gov/pub/oil/new_database_format/Status%20and%20Type%20Codes.pdf). Accessed 9 Jul 2017
- DOGGR, 2017. FTP production/injection database. [ftp://ftp.consrv.ca.gov/pub/oil/new\\_database\\_format/](ftp://ftp.consrv.ca.gov/pub/oil/new_database_format/). Accessed 9 Jul 2017
- Evans D.J., 2009. A review of underground fuel storage events and putting risk into perspective with other areas of the energy supply chain. Geological Society, London, Special Publications 313:173–216. DOI 10.1144/SP313.12
- Ingraffea, A.R., M.T. Wells, R.L. Santoro, and S.B.C. Shonkoff, 2014. Assessment and risk analysis of casing and cement impairment in oil and gas wells in Pennsylvania, 2000–2012. *Proceedings of the National Academy of Sciences*, 201323422. DOI: 10.1073/pnas.1323422111
- Jordan, P.D., and S.M. Benson, 2009. Well blowout rates and consequences in California Oil and Gas District 4 from 1991 to 2005: Implications for geological storage of carbon dioxide. *Environ Geol.*, 57, 1103–1123. DOI: 10.1007/s00254-008-1403-0
- Kang M, Christian S, Celia MA, et al., 2016. Identification and characterization of high methane-emitting abandoned oil and gas wells. *Proceedings of the National Academy of Sciences*, 113, 13636–13641. DOI: 10.1073/pnas.1605913113
- Los Angeles County Department of Health, 2016. Aliso Canyon gas leak results of air monitoring and assessments of health. <http://www.publichealth.lacounty.gov/media/docs/AlisoAir.pdf>. Accessed 11 Jul 2017
- Michanowicz, D.R., J.J. Buonocore, S.T. Rowland, et al., 2017. A national assessment of underground natural gas storage: identifying wells with designs likely vulnerable to a single-point-of-failure. *Environ Res Lett* 12, 064004. DOI: 10.1088/1748-9326/aa7030
- Miyazaki, B., 2009. Well integrity: An overlooked source of risk and liability for underground natural gas storage. Lessons learned from incidents in the USA. Geological Society, London, Special Publications 313, 163–172. DOI: 10.1144/SP313.11



- Townsend-Small, A., T.W. Ferrara, D.R. Lyon, et al., 2016. Emissions of coalbed and natural gas methane from abandoned oil and gas wells in the United States. *Geophysical Research Letters*, 43, 2283–2290. DOI: 10.1002/2015GL067623
- U.S. Census Bureau, 2011. 2010 Census summary file 1. Demographic data files. [http://www2.census.gov/census\\_2010/04-Summary\\_File\\_1/](http://www2.census.gov/census_2010/04-Summary_File_1/). Accessed 23 Apr 2015
- Yang, C., W. Jing, J.J.K. Daemen, et al., 2013. Analysis of major risks associated with hydrocarbon storage caverns in bedded salt rock. *Reliability Engineering & System Safety*, 113, 94–111. DOI: 10.1016/j.res.2012.12.017