Appendix A

Air Quality and Greenhouse Gas Emissions Data

Cantara Trunk Line Detailed Report

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1.1. Basic Project Information

Data Field	Value
Project Name	Cantara Trunk Line
Construction Start Date	7/1/2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	20.6
Location	34.21579991401883, -118.39305187880771
County	Los Angeles-South Coast
City	Los Angeles
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	3880
EDFZ	17
Electric Utility	Los Angeles Department of Water & Power
Gas Utility	Southern California Gas
App Version	2022.1.1.29

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Asphalt Surfaces	383,488	1000sqft	8,804	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.86	2.37	20.7	25.7	0.05	0.75	0.72	1.42	0.69	0.18	0.85	—	5,859	5,859	0.24	0.20	3.73	5,925
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.86	2.37	20.8	25.4	0.05	0.75	0.72	1.42	0.69	0.18	0.85	—	5,837	5,837	0.25	0.21	0.10	5,900
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.67	1.38	11.9	17.4	0.04	0.33	0.51	0.80	0.31	0.13	0.42	—	4,063	4,063	0.16	0.13	0.93	4,104
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.30	0.25	2.17	3.17	0.01	0.06	0.09	0.15	0.06	0.02	0.08	—	673	673	0.03	0.02	0.15	679

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.86	2.37	20.7	25.7	0.05	0.75	0.67	1.42	0.69	0.17	0.85	—	5,859	5,859	0.24	0.19	3.73	5,925

2027	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
2029	2.35	1.93	15.9	23.4	0.05	0.47	0.72	1.20	0.44	0.18	0.62	—	5,284	5,284	0.21	0.20	3.28	5,353
2030	2.25	1.86	15.6	23.2	0.05	0.45	0.72	1.17	0.41	0.18	0.59	—	5,249	5,249	0.20	0.20	3.02	5,317
2031	2.40	1.98	17.1	24.7	0.05	0.51	0.67	1.17	0.47	0.17	0.63	—	5,716	5,716	0.22	0.16	2.48	5,772
2032	2.33	1.92	16.5	24.4	0.05	0.46	0.67	1.13	0.43	0.17	0.59	—	5,687	5,687	0.22	0.16	2.27	5,742
2033	2.27	1.87	16.1	24.3	0.05	0.42	0.67	1.09	0.39	0.17	0.55	—	5,659	5,659	0.22	0.15	2.08	5,713
2034	2.21	1.84	15.7	24.2	0.05	0.40	0.67	1.06	0.37	0.17	0.53	—	5,632	5,632	0.21	0.15	1.90	5,684
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	2.86	2.37	20.8	25.4	0.05	0.75	0.67	1.42	0.69	0.17	0.85	—	5,837	5,837	0.25	0.19	0.10	5,900
2027	2.76	2.28	20.0	25.2	0.05	0.69	0.67	1.35	0.63	0.17	0.80	—	5,812	5,812	0.23	0.18	0.09	5,873
2029	2.33	1.92	16.0	23.1	0.05	0.47	0.72	1.20	0.44	0.18	0.62	—	5,263	5,263	0.21	0.21	0.09	5,329
2030	2.25	1.86	15.6	23.0	0.05	0.45	0.72	1.17	0.41	0.18	0.59	—	5,229	5,229	0.20	0.20	0.08	5,294
2031	2.40	1.98	17.2	24.4	0.05	0.51	0.67	1.17	0.47	0.17	0.63	—	5,696	5,696	0.22	0.17	0.06	5,753
2032	2.33	1.92	16.6	24.2	0.05	0.46	0.67	1.13	0.43	0.17	0.59	—	5,668	5,668	0.22	0.16	0.06	5,720
2033	2.27	1.87	16.1	24.1	0.05	0.42	0.67	1.09	0.39	0.17	0.55	—	5,640	5,640	0.22	0.15	0.05	5,691
2034	2.21	1.84	15.8	24.0	0.05	0.40	0.67	1.06	0.37	0.17	0.53	—	5,613	5,613	0.21	0.15	0.05	5,663
2035	2.16	1.79	15.3	23.7	0.05	0.37	0.67	1.04	0.34	0.17	0.51	—	5,589	5,589	0.21	0.15	0.03	5,638
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.03	0.85	7.49	9.17	0.02	0.27	0.24	0.51	0.25	0.06	0.31	—	2,104	2,104	0.09	0.07	0.58	2,127
2027	0.32	0.27	2.35	2.96	0.01	0.08	0.08	0.16	0.07	0.02	0.09	—	683	683	0.03	0.02	0.17	690
2029	0.87	0.72	6.00	8.19	0.02	0.18	0.34	0.52	0.17	0.09	0.25	—	2,054	2,054	0.08	0.09	0.68	2,084
2030	1.06	0.87	7.39	9.68	0.02	0.22	0.51	0.73	0.20	0.13	0.33	—	2,645	2,645	0.10	0.13	0.93	2,688
2031	1.57	1.30	11.2	16.0	0.03	0.33	0.43	0.76	0.30	0.11	0.41	—	3,727	3,727	0.14	0.11	0.70	3,765
2032	1.67	1.38	11.9	17.4	0.04	0.33	0.47	0.80	0.31	0.12	0.42	—	4,063	4,063	0.16	0.12	0.70	4,104
2033	1.62	1.34	11.5	17.2	0.04	0.30	0.47	0.77	0.28	0.12	0.39	—	4,032	4,032	0.16	0.11	0.64	4,069
2034	1.58	1.31	11.3	17.2	0.04	0.28	0.47	0.75	0.26	0.12	0.38	—	4,013	4,013	0.15	0.11	0.59	4,049

2035	0.14	0.11	0.96	1.49	< 0.005	0.02	0.04	0.06	0.02	0.01	0.03	—	350	350	0.01	0.01	0.03	353
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.19	0.16	1.37	1.67	< 0.005	0.05	0.04	0.09	0.05	0.01	0.06	—	348	348	0.01	0.01	0.10	352
2027	0.06	0.05	0.43	0.54	< 0.005	0.01	0.01	0.03	0.01	< 0.005	0.02	—	113	113	< 0.005	< 0.005	0.03	114
2029	0.16	0.13	1.10	1.49	< 0.005	0.03	0.06	0.10	0.03	0.02	0.05	—	340	340	0.01	0.02	0.11	345
2030	0.19	0.16	1.35	1.77	< 0.005	0.04	0.09	0.13	0.04	0.02	0.06	—	438	438	0.02	0.02	0.15	445
2031	0.29	0.24	2.05	2.92	0.01	0.06	0.08	0.14	0.06	0.02	0.08	—	617	617	0.02	0.02	0.12	623
2032	0.30	0.25	2.17	3.17	0.01	0.06	0.09	0.15	0.06	0.02	0.08	—	673	673	0.03	0.02	0.12	679
2033	0.30	0.24	2.10	3.15	0.01	0.05	0.09	0.14	0.05	0.02	0.07	—	668	668	0.03	0.02	0.11	674
2034	0.29	0.24	2.06	3.13	0.01	0.05	0.09	0.14	0.05	0.02	0.07	—	664	664	0.03	0.02	0.10	670
2035	0.02	0.02	0.18	0.27	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.01	—	58.0	58.0	< 0.005	< 0.005	0.01	58.5

3. Construction Emissions Details

3.1. #1 Construction of Jacking and Receiving Pits (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.16	1.80	14.7	21.2	0.04	0.46	—	0.46	0.43	—	0.43	—	3,827	3,827	0.16	0.03	—	3,841
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.27	2.21	3.19	0.01	0.07	—	0.07	0.06	—	0.06	—	577	577	0.02	< 0.005	—	579
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.40	0.58	< 0.005	0.01	—	0.01	0.01	—	0.01	—	95.5	95.5	< 0.005	< 0.005	—	95.8
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.10	1.69	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	411	411	< 0.005	0.02	1.07	416
Vendor	0.03	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	407	407	0.01	0.06	0.99	426
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	636	636	0.03	0.10	1.22	668
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.23	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	59.5	59.5	< 0.005	< 0.005	0.07	60.3
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	61.3	61.3	< 0.005	0.01	0.06	64.1
Hauling	0.01	< 0.005	0.12	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	95.9	95.9	< 0.005	0.02	0.08	101
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.85	9.85	< 0.005	< 0.005	0.01	9.98
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.2	10.2	< 0.005	< 0.005	0.01	10.6
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.9	15.9	< 0.005	< 0.005	0.01	16.7

3.3. #1 Pipe Installation via Jacking (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.80	0.66	5.46	5.00	0.01	0.21	—	0.21	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.80	0.66	5.46	5.00	0.01	0.21	—	0.21	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.82	0.75	< 0.005	0.03	—	0.03	0.03	—	0.03	—	185	185	0.01	< 0.005	—	185
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.6	30.6	< 0.005	< 0.005	—	30.7
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.12	0.11	0.10	1.69	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	411	411	< 0.005	0.02	1.07	416
Vendor	0.03	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	407	407	0.01	0.06	0.99	426
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	636	636	0.03	0.10	1.22	668

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.11	1.43	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	389	389	< 0.005	0.02	0.03	394
Vendor	0.03	0.01	0.44	0.21	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	407	407	0.01	0.06	0.03	425
Hauling	0.04	0.01	0.77	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	637	637	0.03	0.10	0.03	667
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.23	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	59.5	59.5	< 0.005	< 0.005	0.07	60.3
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	61.3	61.3	< 0.005	0.01	0.06	64.1
Hauling	0.01	< 0.005	0.12	0.05	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	95.9	95.9	< 0.005	0.02	0.08	101
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.85	9.85	< 0.005	< 0.005	0.01	9.98
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.2	10.2	< 0.005	< 0.005	0.01	10.6
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.9	15.9	< 0.005	< 0.005	0.01	16.7

3.5. #2 Construction of Jacking and Receiving Pits (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.16	1.80	14.7	21.2	0.04	0.46	—	0.46	0.43	—	0.43	—	3,827	3,827	0.16	0.03	—	3,841

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.27	2.17	3.14	0.01	0.07	—	0.07	0.06	—	0.06	—	566	566	0.02	< 0.005	—	568
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.40	0.57	< 0.005	0.01	—	0.01	0.01	—	0.01	—	93.8	93.8	< 0.005	< 0.005	—	94.1
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.11	1.43	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	389	389	< 0.005	0.02	0.03	394

Vendor	0.03	0.01	0.44	0.21	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	407	407	0.01	0.06	0.03	425
Hauling	0.04	0.01	0.77	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	637	637	0.03	0.10	0.03	667
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.22	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.4	58.4	< 0.005	< 0.005	0.07	59.2
Vendor	< 0.005	< 0.005	0.07	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	60.2	60.2	< 0.005	0.01	0.06	62.9
Hauling	0.01	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	94.2	94.2	< 0.005	0.01	0.08	98.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.68	9.68	< 0.005	< 0.005	0.01	9.80
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.97	9.97	< 0.005	< 0.005	0.01	10.4
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	15.6	15.6	< 0.005	< 0.005	0.01	16.3

3.7. #2 Pipe Installation via Jacking (2029) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.80	0.66	5.46	5.00	0.01	0.21	—	0.21	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.16	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	36.0	36.0	< 0.005	< 0.005	—	36.1
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.96	5.96	< 0.005	< 0.005	—	5.98
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.11	1.43	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	389	389	< 0.005	0.02	0.03	394
Vendor	0.03	0.01	0.44	0.21	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	407	407	0.01	0.06	0.03	425
Hauling	0.04	0.01	0.77	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	637	637	0.03	0.10	0.03	667
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.6	11.6	< 0.005	< 0.005	0.01	11.7

Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.9	11.9	< 0.005	< 0.005	0.01	12.5
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	18.7	18.7	< 0.005	< 0.005	0.02	19.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.92	1.92	< 0.005	< 0.005	< 0.005	1.94
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.98	1.98	< 0.005	< 0.005	< 0.005	2.07
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.09	3.09	< 0.005	< 0.005	< 0.005	3.24

3.9. #2 Pipe Installation via Jacking (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78	0.65	5.38	4.99	0.01	0.20	—	0.20	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.09	0.08	0.63	0.59	< 0.005	0.02	—	0.02	0.02	—	0.02	—	144	144	0.01	< 0.005	—	145

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.12	0.11	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	23.8	23.8	< 0.005	< 0.005	—	23.9
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.10	1.34	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	383	383	< 0.005	0.02	0.02	388
Vendor	0.02	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.02	412
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	0.03	651
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.17	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	45.6	45.6	< 0.005	< 0.005	0.05	46.2
Vendor	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	46.4	46.4	< 0.005	0.01	0.05	48.4
Hauling	0.01	< 0.005	0.09	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	72.9	72.9	< 0.005	0.01	0.06	76.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.55	7.55	< 0.005	< 0.005	0.01	7.65

Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.68	7.68	< 0.005	< 0.005	0.01	8.02
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	12.1	12.1	< 0.005	< 0.005	0.01	12.7

3.11. #3 Construction of Jacking and Receiving Pits (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.74	14.4	21.1	0.04	0.44	—	0.44	0.40	—	0.40	—	3,827	3,827	0.16	0.03	—	3,840
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.74	14.4	21.1	0.04	0.44	—	0.44	0.40	—	0.40	—	3,827	3,827	0.16	0.03	—	3,840
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.31	0.26	2.13	3.13	0.01	0.06	—	0.06	0.06	—	0.06	—	566	566	0.02	< 0.005	—	568
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.06	0.05	0.39	0.57	< 0.005	0.01	—	0.01	0.01	—	0.01	—	93.7	93.7	< 0.005	< 0.005	—	94.1
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.08	1.59	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	404	404	< 0.005	0.02	0.95	409
Vendor	0.02	0.01	0.40	0.19	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.94	413
Hauling	0.04	0.01	0.71	0.29	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	1.13	652
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.10	1.34	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	383	383	< 0.005	0.02	0.02	388
Vendor	0.02	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.02	412
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	0.03	651
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.21	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	57.5	57.5	< 0.005	< 0.005	0.06	58.2

Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	58.5	58.5	< 0.005	0.01	0.06	61.0
Hauling	0.01	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	91.8	91.8	< 0.005	0.01	0.07	96.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.52	9.52	< 0.005	< 0.005	0.01	9.64
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.68	9.68	< 0.005	< 0.005	0.01	10.1
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	15.2	15.2	< 0.005	< 0.005	0.01	16.0

3.13. #3 Pipe Installation via Jacking (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78	0.65	5.38	4.99	0.01	0.20	—	0.20	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.81	0.75	< 0.005	0.03	—	0.03	0.03	—	0.03	—	185	185	0.01	< 0.005	—	185

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.14	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.6	30.6	< 0.005	< 0.005	—	30.7
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.08	1.59	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	404	404	< 0.005	0.02	0.95	409
Vendor	0.02	0.01	0.40	0.19	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.94	413
Hauling	0.04	0.01	0.71	0.29	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	1.13	652
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.01	0.01	0.21	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	58.6	58.6	< 0.005	< 0.005	0.06	59.3
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	59.5	59.5	< 0.005	0.01	0.06	62.2
Hauling	0.01	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	93.5	93.5	< 0.005	0.02	0.07	98.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.70	9.70	< 0.005	< 0.005	0.01	9.82

Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.86	9.86	< 0.005	< 0.005	0.01	10.3
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.5	15.5	< 0.005	< 0.005	0.01	16.3

3.15. #4 Construction of Jacking and Receiving Pits (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.74	14.4	21.1	0.04	0.44	—	0.44	0.40	—	0.40	—	3,827	3,827	0.16	0.03	—	3,840
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.08	1.74	14.4	21.1	0.04	0.44	—	0.44	0.40	—	0.40	—	3,827	3,827	0.16	0.03	—	3,840
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.31	0.26	2.13	3.13	0.01	0.06	—	0.06	0.06	—	0.06	—	566	566	0.02	< 0.005	—	568
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.06	0.05	0.39	0.57	< 0.005	0.01	—	0.01	0.01	—	0.01	—	93.7	93.7	< 0.005	< 0.005	—	94.1
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.08	1.59	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	404	404	< 0.005	0.02	0.95	409
Vendor	0.02	0.01	0.40	0.19	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.94	413
Hauling	0.04	0.01	0.71	0.29	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	1.13	652
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.10	1.34	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	383	383	< 0.005	0.02	0.02	388
Vendor	0.02	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.02	412
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	0.03	651
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.21	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	57.5	57.5	< 0.005	< 0.005	0.06	58.2

Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	58.5	58.5	< 0.005	0.01	0.06	61.0
Hauling	0.01	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	91.8	91.8	< 0.005	0.01	0.07	96.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.52	9.52	< 0.005	< 0.005	0.01	9.64
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.68	9.68	< 0.005	< 0.005	0.01	10.1
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	15.2	15.2	< 0.005	< 0.005	0.01	16.0

3.17. #4 Pipe Installation via Jacking (2030) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.78	0.65	5.38	4.99	0.01	0.20	—	0.20	0.19	—	0.19	—	1,227	1,227	0.05	0.01	—	1,231
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.10	0.80	0.74	< 0.005	0.03	—	0.03	0.03	—	0.03	—	181	181	0.01	< 0.005	—	182

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.15	0.13	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.0	30.0	< 0.005	< 0.005	—	30.2
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.10	0.10	1.34	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	383	383	< 0.005	0.02	0.02	388
Vendor	0.02	0.01	0.42	0.20	< 0.005	< 0.005	0.12	0.12	< 0.005	0.03	0.04	—	395	395	0.01	0.06	0.02	412
Hauling	0.04	0.01	0.74	0.30	< 0.005	0.01	0.19	0.19	0.01	0.05	0.06	—	621	621	0.03	0.10	0.03	651
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.21	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	57.5	57.5	< 0.005	< 0.005	0.06	58.2
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	58.5	58.5	< 0.005	0.01	0.06	61.0
Hauling	0.01	< 0.005	0.11	0.04	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	91.8	91.8	< 0.005	0.01	0.07	96.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	9.52	9.52	< 0.005	< 0.005	0.01	9.64

Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.68	9.68	< 0.005	< 0.005	0.01	10.1
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	—	15.2	15.2	< 0.005	< 0.005	0.01	16.0

3.19. Open Trench Construction (8-Inch Distribution Mainline) (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.67	2.23	19.6	23.1	0.05	0.74	—	0.74	0.68	—	0.68	—	4,519	4,519	0.18	0.04	—	4,534
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.67	2.23	19.6	23.1	0.05	0.74	—	0.74	0.68	—	0.68	—	4,519	4,519	0.18	0.04	—	4,534
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.96	0.80	7.04	8.34	0.02	0.27	—	0.27	0.24	—	0.24	—	1,627	1,627	0.07	0.01	—	1,633
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.18	0.15	1.29	1.52	< 0.005	0.05	—	0.05	0.04	—	0.04	—	269	269	0.01	< 0.005	—	270
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.12	2.07	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	434	434	0.02	0.02	1.47	440
Vendor	0.04	0.01	0.55	0.27	< 0.005	0.01	0.14	0.14	< 0.005	0.04	0.04	—	499	499	0.02	0.07	1.35	522
Hauling	0.03	0.01	0.49	0.19	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	408	408	0.02	0.07	0.92	429
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.12	0.14	1.76	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	411	411	0.02	0.02	0.04	416
Vendor	0.04	0.01	0.58	0.27	< 0.005	0.01	0.14	0.14	< 0.005	0.04	0.04	—	499	499	0.02	0.07	0.03	521
Hauling	0.03	0.01	0.51	0.20	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	408	408	0.02	0.07	0.02	428
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.05	0.66	0.00	0.00	0.15	0.15	0.00	0.03	0.03	—	150	150	0.01	0.01	0.23	152

Vendor	0.01	0.01	0.21	0.10	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.01	—	180	180	0.01	0.03	0.21	188
Hauling	0.01	< 0.005	0.19	0.07	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	147	147	0.01	0.02	0.14	154
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.12	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	24.9	24.9	< 0.005	< 0.005	0.04	25.2
Vendor	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	29.7	29.7	< 0.005	< 0.005	0.03	31.1
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.3	24.3	< 0.005	< 0.005	0.02	25.6

3.21. Open Trench Construction (8-Inch Distribution Mainline) (2027) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.58	2.15	18.8	23.1	0.05	0.68	—	0.68	0.62	—	0.62	—	4,519	4,519	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.30	0.25	2.21	2.71	0.01	0.08	—	0.08	0.07	—	0.07	—	531	531	0.02	< 0.005	—	532

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.40	0.49	< 0.005	0.01	—	0.01	0.01	—	0.01	—	87.9	87.9	< 0.005	< 0.005	—	88.2
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.13	0.11	0.14	1.63	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	403	403	0.01	0.02	0.03	408
Vendor	0.03	0.01	0.55	0.26	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	489	489	0.02	0.07	0.03	510
Hauling	0.03	0.01	0.49	0.19	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	400	400	0.02	0.07	0.02	420
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.02	0.20	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	48.0	48.0	< 0.005	< 0.005	0.07	48.7
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	57.5	57.5	< 0.005	0.01	0.06	59.9
Hauling	< 0.005	< 0.005	0.06	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	47.0	47.0	< 0.005	0.01	0.04	49.4
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.95	7.95	< 0.005	< 0.005	0.01	8.05

Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	9.51	9.51	< 0.005	< 0.005	0.01	9.92
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.78	7.78	< 0.005	< 0.005	0.01	8.17

3.23. Open Trench Construction (TL and 20-inch distribution mainline) (2031) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.25	1.88	16.2	22.8	0.05	0.50	—	0.50	0.46	—	0.46	—	4,519	4,519	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.25	1.88	16.2	22.8	0.05	0.50	—	0.50	0.46	—	0.46	—	4,519	4,519	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	1.47	1.23	10.6	14.9	0.03	0.32	—	0.32	0.30	—	0.30	—	2,954	2,954	0.12	0.02	—	2,964
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Roa d Equipm ent	0.27	0.22	1.93	2.72	0.01	0.06	—	0.06	0.05	—	0.05	—	489	489	0.02	< 0.005	—	491
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.08	0.08	1.48	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	398	398	< 0.005	< 0.005	0.84	399
Vendor	0.03	0.01	0.44	0.21	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	437	437	0.02	0.06	1.01	457
Hauling	0.02	0.01	0.41	0.17	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	363	363	0.02	0.06	0.62	381
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.10	0.08	0.10	1.26	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	377	377	< 0.005	0.02	0.02	382
Vendor	0.03	0.01	0.46	0.22	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	437	437	0.02	0.06	0.03	456
Hauling	0.02	0.01	0.43	0.17	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	363	363	0.02	0.06	0.02	381
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.86	0.00	0.00	0.27	0.27	0.00	0.06	0.06	—	250	250	< 0.005	0.01	0.24	253

Vendor	0.02	0.01	0.30	0.14	< 0.005	< 0.005	0.09	0.09	< 0.005	0.02	0.03	—	286	286	0.01	0.04	0.29	298
Hauling	0.02	< 0.005	0.28	0.11	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	—	237	237	0.01	0.04	0.18	249
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.16	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	41.4	41.4	< 0.005	< 0.005	0.04	42.0
Vendor	< 0.005	< 0.005	0.05	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	47.3	47.3	< 0.005	0.01	0.05	49.4
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	39.3	39.3	< 0.005	0.01	0.03	41.2

3.25. Open Trench Construction (TL and 20-inch distribution mainline) (2032) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.19	1.83	15.6	22.6	0.05	0.45	—	0.45	0.42	—	0.42	—	4,520	4,520	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.19	1.83	15.6	22.6	0.05	0.45	—	0.45	0.42	—	0.42	—	4,520	4,520	0.18	0.04	—	4,535

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.57	1.31	11.2	16.2	0.03	0.33	—	0.33	0.30	—	0.30	—	3,237	3,237	0.13	0.03	—	3,248
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.24	2.05	2.96	0.01	0.06	—	0.06	0.05	—	0.05	—	536	536	0.02	< 0.005	—	538
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.40	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	392	392	< 0.005	< 0.005	0.74	394
Vendor	0.03	0.01	0.42	0.21	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	422	422	0.02	0.06	0.96	441
Hauling	0.02	0.01	0.40	0.17	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	354	354	0.02	0.06	0.57	372

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	1.18	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	372	372	< 0.005	< 0.005	0.02	373
Vendor	0.03	0.01	0.44	0.21	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	422	422	0.02	0.06	0.02	441
Hauling	0.02	0.01	0.42	0.17	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	354	354	0.02	0.06	0.01	371
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.89	0.00	0.00	0.30	0.30	0.00	0.07	0.07	—	270	270	< 0.005	0.01	0.23	274
Vendor	0.02	0.01	0.31	0.15	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	302	302	0.01	0.04	0.30	316
Hauling	0.02	< 0.005	0.30	0.12	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.03	—	253	253	0.01	0.04	0.18	266
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.16	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	44.8	44.8	< 0.005	< 0.005	0.04	45.4
Vendor	< 0.005	< 0.005	0.06	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	50.0	50.0	< 0.005	0.01	0.05	52.3
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	41.9	41.9	< 0.005	0.01	0.03	44.0

3.27. Open Trench Construction (TL and 20-inch distribution mainline) (2033) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.13	1.78	15.2	22.6	0.05	0.41	—	0.41	0.38	—	0.38	—	4,520	4,520	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.13	1.78	15.2	22.6	0.05	0.41	—	0.41	0.38	—	0.38	—	4,520	4,520	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.52	1.27	10.9	16.2	0.03	0.29	—	0.29	0.27	—	0.27	—	3,228	3,228	0.13	0.03	—	3,239
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.28	0.23	1.99	2.95	0.01	0.05	—	0.05	0.05	—	0.05	—	534	534	0.02	< 0.005	—	536
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.32	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	387	387	< 0.005	< 0.005	0.65	389
Vendor	0.03	0.01	0.40	0.20	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	408	408	0.02	0.06	0.91	427
Hauling	0.02	0.01	0.39	0.16	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	345	345	0.01	0.05	0.51	362
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.07	1.12	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	367	367	< 0.005	< 0.005	0.02	368
Vendor	0.03	0.01	0.42	0.20	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	408	408	0.02	0.06	0.02	426
Hauling	0.02	0.01	0.41	0.16	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	345	345	0.01	0.05	0.01	362
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.84	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	266	266	< 0.005	< 0.005	0.20	267
Vendor	0.02	0.01	0.30	0.14	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	291	291	0.01	0.04	0.28	305
Hauling	0.02	< 0.005	0.29	0.11	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.03	—	246	246	0.01	0.04	0.16	258
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.15	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	44.1	44.1	< 0.005	< 0.005	0.03	44.2
Vendor	< 0.005	< 0.005	0.05	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	48.2	48.2	< 0.005	0.01	0.05	50.4
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	40.8	40.8	< 0.005	0.01	0.03	42.8

3.29. Open Trench Construction (TL and 20-inch distribution mainline) (2034) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road	2.09	1.75	14.9	22.6	0.05	0.39	—	0.39	0.36	—	0.36	—	4,519	4,519	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.09	1.75	14.9	22.6	0.05	0.39	—	0.39	0.36	—	0.36	—	4,519	4,519	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.49	1.25	10.7	16.1	0.03	0.28	—	0.28	0.26	—	0.26	—	3,228	3,228	0.13	0.03	—	3,239
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.27	0.23	1.95	2.94	0.01	0.05	—	0.05	0.05	—	0.05	—	534	534	0.02	< 0.005	—	536

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.05	1.25	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	383	383	< 0.005	< 0.005	0.57	384
Vendor	0.02	0.01	0.39	0.19	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	394	394	0.01	0.06	0.87	412
Hauling	0.02	0.01	0.38	0.16	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	337	337	0.01	0.05	0.47	354
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	1.05	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	363	363	< 0.005	< 0.005	0.01	364
Vendor	0.02	0.01	0.41	0.20	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	394	394	0.01	0.06	0.02	411
Hauling	0.02	0.01	0.39	0.16	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	337	337	0.01	0.05	0.01	353
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.79	0.00	0.00	0.29	0.29	0.00	0.07	0.07	—	263	263	< 0.005	< 0.005	0.18	264
Vendor	0.02	0.01	0.29	0.14	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	281	281	0.01	0.04	0.27	294
Hauling	0.01	< 0.005	0.28	0.11	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.03	—	241	241	0.01	0.04	0.14	253
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.14	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	43.5	43.5	< 0.005	< 0.005	0.03	43.7
Vendor	< 0.005	< 0.005	0.05	0.03	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	46.6	46.6	< 0.005	0.01	0.04	48.6
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	39.8	39.8	< 0.005	0.01	0.02	41.8

3.31. Open Trench Construction (TL and 20-inch distribution mainline) (2035) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.04	1.71	14.5	22.4	0.05	0.36	—	0.36	0.33	—	0.33	—	4,520	4,520	0.18	0.04	—	4,535
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	0.91	1.40	< 0.005	0.02	—	0.02	0.02	—	0.02	—	283	283	0.01	< 0.005	—	284
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.17	0.26	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	46.9	46.9	< 0.005	< 0.005	—	47.0

Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.07	1.01	0.00	0.00	0.42	0.42	0.00	0.10	0.10	—	359	359	< 0.005	< 0.005	0.01	360
Vendor	0.02	0.01	0.39	0.19	< 0.005	< 0.005	0.14	0.14	< 0.005	0.04	0.04	—	381	381	0.01	0.06	0.01	398
Hauling	0.02	0.01	0.38	0.15	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	329	329	0.01	0.05	0.01	345
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.07	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	22.8	22.8	< 0.005	< 0.005	0.01	22.9
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	23.8	23.8	< 0.005	< 0.005	0.01	24.9
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.6	20.6	< 0.005	< 0.005	0.01	21.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.78	3.78	< 0.005	< 0.005	< 0.005	3.79
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.94	3.94	< 0.005	< 0.005	< 0.005	4.12
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.41	3.41	< 0.005	< 0.005	< 0.005	3.58

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetati	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
#1 Construction of Jacking and Receiving Pits	Site Preparation	5/1/2029	7/16/2029	5.00	55.0	—
#1 Pipe Installation via Jacking	Site Preparation	7/17/2029	10/1/2029	5.00	55.0	—
#2 Construction of Jacking and Receiving Pits	Site Preparation	10/2/2029	12/16/2029	5.00	54.0	—
#2 Pipe Installation via Jacking	Site Preparation	12/17/2029	3/1/2030	5.00	55.0	—
#3 Construction of Jacking and Receiving Pits	Site Preparation	3/2/2030	5/16/2030	5.00	54.0	—
#3 Pipe Installation via Jacking	Site Preparation	5/17/2030	8/1/2030	5.00	55.0	—
#4 Construction of Jacking and Receiving Pits	Site Preparation	8/2/2030	10/16/2030	5.00	54.0	—
#4 Pipe Installation via Jacking	Site Preparation	10/17/2030	12/31/2030	5.00	54.0	—
Open Trench Construction (8-Inch Distribution Mainline)	Trenching	7/1/2026	3/1/2027	5.00	174	—
Open Trench Construction (TL and 20-inch distribution mainline)	Trenching	2/1/2031	2/1/2035	5.00	1,044	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
#1 Construction of Jacking and Receiving Pits	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#1 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	5.00	367	0.29
#1 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	6.00	367	0.29
#1 Construction of Jacking and Receiving Pits	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#1 Construction of Jacking and Receiving Pits	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
#1 Construction of Jacking and Receiving Pits	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
#1 Construction of Jacking and Receiving Pits	Welders	Diesel	Average	1.00	8.00	46.0	0.45
#1 Construction of Jacking and Receiving Pits	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
#1 Construction of Jacking and Receiving Pits	Sweepers/Scrubbers	Diesel	Average	1.00	8.00	36.0	0.46
#1 Construction of Jacking and Receiving Pits	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73

#1 Construction of Jacking and Receiving Pits	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
#1 Construction of Jacking and Receiving Pits	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
#1 Construction of Jacking and Receiving Pits	Forklifts	Diesel	Average	1.00	8.00	82.0	0.20
#1 Construction of Jacking and Receiving Pits	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
#1 Pipe Installation via Jacking	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#1 Pipe Installation via Jacking	Bore/Drill Rigs	Electric	Average	1.00	8.00	83.0	0.50
#1 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#1 Pipe Installation via Jacking	Pumps	Electric	Average	1.00	8.00	11.0	0.74
#1 Pipe Installation via Jacking	Pumps	Diesel	Average	1.00	3.00	11.0	0.74
#1 Pipe Installation via Jacking	Cranes	Diesel	Average	1.00	6.00	367	0.29
#1 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#1 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#2 Construction of Jacking and Receiving Pits	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#2 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	5.00	367	0.29
#2 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	6.00	367	0.29

#2 Construction of Jacking and Receiving Pits	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#2 Construction of Jacking and Receiving Pits	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
#2 Construction of Jacking and Receiving Pits	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
#2 Construction of Jacking and Receiving Pits	Welders	Diesel	Average	1.00	8.00	46.0	0.45
#2 Construction of Jacking and Receiving Pits	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
#2 Construction of Jacking and Receiving Pits	Sweepers/Scrubbers	Diesel	Average	1.00	8.00	36.0	0.46
#2 Construction of Jacking and Receiving Pits	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
#2 Construction of Jacking and Receiving Pits	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
#2 Construction of Jacking and Receiving Pits	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
#2 Construction of Jacking and Receiving Pits	Forklifts	Diesel	Average	1.00	8.00	82.0	0.20
#2 Construction of Jacking and Receiving Pits	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
#2 Pipe Installation via Jacking	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#2 Pipe Installation via Jacking	Bore/Drill Rigs	Electric	Average	1.00	8.00	83.0	0.50

#2 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#2 Pipe Installation via Jacking	Pumps	Electric	Average	1.00	8.00	11.0	0.74
#2 Pipe Installation via Jacking	Pumps	Diesel	Average	1.00	3.00	11.0	0.74
#2 Pipe Installation via Jacking	Cranes	Diesel	Average	1.00	6.00	367	0.29
#2 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#2 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#3 Construction of Jacking and Receiving Pits	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#3 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	5.00	367	0.29
#3 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	6.00	367	0.29
#3 Construction of Jacking and Receiving Pits	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#3 Construction of Jacking and Receiving Pits	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
#3 Construction of Jacking and Receiving Pits	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
#3 Construction of Jacking and Receiving Pits	Welders	Diesel	Average	1.00	8.00	46.0	0.45
#3 Construction of Jacking and Receiving Pits	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36

#3 Construction of Jacking and Receiving Pits	Sweepers/Scrubbers	Diesel	Average	1.00	8.00	36.0	0.46
#3 Construction of Jacking and Receiving Pits	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
#3 Construction of Jacking and Receiving Pits	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
#3 Construction of Jacking and Receiving Pits	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
#3 Construction of Jacking and Receiving Pits	Forklifts	Diesel	Average	1.00	8.00	82.0	0.20
#3 Construction of Jacking and Receiving Pits	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
#3 Pipe Installation via Jacking	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#3 Pipe Installation via Jacking	Bore/Drill Rigs	Electric	Average	1.00	8.00	83.0	0.50
#3 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#3 Pipe Installation via Jacking	Pumps	Electric	Average	1.00	8.00	11.0	0.74
#3 Pipe Installation via Jacking	Pumps	Diesel	Average	1.00	3.00	11.0	0.74
#3 Pipe Installation via Jacking	Cranes	Diesel	Average	1.00	6.00	367	0.29
#3 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#3 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#4 Construction of Jacking and Receiving Pits	Excavators	Diesel	Average	1.00	8.00	36.0	0.38

#4 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	5.00	367	0.29
#4 Construction of Jacking and Receiving Pits	Cranes	Diesel	Average	1.00	6.00	367	0.29
#4 Construction of Jacking and Receiving Pits	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#4 Construction of Jacking and Receiving Pits	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
#4 Construction of Jacking and Receiving Pits	Rubber Tired Loaders	Diesel	Average	1.00	8.00	150	0.36
#4 Construction of Jacking and Receiving Pits	Welders	Diesel	Average	1.00	8.00	46.0	0.45
#4 Construction of Jacking and Receiving Pits	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
#4 Construction of Jacking and Receiving Pits	Sweepers/Scrubbers	Diesel	Average	1.00	8.00	36.0	0.46
#4 Construction of Jacking and Receiving Pits	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
#4 Construction of Jacking and Receiving Pits	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
#4 Construction of Jacking and Receiving Pits	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
#4 Construction of Jacking and Receiving Pits	Forklifts	Diesel	Average	1.00	8.00	82.0	0.20

#4 Construction of Jacking and Receiving Pits	Air Compressors	Diesel	Average	1.00	8.00	37.0	0.48
#4 Pipe Installation via Jacking	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
#4 Pipe Installation via Jacking	Bore/Drill Rigs	Electric	Average	1.00	8.00	83.0	0.50
#4 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#4 Pipe Installation via Jacking	Pumps	Electric	Average	1.00	8.00	11.0	0.74
#4 Pipe Installation via Jacking	Pumps	Diesel	Average	1.00	3.00	11.0	0.74
#4 Pipe Installation via Jacking	Cranes	Diesel	Average	1.00	6.00	367	0.29
#4 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
#4 Pipe Installation via Jacking	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Open Trench Construction (8-Inch Distribution Mainline)	Excavators	Diesel	Average	1.00	5.00	36.0	0.38
Open Trench Construction (8-Inch Distribution Mainline)	Cranes	Diesel	Average	1.00	4.00	367	0.29
Open Trench Construction (8-Inch Distribution Mainline)	Generator Sets	Diesel	Average	1.00	2.00	14.0	0.74
Open Trench Construction (8-Inch Distribution Mainline)	Tractors/Loaders/Backhoes	Diesel	Average	1.00	4.00	84.0	0.37
Open Trench Construction (8-Inch Distribution Mainline)	Rubber Tired Loaders	Diesel	Average	1.00	4.00	150	0.36
Open Trench Construction (8-Inch Distribution Mainline)	Welders	Diesel	Average	1.00	6.00	46.0	0.45

Open Trench Construction (8-Inch Distribution Mainline)	Sweepers/Scrubbers	Diesel	Average	1.00	3.00	36.0	0.46
Open Trench Construction (8-Inch Distribution Mainline)	Cranes	Diesel	Average	1.00	5.00	367	0.29
Open Trench Construction (8-Inch Distribution Mainline)	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Open Trench Construction (8-Inch Distribution Mainline)	Generator Sets	Diesel	Average	1.00	6.00	14.0	0.74
Open Trench Construction (8-Inch Distribution Mainline)	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Open Trench Construction (8-Inch Distribution Mainline)	Forklifts	Diesel	Average	1.00	5.00	82.0	0.20
Open Trench Construction (8-Inch Distribution Mainline)	Air Compressors	Diesel	Average	1.00	5.00	37.0	0.48
Open Trench Construction (8-Inch Distribution Mainline)	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Open Trench Construction (8-Inch Distribution Mainline)	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Open Trench Construction (8-Inch Distribution Mainline)	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
Open Trench Construction (8-Inch Distribution Mainline)	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Open Trench Construction (8-Inch Distribution Mainline)	Pavers	Diesel	Average	1.00	8.00	81.0	0.42

Open Trench Construction (8-Inch Distribution Mainline)	Cranes	Diesel	Average	1.00	8.00	367	0.29
Open Trench Construction (TL and 20-inch distribution mainline)	Excavators	Diesel	Average	1.00	5.00	36.0	0.38
Open Trench Construction (TL and 20-inch distribution mainline)	Cranes	Diesel	Average	1.00	4.00	367	0.29
Open Trench Construction (TL and 20-inch distribution mainline)	Generator Sets	Diesel	Average	1.00	2.00	14.0	0.74
Open Trench Construction (TL and 20-inch distribution mainline)	Tractors/Loaders/Backhoes	Diesel	Average	1.00	4.00	84.0	0.37
Open Trench Construction (TL and 20-inch distribution mainline)	Rubber Tired Loaders	Diesel	Average	1.00	4.00	150	0.36
Open Trench Construction (TL and 20-inch distribution mainline)	Welders	Diesel	Average	1.00	6.00	46.0	0.45
Open Trench Construction (TL and 20-inch distribution mainline)	Sweepers/Scrubbers	Diesel	Average	1.00	3.00	36.0	0.46
Open Trench Construction (TL and 20-inch distribution mainline)	Cranes	Diesel	Average	1.00	5.00	367	0.29
Open Trench Construction (TL and 20-inch distribution mainline)	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73

Open Trench Construction (TL and 20-inch distribution mainline)	Generator Sets	Diesel	Average	1.00	6.00	14.0	0.74
Open Trench Construction (TL and 20-inch distribution mainline)	Skid Steer Loaders	Diesel	Average	1.00	4.00	71.0	0.37
Open Trench Construction (TL and 20-inch distribution mainline)	Forklifts	Diesel	Average	1.00	5.00	82.0	0.20
Open Trench Construction (TL and 20-inch distribution mainline)	Air Compressors	Diesel	Average	1.00	5.00	37.0	0.48
Open Trench Construction (TL and 20-inch distribution mainline)	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Open Trench Construction (TL and 20-inch distribution mainline)	Plate Compactors	Diesel	Average	1.00	8.00	8.00	0.43
Open Trench Construction (TL and 20-inch distribution mainline)	Rollers	Diesel	Average	1.00	8.00	36.0	0.38
Open Trench Construction (TL and 20-inch distribution mainline)	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Open Trench Construction (TL and 20-inch distribution mainline)	Pavers	Diesel	Average	1.00	8.00	81.0	0.42
Open Trench Construction (TL and 20-inch distribution mainline)	Cranes	Diesel	Average	1.00	8.00	367	0.29

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Open Trench Construction (8-Inch Distribution Mainline)	—	—	—	—
Open Trench Construction (8-Inch Distribution Mainline)	Worker	32.0	18.5	LDA,LDT1,LDT2
Open Trench Construction (8-Inch Distribution Mainline)	Vendor	16.0	10.2	HHDT,MHDT
Open Trench Construction (8-Inch Distribution Mainline)	Hauling	6.00	20.0	HHDT
Open Trench Construction (8-Inch Distribution Mainline)	Onsite truck	—	—	HHDT
#1 Construction of Jacking and Receiving Pits	—	—	—	—
#1 Construction of Jacking and Receiving Pits	Worker	32.0	18.5	LDA,LDT1,LDT2
#1 Construction of Jacking and Receiving Pits	Vendor	14.0	10.2	HHDT,MHDT
#1 Construction of Jacking and Receiving Pits	Hauling	10.0	20.0	HHDT
#1 Construction of Jacking and Receiving Pits	Onsite truck	—	—	HHDT
#1 Pipe Installation via Jacking	—	—	—	—
#1 Pipe Installation via Jacking	Worker	32.0	18.5	LDA,LDT1,LDT2
#1 Pipe Installation via Jacking	Vendor	14.0	10.2	HHDT,MHDT
#1 Pipe Installation via Jacking	Hauling	10.0	20.0	HHDT
#1 Pipe Installation via Jacking	Onsite truck	—	—	HHDT
#2 Construction of Jacking and Receiving Pits	—	—	—	—

#2 Construction of Jacking and Receiving Pits	Worker	32.0	18.5	LDA,LDT1,LDT2
#2 Construction of Jacking and Receiving Pits	Vendor	14.0	10.2	HHDT,MHDT
#2 Construction of Jacking and Receiving Pits	Hauling	10.0	20.0	HHDT
#2 Construction of Jacking and Receiving Pits	Onsite truck	—	—	HHDT
#2 Pipe Installation via Jacking	—	—	—	—
#2 Pipe Installation via Jacking	Worker	32.0	18.5	LDA,LDT1,LDT2
#2 Pipe Installation via Jacking	Vendor	14.0	10.2	HHDT,MHDT
#2 Pipe Installation via Jacking	Hauling	10.0	20.0	HHDT
#2 Pipe Installation via Jacking	Onsite truck	—	—	HHDT
#3 Construction of Jacking and Receiving Pits	—	—	—	—
#3 Construction of Jacking and Receiving Pits	Worker	32.0	18.5	LDA,LDT1,LDT2
#3 Construction of Jacking and Receiving Pits	Vendor	14.0	10.2	HHDT,MHDT
#3 Construction of Jacking and Receiving Pits	Hauling	10.0	20.0	HHDT
#3 Construction of Jacking and Receiving Pits	Onsite truck	—	—	HHDT
#3 Pipe Installation via Jacking	—	—	—	—
#3 Pipe Installation via Jacking	Worker	32.0	18.5	LDA,LDT1,LDT2
#3 Pipe Installation via Jacking	Vendor	14.0	10.2	HHDT,MHDT
#3 Pipe Installation via Jacking	Hauling	10.0	20.0	HHDT
#3 Pipe Installation via Jacking	Onsite truck	—	—	HHDT
#4 Construction of Jacking and Receiving Pits	—	—	—	—
#4 Construction of Jacking and Receiving Pits	Worker	32.0	18.5	LDA,LDT1,LDT2

#4 Construction of Jacking and Receiving Pits	Vendor	14.0	10.2	HHDT,MHDT
#4 Construction of Jacking and Receiving Pits	Hauling	10.0	20.0	HHDT
#4 Construction of Jacking and Receiving Pits	Onsite truck	—	—	HHDT
#4 Pipe Installation via Jacking	—	—	—	—
#4 Pipe Installation via Jacking	Worker	32.0	18.5	LDA,LDT1,LDT2
#4 Pipe Installation via Jacking	Vendor	14.0	10.2	HHDT,MHDT
#4 Pipe Installation via Jacking	Hauling	10.0	20.0	HHDT
#4 Pipe Installation via Jacking	Onsite truck	—	—	HHDT
Open Trench Construction (TL and 20-inch distribution mainline)	—	—	—	—
Open Trench Construction (TL and 20-inch distribution mainline)	Worker	32.0	18.5	LDA,LDT1,LDT2
Open Trench Construction (TL and 20-inch distribution mainline)	Vendor	16.0	10.2	HHDT,MHDT
Open Trench Construction (TL and 20-inch distribution mainline)	Hauling	6.00	20.0	HHDT
Open Trench Construction (TL and 20-inch distribution mainline)	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (sq. ft.)	Acres Paved (acres)
#1 Construction of Jacking and Receiving Pits	—	2,700	0.00	0.00	—
#1 Pipe Installation via Jacking	—	2,750	0.00	0.00	—
#2 Construction of Jacking and Receiving Pits	—	2,750	0.00	0.00	—
#2 Pipe Installation via Jacking	—	2,750	0.00	0.00	—
#3 Construction of Jacking and Receiving Pits	—	2,700	0.00	0.00	—
#3 Pipe Installation via Jacking	—	2,750	0.00	0.00	—
#4 Construction of Jacking and Receiving Pits	—	2,700	0.00	0.00	—
#4 Pipe Installation via Jacking	—	2,750	0.00	0.00	—
Open Trench Construction (8-Inch Distribution Mainline)	—	4,698	0.00	0.00	—
Open Trench Construction (TL and 20-inch distribution mainline)	—	28,188	0.00	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Other Asphalt Surfaces	8,804	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2026	0.00	690	0.05	0.01
2027	0.00	690	0.05	0.01
2031	0.00	690	0.05	0.01
2032	0.00	690	0.05	0.01
2033	0.00	690	0.05	0.01
2034	0.00	690	0.05	0.01
2030	888	690	0.05	0.01
2029	592	690	0.05	0.01
2035	0.00	690	0.05	0.01

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	13.6	annual days of extreme heat
Extreme Precipitation	6.30	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A

Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	N/A	N/A	N/A	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	91.1
AQ-PM	59.4
AQ-DPM	41.3
Drinking Water	83.1
Lead Risk Housing	93.8
Pesticides	0.00
Toxic Releases	60.4
Traffic	73.7
Effect Indicators	—
CleanUp Sites	93.2
Groundwater	56.1
Haz Waste Facilities/Generators	45.0
Impaired Water Bodies	0.00
Solid Waste	67.4
Sensitive Population	—
Asthma	78.8
Cardio-vascular	81.9
Low Birth Weights	98.1
Socioeconomic Factor Indicators	—
Education	78.9
Housing	70.8
Linguistic	65.6
Poverty	75.1
Unemployment	68.4

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	18.86308225
Employed	8.417810856
Median HI	36.36596946
Education	—
Bachelor's or higher	23.94456564
High school enrollment	100
Preschool enrollment	37.5465161
Transportation	—
Auto Access	54.54895419
Active commuting	75.10586424
Social	—
2-parent households	64.45528038
Voting	17.92634416
Neighborhood	—
Alcohol availability	4.516874118
Park access	2.194276915
Retail density	76.08109842
Supermarket access	87.91222892
Tree canopy	40.36956243
Housing	—
Homeownership	82.99756191
Housing habitability	49.82676761
Low-inc homeowner severe housing cost burden	16.04003593
Low-inc renter severe housing cost burden	53.57372001
Uncrowded housing	22.62286668
Health Outcomes	—

Insured adults	32.84999358
Arthritis	51.7
Asthma ER Admissions	23.7
High Blood Pressure	54.9
Cancer (excluding skin)	63.4
Asthma	46.1
Coronary Heart Disease	31.2
Chronic Obstructive Pulmonary Disease	35.3
Diagnosed Diabetes	21.5
Life Expectancy at Birth	44.7
Cognitively Disabled	2.1
Physically Disabled	9.6
Heart Attack ER Admissions	19.3
Mental Health Not Good	30.2
Chronic Kidney Disease	35.4
Obesity	25.3
Pedestrian Injuries	81.6
Physical Health Not Good	24.5
Stroke	34.3
Health Risk Behaviors	—
Binge Drinking	55.6
Current Smoker	32.9
No Leisure Time for Physical Activity	30.6
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	0.0
Children	45.9
Elderly	64.7

English Speaking	28.6
Foreign-born	74.9
Outdoor Workers	19.4
Climate Change Adaptive Capacity	—
Impervious Surface Cover	32.1
Traffic Density	74.1
Traffic Access	66.4
Other Indices	—
Hardship	80.8
Other Decision Support	—
2016 Voting	8.9

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	95.0
Healthy Places Index Score for Project Location (b)	24.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	Yes
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Schedule based on Project Description.
Construction: Off-Road Equipment	Equipment from LADWP.
Construction: Dust From Material Movement	Estimated 27 cubic yards per day to be exported during open trench construction. Estimated 50 cubic yards per day to be exported during pipe jacking process. Watering twice per day in accordance with LADWP BMP-AQ-1.
Construction: Trips and VMT	Assumptions per project description and LADWP. Rounded up defaults to nearest even integer.

Appendix B
Biological Resources Technical Report

Biological Resources Technical Report

Cantara Trunk Line Replacement Project

JUNE 2025

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Acronyms and Abbreviations

Acronym	Definition
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWA	Clean Water Act
FESA	federal Endangered Species Act
GIS	geographic information system
HCP	habitat conservation plan
IPaC	Information for Planning and Conservation System
NCCP	natural community conservation plan
NRCS	Natural Resources Conservation Service
OHWM	ordinary high-water mark
SR	State Route
SSC	California Species of Special Concern
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

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1 Introduction

This report presents the findings of a biological resources constraints assessment conducted by Dudek of the approximately 20,000-linear-foot alignment for the Los Angeles Department of Water and Power (LADWP) proposed Cantara Trunk Line Replacement Project (project). The proposed project would include the following: a new route of the Cantara Trunk Line via a connection to the North Hollywood Trunk Line near State Route (SR) 170 and Whitsett Avenue, extending Cantara Trunk Line along Strathern Street from Whitsett Avenue to Irvine Avenue; the abandonment and replacement of an existing mainline along San Fernando Road, from approximately Lockhead Drive to Sunland Boulevard; the replacement of a portion of existing mainline line within Cantara Street from San Fernando Road to Fair Avenue; and the abandonment of existing Cantara Trunk Line along Cantara Street from Irvine Avenue to Potter Avenue. The proposed project activities would occur within the project site defined in this report.

This biological technical report describes the existing biological conditions for the project site, which is located in the Sun Valley neighborhood of Los Angeles County, California (Figure 1, Regional Location). A project study area encompassing the project site and an area 300 feet from the project site was created to evaluate biological resources potentially present, as well as potential direct and indirect impacts to those biological resources. This biological technical report (1) describes the existing conditions of biological resources within the project study area in terms of vegetation, flora, wildlife, and wildlife habitats,; (2) describes potential direct and indirect impacts to biological resources that would result from implementation of the project, and describes those impacts in terms of biological significance in view of federal, state, and local laws and policies, including the California Environmental Quality Act (CEQA); and (3) provides a discussion of the potential impacts associated with the proposed action.

The purpose of this assessment was to evaluate the existing biological conditions and potential impacts to sensitive biological resources associated with the proposed project, including a 300-foot buffer (Study Area). This report is prepared at a level of detail sufficient to address CEQA requirements, as well as identifying the potential need for permits for sensitive resources protected under federal and state regulations.

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SOURCE: Bing Maps, OpenStreetMaps

Los Angeles Department of Water & Power

0 0.5 1 Miles

FIGURE 1

Regional Location

Cantara Trunk Line Replacement Project

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2 Project Setting

The project alignment is located entirely in the Sun Valley – La Tuna Canyon Community Plan Area, in the eastern San Fernando Valley region, within the City of Los Angeles (City). The proposed pipeline replacement would occur within the public right-of-way (ROW) for San Fernando Road, Cantara Avenue, Irvine Avenue, and Strathern Street (Figure 1), with decommissioning/abandonment of trunk lines within the public ROW on Cantara Street between San Fernando Road and Fair Avenue and additionally between Irvine Avenue and Potter Avenue, and Irvine Avenue between Strathern Street and Cantara Street. San Fernando Road and Strathern Street are mapped by the City as an Avenue I (Secondary Highway) and an Avenue II (Secondary Highway), respectively, while Cantara Steet and Irvine Avenue are mapped as Local Streets (City of Los Angeles 2025). Within the project alignment, San Fernando Road is four lanes in width with sidewalks on one or both sides and street parking along portions of one or both sides. Strathern Street is two lanes in width, with sections containing a bike lane, and sidewalks on one or both sides and on-street parking along portions of one or both sides. Irvine Avenue is a typical neighborhood street with two lanes, sidewalks on either side, and on-street parking provided on both sides. Cantara Street, between Irvine Avenue and Lankershim Boulevard, is two lanes with one sidewalk, and no on-street parking available, while the remainder is a typical neighborhood street with two lanes, on-street parking available throughout, and sidewalks on both sides of the street.

The project alignment is located within a heavily urbanized area dominated by residential, commercial, and industrial development. Vegetation cover within the Study Area is limited and predominantly composed of ornamental plantings and landscaping.

2.1 Project Location

The project alignment is situated between Interstate 5 to the east and SR-170 to the west. The entire work area is generally situated between Roscoe Boulevard to the north and Stagg Street to the south, with a portion of the project running adjacent to the Hollywood Burbank Airport. The project can be found on the U.S. Geological Survey's (USGS) Burbank, California and Van Nuys, California 7.5-minute topographical quadrangles (USGS 2015, 2018).

2.2 Project Description

The proposed project would replace aging and deteriorating riveted steel pipe sections of Cantara Trunk Line (Cantara TL), installed in 1917, along Cantara Street from Potter Avenue, east of the SR-170, to Irvine Avenue and from Fair Avenue to San Fernando Road. An extension of the Cantara TL along San Fernando Road (installed in the 1960s) would also be replaced from Cantara Street to just east of Arvilla Avenue. The 36.75-inch welded-steel pipe section of existing Cantara TL from Coldwater Canyon Avenue to Potter Avenue installed in 1965, and the 32-inch welded-steel pipe sections located along Strathern Street and Fair Avenue installed in 1961, are in good condition, would not be replaced, and would remain in service. The installation of the new 20-inch mainline and 30-inch diameter trunk lines would replace the aging and deteriorated existing Cantara TL to provide greater operational flexibility for water flow and delivery and to improve system redundancy and resiliency. LADWP proposes to install the following:

- 8,200 feet of 30-inch diameter underground pipe along Strathern Street and Cantara Street
- 5,100 feet of 20-inch diameter underground pipe along San Fernando Road

- 1,550 feet of new 8-inch distribution mainline along Cantara Street from Fair Avenue to San Fernando Road and another 5,460 feet of new 8-inch distribution mainline along Cantara Street from Rhodes Avenue to Irvine Avenue

Construction Methods

The existing Cantara TL would remain in service during construction, and all related facilities will continue to operate normally. Several temporary shutdowns would be required in order to connect the TL replacements to the existing trunk lines and would take place while demand is low. Minimal interruptions in water service may occur during construction. Affected customers would be notified in advance of any brief service interruptions. Replacement pipes would be installed within existing public right-of-way along the proposed alignment, and one distribution mainlain spur would extend through a parking lot associated with private industrial properties. Construction work areas would generally occur within the public right-of-way and would move iteratively as construction progresses. A work area of approximately 1,000 feet can be used for both pipe installation activities and staging equipment. The construction crew would install pipe for half of the work area, then flip equipment to install pipe on the other half. Utility relocations, such as sewer main lines, underground gas lines, water lines, fiber optics, and power lines, are not anticipated. No permanent land use changes would occur at the potential staging areas as part of this project, as all staging would occur along the proposed alignment.

Open-trench construction activities would last for approximately 58 months assuming one construction crew (15–16 persons). Pipe-jacking activities would last approximately 20 months, assuming one construction crew. Open-trench excavation would consist of site preparation, excavation, shoring, pipe installation, backfilling, and work site restoration. The majority of construction would occur within the public right-of-way, with work areas divided into lengths of approximately 1,000 feet. The maximum length of open trench at any one time would be approximately 1,000 feet. Open trenches would be plated during non-construction hours. During the open-trench construction processes, approximately 27 cubic yards of excavated material are expected to be removed and hauled off per day. Each work area would be occupied for approximately 4 months. Pipe jacking, which is a form trenchless construction, would be used to reduce traffic disruptions at busy intersections. Pipe-jacking would be used along Strathern Street at the intersections of Lankershim Boulevard and Laurel Canyon Boulevard. Along San Fernando Road, LADWP is considering use of pipe jacking (as opposed to open trench) at the intersections of Sunland Boulevard and Arvilla Avenue. Pipe jacking would consist of site preparation, excavation and shoring, pipe installation, and work site restoration. During the pipe jacking process, approximately 50 cubic yards of excavated materials are expected to be removed and hauled off per day. The pipe jacking process would take less than 5 months at each of the four intersections.

Hydrostatic testing would be conducted periodically throughout construction. Approximately 210,000 cubic feet of the trunk line and 10,000 cubic feet of the mainline would be tested. Once hydrostatic testing is completed, the new pipelines would be disinfected. Hydrostatic test water and disinfectant water would be discharged to the sewer system or the storm drain system in accordance with the State Water Regional Control Board (SWRCB) permit requirements.

Construction Schedule

Project construction is anticipated to start in 2026 and is anticipated to conclude in 2035. While construction would occur over the course of approximately 9 years, no construction is planned for 2028. As such, the construction duration totals approximately 6.5 years. Construction would generally occur between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday. While work is not generally anticipated to occur at nighttime or on the weekends,

situations may arise that require extended work hours, including hydrostatic testing and shutdowns to complete tie-ins. In the event that extended work hours are required beyond these times, extended hours permits would be required. Below is the anticipated construction schedule (Table 1).

Table 1. Anticipated Construction Schedule

Activity	Start Date	End Date
Open-Trench Construction (8-inch distribution mainline)	July 2026	March 2027
Pipe Jacking Construction	May 2029	December 2030
Open-Trench Construction (TL and 20-inch distribution mainline)	February 2031	February 2035

Operations and Maintenance

The proposed replacement pipelines are anticipated to have an operational life of 100 years and replacement valves are anticipated to have an operational life of 70 years; however, due to the limitations of the staff associated with large valve replacement, as well as shutdown limitations, valves are replaced as they begin to show signs of failure. The pipelines would be underground and would not be visible from the ground level during operation. Operational activities would be limited to scheduled maintenance and repair. Maintenance activities would be minimal and would be similar to those that occur under existing conditions. Maintenance would occur every 1–3 years and include exercising valves and replacing or repairing worn appurtenances to ensure proper performance over the life of the facilities. No permanent workers would be required to operate or maintain the proposed project. Activities associated with long-term operations and maintenance would, therefore, be minimal.

Best Management Practices

The following biological best management practices (BMP-BIO) would be employed during construction of the proposed project, to help minimize or eliminate potential impacts to the environment. BMPs are distinguished from mitigation measures because they are based on existing regulatory requirements and/or are standard practices and procedures of LADWP and/or its contractors not unique to the proposed project.

Nesting bird season (which generally occurs February 1 through August 31, and as early as January for raptors) is not expected to be avoided during project construction. Therefore, the following BMPs shall be employed to avoid and minimize impacts to nesting birds protected under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code (CFGC):

- **BMP-BIO-1:** A pre-construction nesting bird survey shall be conducted by a qualified biologist within 3 days prior to the start of construction activities during the nesting season to determine whether active nests are present within or directly adjacent to the construction zone. All nests found shall be recorded.
- **BMP-BIO-2:** In the event an active nest is detected, a qualified biologist shall monitor the nest to determine if a nest avoidance buffer zone is necessary to restrict construction activities in proximity to the nest to protect the nest from failing. Any buffer zone, within which construction activities may not occur, shall be established in coordination with the qualified biologist, who shall take into account existing baseline conditions (e.g., topography, buffering buildings or other structures, etc.). In addition, observed avian response to ambient conditions (e.g., existing traffic noise and human activity) shall factor into the requirement for and size of a nest avoidance buffer.

- BMP-BIO-3: The qualified biologist shall monitor all active nests, including those with and without an established buffer, at least once per week to determine whether birds are being disturbed. If signs of disturbance or stress are observed, the qualified biologist shall implement adaptive measures to reduce disturbance. These measures could include establishing or increasing buffer distances, or placing visual screens or sound dampening structures between the nest and construction activity until fledging is confirmed. The qualified biologist shall monitor each active nest until they determine that nestlings have fledged and dispersed, or the nest is no longer active.

3 Regulatory Context

This section describes the regulatory framework relevant to the project.

3.1 Federal Regulations

3.1.1 Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by USFWS for most plant and animal species, and by the National Oceanic and Atmospheric Administration National Marine Fisheries Service for certain marine species. FESA is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend, and to provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. FESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under FESA, it is unlawful to take any listed species; "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

FESA allows for the issuance of incidental take permits for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans on private property without any other federal agency involvement. Upon development of a habitat conservation plan, USFWS can issue incidental take permits for listed species.

3.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act was originally passed in 1918 as four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The primary motivation for the international negotiations was to stop the "indiscriminate slaughter" of migratory birds by market hunters and others (16 USC 703–712). Each of the treaties protects selected species of birds and provides for closed and open seasons for hunting game birds. The Migratory Bird Treaty Act protects more than 800 species. Two species of eagles that are native to the United States—bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*)—were granted additional protection within the United States under the Bald and Golden Eagle Protection Act (16 USC 668–668d) to prevent these species from becoming extinct.

3.1.3 Section 404 of the Clean Water Act

The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Section 404 of the CWA, the USACE has the authority to regulate activities that could discharge fill or dredge material or otherwise adversely modify wetlands or other waters of the United States. The USACE implements the federal policy embodied in Executive Order 11990, which, when implemented, is intended to result in no net loss of wetland values or function.

3.1.4 Section 401 of the Clean Water Act

The State Water Resources Control Board has authority over wetlands through Section 401 of the CWA, as well as the Porter–Cologne Act, California Code of Regulations Section 3831(k), and California Wetlands Conservation Policy. The CWA requires that an applicant for a Section 404 permit (to discharge dredge or fill material into waters of the United States) first obtain certification from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. In California, the authority to either grant certification or waive the requirement for permits is delegated by the State Water Resources Control Board to the nine regional boards. The Los Angeles Regional Water Quality Control Board has authority for Section 401 compliance in the project area. A request for certification is submitted to the regional board at the same time that an application is filed with the USACE.

3.2 State Regulations

3.2.1 California Endangered Species Act

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA), which prohibits the take of plant and animal species designated by the Fish and Game Commission as endangered or threatened in California. Under CESA Section 86, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

CESA defines an endangered species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." CESA defines a threatened species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the Commission as rare on or before January 1, 1985, is a threatened species." A candidate species is defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list." CESA does not list invertebrate species.

3.2.2 California Fish and Game Code Sections 3503, 3511, 3513, 3801, 4700, 5050, and 5515

Section 2081(b) and (c) of the California Fish and Game Code authorizes take of endangered, threatened, or candidate species if take is incidental to otherwise lawful activity and if specific criteria are met. These provisions also require CDFW to coordinate consultations with USFWS for actions involving federally listed species that are also state-listed species. In certain circumstances, Section 2080.1 of CESA allows CDFW to adopt a federal incidental take statement or a 10(a) permit as its own, based on its findings that the federal permit adequately

protects the species and is consistent with state law. A Section 2081(b) permit may not authorize the take of "fully protected" species or "specified birds" (California Fish and Game Code Sections 3505, 3511, 4700, 5050, 5515, and 5517). If a project is planned in an area where a fully protected species or a specified bird occurs, an applicant must design the project to avoid take.

3.2.3 California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources and ways that such impacts can be avoided, minimized, or mitigated. CEQA also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

Special-Status Plants and Wildlife

The CEQA Guidelines (14 CCR 15000 et seq.) define endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors" (14 CCR 15380[b][1]). A rare animal or plant is defined in CEQA Guidelines Section 15380(b)(2) as a species that, although not currently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing as defined further in CEQA Guidelines Section 15380(c).

Special-Status Vegetation Communities

Section IV, Appendix G (Environmental Checklist Form) of the CEQA Guidelines (14 CCR 15000 et seq.) requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFW or the USFWS."

3.2.4 California Fish and Game Code Sections 1600–1616

California Fish and Game Code, Sections 1600–1616, mandates that "it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of such activity."

CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of (1) definable bed and banks and (2) existing fish or wildlife resources. CDFW takes jurisdiction to the top of bank of the stream, or the limit of the adjacent riparian vegetation, which may include oak woodlands in canyon bottoms. Historical court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear but reemerge elsewhere. Under the CDFW definition, a watercourse need not exhibit evidence of an ordinary high-water mark (OHWM) to be claimed as jurisdictional. CDFW does not have jurisdiction over ocean or shoreline resources.

Under California Fish and Game Code, Sections 1600–1616, CDFW has the authority to regulate work that will substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed,

channel, or bank of any river, stream, or lake. CDFW also has the authority to regulate work that will deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement for a Lake or Streambed Alteration Agreement and is applicable to all projects. Applications to CDFW must include a complete certified CEQA document.

3.2.5 Porter–Cologne Water Quality Control Act

Pursuant to provisions of the Porter–Cologne Act, the Regional Water Quality Control Board regulates discharging waste, or proposing to discharge waste, within any region that could affect a water of the state (California Water Code, Section 13260[a]). The State Water Resources Control Board defines a water of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050[e]).

3.3 Local Regulations

3.3.1 City of Los Angeles Protected Tree Ordinance

The Protected Tree Ordinance defines a protected tree as any of the following Southern California native species that measures 4 inches or more in cumulative diameter, 4.5 feet above the ground level at the base of the tree:

- Oak tree, including valley oak (*Quercus lobata*), coast live oak (*Quercus agrifolia*), or any other tree of the oak genus indigenous to California, but excluding scrub oak (*Quercus dumosa*)
- Southern California black walnut (*Juglans californica* var. *californica*)
- California sycamore (*Platanus racemosa*)
- California bay (*Umbellularia californica*)

Replacement trees shall be planted on the same property from which they were removed unless there is no appropriate place for planting. If an appropriate on-site location for replanting does not exist, mitigation trees may be donated to the City following the replacement schedule above or their monetary value may be paid to the City to the satisfaction of the Director.

4 Methods

Data regarding biological resources present within the Study Area were obtained through a review of pertinent literature, field reconnaissance, and tree survey; both are described in detail below.

4.1 Literature Review

The following data sources were reviewed to assist with the assessment of biological resources:

- CDFW California Natural Diversity Database (CNDDB) (CDFW 2025a)
- USFWS Information for Planning and Consultation (IPaC) (USFWS 2025a)
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (Inventory) (CNPS 2025a)
- U.S. Department of Agriculture-National Resources Conservation Service Web Soil Survey (USDA 2025a)
- CDFW Biogeographic Information and Observation System (CDFW 2025b)

Prior to conducting the field investigation, the CNDDB and CNPS Inventory were queried based on the USGS 7.5-minute topographic quadrangle map for Burbank, California, and Van Nuys, California, where the Study Area is located, as well as the surrounding 10 USGS 7.5-minute quadrangle maps (i.e., Oat Mountain, San Fernando, Condor Peak, Sunland, Canoga Park, Pasadena, Topanga, Beverly Hills, Hollywood, Los Angeles). The purpose of this review was to determine whether special-status plant and wildlife species are known to occur in the vicinity of or within the Study Area.

Other literature reviewed included A Manual of California Vegetation, Online Edition (CNPS 2025b); the California Natural Community list (CDFW 2025f); State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW 2025c); State and Federally Listed Endangered and Threatened Animals of California (CDFW 2025d); and the CDFW California Wildlife Habitat Relationships Life History Accounts and Range Maps (CDFW 2025e).

The following available resources were reviewed to assess the potential for jurisdictional waters: aerial photographs (Google Earth 2025; NETR 2025), the USGS Burbank and Van Nuys 7.5-minute topographic quadrangle map (USGS 2015, 2018), the National Hydrography Dataset and Watershed Boundary Dataset (USGS 2025), and the USFWS National Wetland Inventory (USFWS 2025b).

4.2 General Field Reconnaissance

Dudek biologist Ryan Stanley conducted a general biological reconnaissance survey of the Study Area on February 2, 2025. The purpose of the field surveys were to map existing vegetation communities and land covers, identify commonly occurring plant or wildlife species, identify plant or wildlife species protected under FESA and CESA, determine the likelihood of occurrence of any special-status plant or wildlife species, and identify aquatic resources potentially regulated under the CWA, Porter–Cologne Act, or California Fish and Game Code.

Vegetation Community and Land Cover Mapping

Vegetation mapping surveys were conducted in accordance with the CDFW Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018) and the California

Native Plant Society (CNPS) Guideline for Mapping Rare Vegetation (CNPS 2011). Vegetation community classifications used in this report follow CDFW's List of Vegetation Alliances and Associations (or California Natural Community List) (CDFW 2025f), which is based on A Manual of California Vegetation, Second Edition (Sawyer et al. 2009) and A Manual of California Vegetation, Online Edition (CNPS 2025a). Modifications to these classifications were made to accommodate the lack of conformity of the observed communities (e.g., developed/disturbed land cover types) using Oberbauer et al. (2008) and Jones and Stokes (1993).

Plants

All plant species encountered during the field surveys were identified and recorded. Latin and common names for plant species with a California Rare Plant Rank (CRPR) follow the CNPS Inventory (CNPS 2025a). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2025), and common names follow the USDA NRCS Plants Database (USDA 2025b). Potential for special-status plant species to occur within the Study Area was assessed based on known geographic and elevation ranges as well as habitat and soil conditions that are known to support species occurring in the region.

Wildlife

All wildlife species, as detected during the field survey—by sight, calls, tracks, scat, or other signs—were identified and recorded. Binoculars were used to aid in the identification of observed wildlife. No trapping or focused surveys for special-status species or nocturnal species was conducted. In addition to species observed, expected wildlife usage of the Study Area was determined according to known habitat preferences of regional wildlife species and knowledge of their relative distributions in the area. Latin and common names for wildlife species referred to in this report follow Crother (2017) for reptiles and amphibians, American Ornithologists' Union Checklist (AOU 2018) for birds, Wilson and Reeder (2005) for mammals, and Moyle (2002) for fish. Potential for special-status wildlife species to occur within the Study Area was assessed based on known geographic ranges, the presence/absence of suitable habitat, and other natural history elements that might predict their occurrence.

4.3 Special-Status Plant and Wildlife Species Assessment

Endangered, rare, or threatened plant species as defined in Section 15380(b) of the CEQA Guidelines (14 CCR 15000 et seq.) are referred to as "special-status plant species" and, as used in this report, include (1) plant species listed, proposed for listing, or candidates for listing as endangered or threatened recognized in the context of CESA and the FESA (CDFW 2025d); and/or (2) plant species with a CRPR of 1 or 2 as designated by CNPS (2025a). Species with a CRPR of 3 or 4 generally do not qualify for protection under CEQA; therefore, they are not considered special-status and impacts to these species are not analyzed in this BRTR.

Endangered, rare, or threatened wildlife species as defined in CEQA Guidelines, Section 15380(b), are referred to as "special-status wildlife species" and, as used in this report, include (1) wildlife species listed, proposed for listing, or candidates for listing as endangered or threatened recognized in the context of CESA and FESA (CDFW 2025e); (2) California Species of Special Concern (SSC) as designated by CDFW (2023g); and (3) mammals and birds that are fully protected species as described in the California Fish and Game Code, Sections 4700 and 3511 (CDFW 2025h).

The potential for special-status plant species to occur within the Study Area was assessed based on known geographic and elevation ranges as well as habitat and soil conditions that are known to support species occurring in the region. Potential for special-status wildlife species to occur within the Study Area was assessed based on known geographic ranges, the presence/absence of suitable habitat, and other natural history elements that might predict their occurrence. After completion of the reconnaissance surveys, the potential for special-status plant and wildlife species to occur on or near the project site was summarized according to the following categories. Because not all species are accommodated precisely by a given category (i.e., category definitions may be too restrictive), an expanded rationale for each category assignment is provided:

- Known to occur: the species has been documented on the property by a reliable source
- High potential to occur: the species has not been documented on the property but is known to recently occur in the vicinity and suitable habitat is present
- Moderate potential to occur: the species has not been documented on the property or in the vicinity, but the site is within the known range of the species and suitable habitat for the species is present
- Low potential to occur: the species has not been documented in the vicinity or on the property, but the site is within the known range of the species; however, suitable habitat for the species on site is of low quality
- Not expected to occur: the property is outside the known geographic or elevational range of the species and/or the site does not support suitable habitat for the species

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5 Environmental Setting

5.1 Land Use

The project site consists of dense urban residential and industrial uses. Adjacent land includes various residential developments (e.g., single-family homes, apartment buildings, townhomes), industrial operations (e.g., freight truck yards, gravel/sediment mining, recycling center), a transmission line ROW, business and office centers, an airport, various retail, shopping, and service centers (e.g., mini-malls, gas stations, auto repair), two elementary schools, a sports field complex, and three community parks. The western area of the project alignment, from Hinds Avenue to SR-170consists mainly of residential neighborhoods, and the remaining project area east of Hinds Avenue is mostly business and industrial, with sporadic residential developments.

5.2 Climate

The project region has a Mediterranean climate with cool, wet winters and hot, dry summers. August is the average warmest month with an average high temperature of 88.3°F and January is the coolest month on average with a low of 38.7°F. Rainfall occurs primarily between November and April, with the maximum average precipitation occurring in February. The mean annual rainfall for the region is approximately 16.35 inches of rain per year (WRCC 2025).

5.3 Topography

Topography is generally flat with no streams or waterbodies within the project area. Elevation ranges from approximately 825 feet above mean sea level (amsl) in the northwestern area of the Study Area to 750 feet amsl in the southeastern corner of the Study Area.

5.4 Soils

According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (USDA 2025a), there are five soil map units mapped in the Study Area: Palmview–Tujunga complex, 0% to 5% slopes; Soboba complex, 0% to 5% slopes; Urban land-Tujunga-Typic Xerorthents, sandy substratum complex, 0% to 2% slopes; Urban land, commercial-Soboba complex, 0% to 5% slopes; and Pits and Quarries. None of the soil maps units are included in the USDA NRCS hydric soil list (USDA 2025c).

Urban land is mostly covered by streets, parking lots, buildings, and other structures of urban areas. Soils in urban areas are commonly human-transported (e.g., fill) or human-altered (e.g., truncated or mixed in situ) to significant depth (Ditzler et al. 2017). The Study Area has been developed for over 75 years (NETR 2025) and has altered or covered the native soils, meeting the definition of Urban land.

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6 Results

Representative photos of the Study Area and the biological resources described in this section are included in Appendix A. Compendia of plant and wildlife observed in the Study Area are included in Appendix B.

6.1 Vegetation Communities and Land Covers

No vegetation communities were mapped within the Study Area. There are four non-natural land cover types mapped in the Study Area; these are presented in Table 2 below and their spatial distributions are presented on Figure 2, Vegetation Communities and Land Cover Types. Descriptions of the land cover types are provided in detail in Sections 6.1.1 through 6.1.4.

Table 2. Land Cover Types Within the Study Area

Land Cover Type	Study Area (acres)
Non-Natural Land Cover Types	
Disturbed Habitat	1.80
Ornamental Plantings	3.50
Parks	14.54
Urban/Developed Land	299.08
Total[1]	**318.92**

Note:
[1] Totals may not sum due to rounding

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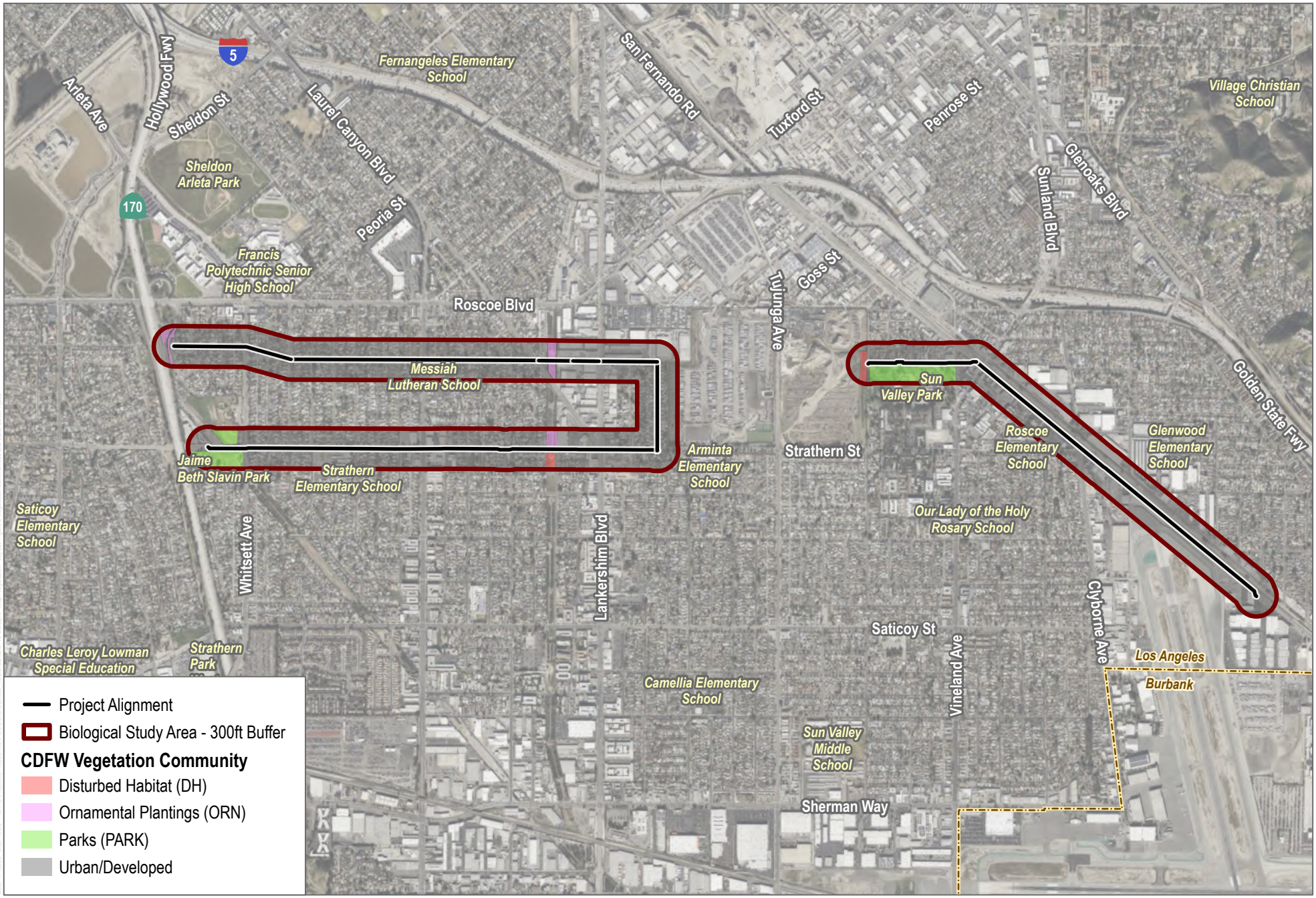

SOURCE: Bing Imagery 2024; OpenStreetMaps 2019

Los Angeles Department of Water & Power

0 500 1,000 Feet

FIGURE 2

Vegetation Communities and Land Cover Types

Cantara Trunk Line Replacement Project

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6.1.1 Disturbed Habitat

Disturbed habitat refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species such as ornamentals or ruderal exotic species that take advantage of disturbance (Oberbauer et al. 2008). Disturbed habitat is not a listed vegetation community under the CDFW California Natural Community List (CDFW 2025i), but it has been used in this report because it best describes what was observed in the field.

In the Study Area, disturbed habitat is mapped along unpaved roadways throughout the Study Area, as well as lots and ROWs adjacent to residences or roads that appear to be regularly mowed, likely for fire hazard abatement purposes.

6.1.2 Ornamental Plantings

Ornamental plantings refer to areas where non-native ornamental species and landscaping schemes have been installed and maintained, usually as part of commercial or residential property. This habitat type typically supports myriad ornamental species, including, but not limited to, Bermudagrass (*Cynodon dactylon*), hottentot fig (*Carpobrotus edulis*), Peruvian peppertree (*Schinus molle*), Brazilian peppertree (*S. terebinthifolius*), and red apple iceplant (*Aptenia cordifolia*). Parks and ornamental plantings are not a listed vegetation community under the CDFW California Natural Community List (CDFW 2025i), but it has been used in this report because it best describes what was observed in the field.

In the Study Area, ornamental plantings are mapped in the northwestern corner of the Study Area, comprising an on-ramp area for access to SR-170, an area between the highway and adjacent residential housing, and commercial ornamental plant operations in a transmission line ROW in the central part of the Study Area.

6.1.3 Parks

Parks refer to areas where non-native ornamental species and landscaping schemes have been installed and maintained. This habitat type typically supports myriad ornamental species including those listed in the Ornamental Plantings land cover type, but not limited to, Bermudagrass (*Cynodon dactylon*), hottentot fig (*Carpobrotus edulis*), Peruvian peppertree, Brazilian peppertree (*Schinus terebinthifolius*), and red apple iceplant (*Aptenia cordifolia*).

Parks is not a listed vegetation community under the California Natural Community List (CDFW 2025i), but it has been used in this report because it best describes what was observed in the field. As such, this community is not globally or state ranked and is not considered a sensitive natural community.

Within the Study Area, three distinct parks occur at southwestern area of the Study Area and the northeastern area of the Study Area and consist of two community parks and one area of baseball fields.

6.1.4 Urban/Developed Land

Urban or developed land refers to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Urban or developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation (Oberbauer et al. 2008).

Developed land is not a listed vegetation community under the CDFW California Natural Community List (CDFW 2025i) but has been used in this report because it best describes what was observed in the field.

In the Study Area, the urban/developed land cover is distributed throughout the entire Study Area and consists of the entire project site (e.g., paved roads) and structures and hardscapes associated with the residential neighborhoods and commercial areas.

6.2 Special-Status Resources Assessment

6.2.1 Special-Status Plant Species

Appendix C, Assessment of Special-Status Plant Species Potentially Occurring in the Study Area, lists special-status plant species that are known to occur in the USGS 7.5-minute Burbank and Van Nuys quadrangles and the surrounding 10 USGS 7.5-minute quadrangles, as well as plant species included within the USFWS IPaC list generated for the Study Area (CDFW 2025a; CNPS 2025a; USFWS 2025a). For each species listed, a determination was made regarding the potential for the species to occur on site based on information gathered during the literature review and site visits, including the location of the site, vegetation communities or land covers present, current site conditions, and past and present land use.

None of the CNDDB and USFWS special-status plant occurrences within the 12-quad query had potential to occur in the Study Area due to the high level of development within the region (Appendix C). Special-status plant species are not further analyzed in this report because no direct, indirect, or cumulative impacts are expected.

6.2.2 Special-Status Wildlife Species

Appendix D, Assessment of Special-Status Wildlife Species Potentially Occurring in the Study Area, lists special-status wildlife species that are known to occur in the USGS 7.5-minute Burbank and Van Nuys quadrangles and the surrounding 10 USGS 7.5-minute quadrangles, as well as wildlife species included within the USFWS IPaC list generated for the Study Area (CDFW 2025a; CNPS 2025a; USFWS 2025a). For each species listed, a determination was made regarding the potential for the species to occur on site based on information gathered during the literature review and site visits, including the location of the site, vegetation communities or land covers present, current site conditions, and past and present land use.

None of the CNDDB and USFWS special-status plant occurrences within the 12-quad query have potential to occur in the Study Area due to the high level of development within the region (Appendix D). Special-status wildlife species are not further analyzed in this report because no direct, indirect, or cumulative impacts are expected.

6.2.3 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Corridors can also be aquatic resources that provide passage for fish. Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation; they may be continuous habitat or discrete habitat islands that function as steppingstones for wildlife dispersal.

On a regional and local level, the Study Area does not occur within any designated wildlife corridors or habitat linkages identified in the South Coast Missing Linkages analysis conducted by South Coast Wildlands (2008) or CDFW's California Essential Habitat Connectivity Project (Spencer et al. 2010), as shown in the CDFW BIOS (CDFW 2025b).

6.2.4 Native Wildlife Nursery Sites

There are numerous mature native and ornamental trees found throughout the Study Area. No diagnostic signs of bird rookeries (e.g., numerous nests, whitewash) or large maternal or overwintering bat roosts (e.g., large concentrations of guano or guano odors) were identified in the Study Area. The dominance of sparse ornamental vegetation and the lack of habitat to provide substantial foraging opportunities for birds on site or in the immediate area make rookeries unlikely. The lack of typical urban roosting habitat (bridges and older buildings with structural deficiencies) makes it unlikely for the Study Area to support native wildlife nursery sites. Vegetation located within and adjacent to the project site does provide suitable nesting habitat for birds.

6.3 Jurisdictional Wetlands and Waters

A desktop review of the USFWS National Wetland Inventory (NWI) database (USFWS 2025b) found no features mapped within the Study Area.

6.4 City of Los Angeles Protected Tree Ordinance

Several coast live oak and California sycamore trees were observed in the Study Area. The trees were associated with ornamental landscaping for residential homes and parks. Some of the trees had driplines that overlapped the asphalted streets that the project alignment occurs on.

6.5 Local, Regional, or State Habitat Conservation Plans

The Study Area is not within any habitat conservation plan (HCP), natural community conservation plan (NCCP), or other approved local, regional, or state habitat conservation plan (CDFW 2019).

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7 Project Impacts

This section addresses direct and indirect impacts to biological resources that would result from implementation of the proposed project.

7.1 Definition of Impacts

7.1.1 Direct Permanent Impacts

Direct permanent impacts refer to the absolute and permanent physical loss of a biological resource due to clearing, grading, and/or construction of structures, which can be determined in four ways: (1) permanent loss of vegetation communities, land covers, and general wildlife and their habitat; (2) permanent loss of or harm to individuals of special-status plant and wildlife species; (3) permanent loss of suitable habitat for special-status species; and (4) permanent loss of wildlife movement and habitat connectivity.

7.1.2 Direct Temporary Impacts

Direct temporary impacts refer to a temporal loss of vegetation communities and land covers resulting from vegetation and land cover clearing. The main criterion for direct temporary impacts is that impacts would occur for a short period of time and would be reversible. Areas currently supporting native vegetation temporarily disturbed by construction activities would be restored and revegetated with a native species mix similar to that which existed prior to disturbance following completion of work in the area such that full biological function can be restored. Areas not currently supporting native vegetation would be adequately restored to prevent adverse effects such as erosion or establishment of invasive species following construction.

7.1.3 Indirect Impacts

Indirect impacts are reasonably foreseeable effects caused by project implementation on remaining or adjacent biological resources outside the direct construction disturbance zone that may occur during construction (i.e., short-term construction-related indirect impacts) or later in time as a result of the development (i.e., long-term, or operational, indirect impacts). Indirect impacts may affect areas within the defined Study Area, but outside the construction disturbance zone. Indirect impacts include short-term effects immediately related to construction activities and long-term or chronic effects related to the human occupation of developed areas (i.e., development-related long-term effects) that are adjacent to naturalized areas.

For the proposed project, it is assumed that the potential indirect impacts resulting from construction activities include fugitive dust from earthmoving activities, leaks or spills from construction equipment, noise from construction activities, and general human presence that may temporarily disrupt species and habitat vitality, as well construction-related soil erosion and runoff that could affect downstream resources.

7.1.4 Explanation of Findings of Significance

Impacts to sensitive vegetation communities or riparian habitat, special-status plant species, special-status wildlife species, wildlife corridors and habitat connectivity, and regional resource planning must be analyzed to determine

whether such impacts are significant. CEQA Guidelines Section 15064(b) states that an ironclad definition of "significant" effect is not possible because the significance of an activity may vary with the setting. However, CEQA Guidelines Section 15065(a) lists impacts that are helpful in defining whether a project may have a significant effect on the environment. Mandatory findings of significance occur when there is substantial evidence that a project could: (1) substantially degrade the quality of the environment, (2) substantially reduce the habitat of a fish or wildlife species, (3) cause a fish or wildlife population to drop below self-sustaining levels, (4) threaten to eliminate a plant or animal community, or (5) reduce the number or restrict the range of a rare or endangered plant or animal.

The following are the significance thresholds for biological resources provided in the CEQA Appendix G environmental checklist, which states that a project would potentially have a significant effect if it:

Impact BIO-1. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as being a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS?

Impact BIO-2. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS?

Impact BIO-3. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Impact BIO-4. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites?

Impact BIO-5. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact BIO-6. Would the project conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan?

The evaluation of whether an impact to a particular biological resource is significant must consider both the resource itself and the role of that resource in a regional context. Substantial impacts are those that contribute to, or result in, permanent loss of an important resource, such as a population of a rare plant or animal. Impacts may be important locally because they result in an adverse alteration of existing site conditions but considered not significant because they do not contribute substantially to the permanent loss of that resource regionally. The severity of an impact and the offsetting benefits of mitigation are the primary determinants of whether that impact can be mitigated to a less-than-significant level.

7.2 Impact BIO-1: Special-Status Species

No special-status plants or wildlife species were observed within the project site or surrounding Study Area during the site visit conducted in February 2025. The Study Area occurs within a heavily urbanized area where

natural vegetation and soils have been removed or altered, and suitable wildlife habitat capable of supporting special-status plant and wildlife species is not present. Based on the lack of suitable habitat, no special-status plants or wildlife species are expected to occur in the project site or Study Area (Appendices C and D). Therefore, direct and/or indirect impacts to special-status species are not anticipated, and no mitigation measures are recommended.

7.3 Impact BIO-2: Riparian Habitat and Sensitive Communities

No riparian habitat or sensitive vegetation communities occur within the project site or surrounding Study Area. Therefore, direct and/or indirect impacts to riparian habitat and sensitive vegetation communities are not anticipated, and no mitigation measures are recommended.

7.4 Impact BIO-3: Jurisdictional Wetlands and Waters

No jurisdictional wetlands and waters are expected to occur in the project site or surrounding area. Therefore, direct and/or indirect impacts to any jurisdictional wetlands or water resources by the project are not anticipated, and no avoidance or mitigation measures are recommended.

7.5 Impact BIO-4: Wildlife Corridors and Nurseries

The project site occurs within an urban setting and does not function as a wildlife corridor or habitat linkage. Additionally, it does not occur within any designated wildlife corridors or habitat linkages identified in the South Coast Missing Linkages project (South Coast Wildlands 2008), California Essential Habitat Connectivity project (Spencer et al. 2010), or as recognized by the City (2006, 2025). Urban-adapted wildlife species (i.e., striped skunk, racoon, and opossum) may use the Study Area for local movement, but these species are primarily nocturnal and limited nighttime work and lighting is expected; project construction hours are scheduled to be between 7:00 a.m. and 5:00 p.m. Monday through Friday. The direct take of bird nests is not expected because the project is not removing vegetation or structures that could be used for nesting. The bird species that could nest in the Study Area are expected to be common, urban-adapted species that are accustomed to human activity related to the residential homes and traffic along the project alignment, and the increased human activity from the project is not expected to indirectly impact active nests. However, BMP-BIO-1 though BMP-BIO-3 will be implemented by the project and would further avoid and minimize any effect of construction activities on nesting birds. Therefore, direct and/or indirect impacts to wildlife corridors, habitat linkages, and wildlife nurseries are not anticipated, and impacts would be less than significant.

7.6 Impact BIO-5: City-Protected Trees

No City-protected trees are expected to be removed due to project actions. Therefore, direct and/or indirect impacts to City-protected trees are not anticipated, and no avoidance or mitigation measures are recommended.

7.7 Impact BIO-6: Habitat Conservation Plan/ Natural Community Conservation Plan

The Study Area is not within any HCP, NCCP, or other approved local, regional, or state HCP (CDFW 2019). Therefore, there is no impacts to any HCP, NCCP, or other approved local, regional, or state HCP.

8 Biological Recommendations Summary

The project is not expected to have a significant impact on sensitive species, sensitive vegetation communities, wetlands or other jurisdictional waters, wildlife corridors or nurseries, local policies or ordinances protecting biological resources, or any adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. Thus, no biological recommendations are given.

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Appendix A
Photo Exhibit



Photo 1. View of San Fernando Road in the industrial area near the Hollywood-Burbank Airport.



Photo 2. View of typical roadway between residential houses and community park at Cantara Street and Fair Avenue.



Photo 3. View of ornamental vegetation and trees associated with the residential and park properties. Cantara Street on the left.



Photo 4. View of typical residential neighborhood on Irvine Avenue near Strathern Street.



Photo 5. View of Strathern Street near Whitsett Avenue, in southwestern corner of project area.



Photo 6. View Cantara Street at Vanscoy Avenue, in northwestern corner of project area.



Photo 7. View of commercial ornamental operations on the north side of Strathern Street at Morella Avenue.



Photo 8. View of maintained ROW on the south side of Strathern Street at Morella Avenue.

Appendix B
Species Compendium

Plant Species

Angiosperms (Dicots)

AIZOACEAE – FIG-MARIGOLD FAMILY

* *Carpobrotus chilensis*– sea fig

ANACARDIACEAE – SUMAC FAMILY

* *Schinus molle* – Peruvian pepper tree

APOCYNACEAE – DOGBANE FAMILY

* *Nerium oleander*– oleander

BIGNONIACEAE – BIGNONIA FAMILY

* *Tabebuia impetiginosa* – pink trumpet tree

FAGACEAE – OAK FAMILY

Quercus agrifolia – coast live oak

* *Quercus ilex* – holly oak

MYRTACEAE – MYRTLE FAMILY

* *Eucalyptus camaldulensis* – river redgum
* *Eucalyptus citriodora* – lemon scented gum

PLATANACEAE – PLANE TREE, SYCAMORE FAMILY

Platanus racemosa – California sycamore

RHAMNACEAE – BUCKTHORN FAMILY

Ceanothus velutinus – tobacco brush or snow bush

ROSACEAE – ROSE FAMILY

Cercocarpus betuloides – birch leaf mountain mahogany

Heteromeles arbutifolia – toyon

SIMAROUBACEAE – QUASSIA OR SIMAROUBA FAMILY

* *Ailanthus altissima* – tree of heaven

ULMACEAE – ELM FAMILY

* *Ulmus parvifolia* – Chinese elm

Gymnosperms and Gnetophytes

PINACEAE – PINE FAMILY

* *Pinus canariensis* – Canary Island pine

Monocots

ARECACEAE – PALM FAMILY

* *Pheonix canariensis* – Canary Island date palm
* *Washingtonia robusta* – Washington fan palm

Wildlife Species – Vertebrates

Birds

ACCIPITRIDAE – HAWKS

Buteo jamaicensis – red-tailed hawk

AEGITHALIDAE – LONG-TAILED TITS & BUSHTITS

Psaltriparus minimus - bushtit

CATHARTIDAE – NEW WORLD VULTURES

Cathartes aura – turkey vulture

COLUMBIDAE – PIGEONS AND DOVES

Zenaida macroura – mourning dove

CORVIDAE – JAYS AND CROWS

Corvus brachyrhynchos – American crow

FRINGILLIDAE – FINCHES

Carpodacus mexicanus – house finch

PARULIDAE – WOOD-WARBLERS

Setophaga coronata – yellow-rumped warbler

PASSERELLIDAE – NEW WORLD SPARROWS

Melozone crissalis – California towhee

PICIDAE – WOODPECKERS & ALLIES

Colaptes auratus – northern flicker

Melanerpes formicivorus – acorn woodpecker

STURNIDAE – STARLINGS

* *Sturnus vulgaris* – European starling

TYRANNIDAE – TYRANT FLYCATCHERS

Sayornis nigricans – black phoebe

TROCHILIDAE – HUMMINGBIRDS

Calypte anna – Anna's hummingbird

* signifies introduced (non-native) species

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Appendix C

Assessment of Special-Status Plant Species Potentially Occurring in the Study Area

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Aphyllon validum ssp. *validum*	Rock Creek broomrape	None/None/1B.2	Chaparral, Pinyon and juniper woodland; Granitic/perennial herb (parasitic)/May–Sep/3,380–6,560	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
–	San Gabriel manzanita	None/None/1B.2	Chaparral (rocky)/perennial evergreen shrub/Mar/1950–4920	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Arenaria paludicola	marsh sandwort	FE/SE/1B.1	Marshes and swamps (brackish, freshwater); Openings, Sandy/ perennial stoloniferous herb/ May–Aug/10–560	Not expected to occur. Suitable marsh habitat for the species is not present in the Study Area.
Astragalus brauntonii	Braunton's milk-vetch	FE/None/1B.1	Chaparral, Coastal scrub, Valley and foothill grassland; Burned areas (sometimes), Carbonate, Disturbed areas (sometimes), Sandstone (usually)/perennial herb/Jan–Aug/ 15–2,100	Not expected to occur. Suitable micro-habitat (sandstone with carbonate layers) for the species is not present in the Study Area.
Astragalus pycnostachyus var. *lanosissimus*	Ventura Marsh milk-vetch	FE/SE/1B.1	Coastal dunes, Coastal scrub, Marshes and swamps (edges, coastal salt, brackish)/perennial herb/ (June)Aug–Oct/5–115	Not expected to occur. Suitable coastal and marsh habitat not present in the Study Area.
Astragalus tener var. *titi*	coastal dunes milk-vetch	FE/SE/1B.1	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie (mesic); Mesic (often), Vernally Mesic (often)/ annual herb/Mar–May/5–165	Not expected to occur. Suitable coastal and marsh habitat not present in the Study Area.
Atriplex coulteri	Coulter's saltbush	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley and foothill grassland; Alkaline (sometimes), Clay (sometimes)/perennial herb/ Mar–Oct/10–1,510	Not expected to occur. Suitable habitat and alkali soils for the species is not present in the Study Area.
Atriplex pacifica	south coast saltscale	None/None/1B.2	Coastal bluff scrub, Coastal dunes, Coastal scrub, Playas/annual herb/ Mar–Oct/0–460	Not expected to occur. Suitable habitat and alkali soils for the species is not present in the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Atriplex parishii	Parish's brittlescale	None/None/1B.1	Chenopod scrub, Playas, Vernal pools; Alkaline/annual herb/June–Oct/ 80–6,235	Not expected to occur. Suitable habitat and alkali flats not present in the Study Area.
Atriplex serenana var. *davidsonii*	Davidson's saltscale	None/None/1B.2	Coastal bluff scrub, Coastal scrub; Alkaline/annual herb/Apr–Oct/ 35–655	Not expected to occur. Suitable habitat and alkali flats not present in the Study Area.
Berberis nevinii	Nevin's barberry	FE/SE/1B.1	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub; Gravelly (sometimes), Sandy (sometimes)/ perennial evergreen shrub/ (Feb)Mar–June/230–2,705	Not expected to occur. This species is a conspicuous perennial shrub that would have been observed, if present, during the site visit.
Calochortus clavatus var. *gracilis*	slender mariposa-lily	None/None/1B.2	Chaparral, Coastal scrub, Valley and foothill grassland/perennial bulbiferous herb/Mar–June(Nov)/ 1050–3280	Not expected to occur. Suitable habitat with species occurrences is found in the Verdugo Mountains north and the eastern end of the Santa Monica Mountains to the south of the Project area. However, suitable habitat is not present in the Study Area.
Calochortus palmeri var. *palmeri*	Palmer's mariposa-lily	None/None/1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps; Mesic/ perennial bulbiferous herb/Apr–July/ 2,330–7,840	Not expected to occur. Suitable micro-habitat (vernally moist forest and chapparal) for the species is not present in the Study Area.
Calystegia felix	lucky morning-glory	None/None/1B.1	Meadows and seeps (sometimes alkaline), Riparian scrub (alluvial); Alkaline (sometimes), Loam (sometimes)/annual rhizomatous herb/Mar–Sep/100–705	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Castilleja gleasoni	Mt. Gleason paintbrush	None/SR/1B.2	Chaparral, Lower montane coniferous forest, Pinyon and juniper woodland; Granitic/perennial herb (hemiparasitic)/May–June(Sep)/ 3,805–7,120	Not expected to occur. Suitable habitat for the species is not present in the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Centromadia parryi ssp. *australis*	southern tarplant	None/None/1B.1	Marshes and swamps (margins), Valley and foothill grassland (vernally mesic), Vernal pools/annual herb/May–Nov/ 0–1575	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Centromadia pungens ssp. *laevis*	smooth tarplant	None/None/1B.1	Chenopod scrub, Meadows and seeps, Playas, Riparian woodland, Valley and foothill grassland; Alkaline/annual herb/Apr–Sep/0–2,100	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Chloropyron maritimum ssp. *maritimum*	salt marsh bird's-beak	FE/SE/1B.2	Coastal dunes, Marshes and swamps (coastal salt)/annual herb (hemiparasitic)/May–Oct(Nov)/0–100	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Chorizanthe parryi var. *fernandina*	San Fernando Valley spineflower	None/SE/1B.1	Coastal scrub (sandy), Valley and foothill grassland/annual herb/ Apr–July/490–4005	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Chorizanthe parryi var. *parryi*	Parry's spineflower	None/None/1B.1	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland; Openings, Rocky (sometimes), Sandy (sometimes)/ annual herb/Apr–June/900–4,005	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Dithyrea maritima	beach spectaclepod	None/ST/1B.1	Coastal dunes, Coastal scrub (sandy)/perennial rhizomatous herb/ Mar–May/10–165	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Dodecahema leptoceras	slender-horned spineflower	FE/SE/1B.1	Chaparral, Cismontane woodland, Coastal scrub (alluvial fans); Sandy/ annual herb/Apr–June/655–2,495	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Dudleya densiflora	San Gabriel Mountains dudleya	None/None/1B.1	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Riparian woodland; Granitic/perennial herb/Mar–July/ 800–2,000	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Dudleya multicaulis	many-stemmed dudleya	None/None/1B.2	Chaparral, Coastal scrub, Valley and foothill grassland; Clay (often)/ perennial herb/Apr–July/50–2,590	Not expected to occur. Suitable habitat for the species is not present in the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Helianthus nuttallii ssp. *parishii*	Los Angeles sunflower	None/None/1A	Marshes and swamps (freshwater, coastal salt)/perennial rhizomatous herb/Aug–Oct/35–5005	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Horkelia cuneata var. *puberula*	mesa horkelia	None/None/1B.1	Chaparral (maritime), Cismontane woodland, Coastal scrub; Gravelly (sometimes), Sandy (sometimes)/ perennial herb/Feb–July(Sep)/ 230–2,660	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Imperata brevifolia	California satintail	None/None/2B.1	Chaparral, Coastal scrub, Meadows and seeps (often alkali), Mojavean desert scrub, Riparian scrub; Mesic/ perennial rhizomatous herb/ Sep–May/0–3,985	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None/1B.1	Marshes and swamps (coastal salt), Playas, Vernal pools/annual herb/ Feb–June/5–4005	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Linanthus concinnus	San Gabriel linanthus	None/None/1B.2	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest; Openings, Rocky/annual herb/ Apr–July/4,985–9,185	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Malacothamnus davidsonii	Davidson's bush-mallow	None/None/1B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland/ perennial deciduous shrub/June–Jan/ 605–3740	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Nama stenocarpa	mud nama	None/None/2B.2	Marshes and swamps (lake margins, riverbanks)/annual/perennial herb/ Jan–July/15–1640	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Nasturtium gambelii	Gambel's water cress	FE/ST/1B.1	Marshes and swamps (brackish, freshwater)/perennial rhizomatous herb/Apr–Oct/15–1085	Not expected to occur. Suitable habitat for the species is not present in the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Navarretia prostrata	prostrate vernal pool navarretia	None/None/1B.2	Coastal scrub, Meadows and seeps, Valley and foothill grassland (alkaline), Vernal pools; Mesic/annual herb/ Apr–July/10–3,970	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Orcuttia californica	California Orcutt grass	FE/SE/1B.1	Vernal pools/annual herb/Apr–Aug/ 50–2165	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Pelazoneuron puberulum var. *sonorense*	Sonoran maiden fern	None/None/2B.2	Meadows and seeps (seeps, streams)/ perennial rhizomatous herb/Jan–Sep/ 165–2000	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Pseudognaphalium leucocephalum	white rabbit-tobacco	None/None/2B.2	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland; Gravelly, Sandy/perennial herb/ (July)Aug–Nov(Dec)/0–6,890	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Quercus dumosa	Nuttall's scrub oak	None/None/1B.1	Chaparral, Closed-cone coniferous forest, Coastal scrub; Clay, Loam, Sandy/perennial evergreen shrub/ Feb–Apr(May–Aug)/50–1,310	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Ribes divaricatum var. *parishii*	Parish's gooseberry	None/None/1A	Riparian woodland/perennial deciduous shrub/Feb–Apr/215–985	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Sagittaria sanfordii	Sanford's arrowhead	None/None/1B.2	Marshes and swamps (shallow freshwater)/perennial rhizomatous herb (emergent)/May–Oct(Nov)/ 0–2135	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Sidalcea neomexicana	salt spring checkerbloom	None/None/2B.2	Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Playas; Alkaline, Mesic/ perennial herb/Mar–June/50–5,020	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Spermolepis lateriflora	western bristly scaleseed	None/None/2A	Sonoran desert scrub; Rocky (sometimes), Sandy (sometimes)/ annual herb/Mar–Apr/1,200–2,200	Not expected to occur. Suitable habitat for the species is not present in the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur[2]
Symphyotrichum defoliatum	San Bernardino aster	None/None/1B.2	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps, Valley and foothill grassland (vernally mesic); Streambanks/ perennial rhizomatous herb/July–Nov/ 5–6,695	Not expected to occur. Suitable habitat for the species is not present in the Study Area.
Symphyotrichum greatae	Greata's aster	None/None/1B.3	Broadleafed upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland; Mesic/perennial rhizomatous herb/ June–Oct/985–6,595	Not expected to occur. Suitable habitat for the species is not present in the Study Area.

Notes:

1 **Status Abbreviations**

Federal and State Statuses

FE: Federally listed as endangered
FT: Federally listed as threatened
SE: State listed as endangered
ST: State listed as threatened
SR: State designated as rare

CRPR: California Rare Plant Rank

CRPR 1A: Plants presumed extirpated in California and either rare or extinct elsewhere
CRPR 1B: Plants rare, threatened, or endangered in California and elsewhere
CRPR 2A: Plants presumed extirpated in California but common elsewhere
CRPR 2B: Plants rare, threatened, or endangered in California but more common elsewhere

- Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
- Moderately threatened in California (20% - 80% of occurrences threatened/moderate degree and immediacy of threat)
- Not very threatened in California (less than 20% of occurrences threatened/low degree and immediacy of threat)

2 Refers to records within the Burbank & Van Nuys U.S. Geological Survey (USGS) 7.5-minute quadrangle and surrounding eight quadrangles (i.e., Oat Mountain, San Fernando, Canoga Park, Sunland, Condor Peak, Pasadena, Topanga, Beverly Hills, Hollywood, and Los Angeles)

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Appendix D

Assessment of Special-Status Wildlife Species Potentially Occurring in the Study Area

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
Invertebrates				
Bombus crotchii	Crotch bumble bee	None/CSE	Open grassland and scrub communities supporting suitable floral resources.	Not expected to occur. The project site and surrounding area is primarily composed of heavily urbanized commercial and residential development, lacking suitable habitat to support food plants and floral resources this species utilizes. There is a 2019 occurrences approximately 1.3 miles north at a retail nursery and community garden (CDFW 2025), and transitory individuals may occur in the project site but are not expected to be impacted by the project.
Danaus plexippus plexippus pop. 1	monarch - California overwintering population	FC/None	Wind-protected tree groves with nectar sources and nearby water sources	Not expected to occur. The project site and surrounding area is primarily composed of heavily urbanized commercial and residential development, lacking suitable habitat to support food plants and refuge. The only occurrences within the study area are approximately 13.5 miles southwest (CDFW 2025).
Fish				
Catostomus santaanae	Santa Ana sucker	FT/None	Small, shallow, cool, clear streams less than 7 meters (23 feet) in width and a few centimeters to more than a meter (1.5 inches to more than 3 feet) in depth; substrates are generally coarse gravel, rubble, and boulder	Not expected to occur in the Project site. This species occurs in the northern and northeastern portions of the Study Area; however, there is no suitable aquatic habitat within the Project site or connectivity to suitable habitat.
Gila orcuttii	arroyo chub	None/SSC	Warm, fluctuating streams with slow-moving or backwater sections of warm to cool streams at depths >40 centimeters (16 inches); substrates of sand or mud	Not expected to occur in the Project site. This species occurs in the northern portions of the Study Area; however, there is no suitable aquatic habitat within the Project site or connectivity to suitable habitat.

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
Oncorhynchus mykiss irideus pop. 10	Southern steelhead – southern California DPS	FE/SCE	Clean, clear, cool, well-oxygenated streams; needs relatively deep pools in migration and gravelly substrate to spawn	Not expected to occur. Suitable aquatic resources and connectivity to this species habitat is not present.
Rhinichthys gabrielino	Santa Ana speckled dace	None/SSC	Headwaters of the Santa Ana and San Gabriel Rivers; may be extirpated from the Los Angeles River system	Not expected to occur in the Project site. This species occurs in the northern portions of the Study Area; however, there is no suitable aquatic habitat within the Project site or connectivity to suitable habitat.
Amphibians				
Anaxyrus californicus	arroyo toad	FE/SSC	Semi-arid areas near washes, sandy riverbanks, riparian areas, palm oasis, Joshua tree, mixed chaparral and sagebrush; stream channels for breeding (typically third order); adjacent stream terraces and uplands for foraging and wintering	Not expected to occur. Suitable habitat is not present. There are no nearby occurrences or suitable habitat within the Project site.
marmoratRana muscosa	mountain yellow-legged frog	FE/SE	Lakes, ponds, meadow streams, isolated pools, and open riverbanks; rocky canyons in narrow canyons and in chaparral	Not expected to occur. This species is believed to be extirpated within the Study Area (CDFW 2025).
Spea hammondii	western spadefoot	None/SSC	Primarily grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks in chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture	Not expected to occur. Suitable habitat for the species is not present within the Project site. All recent occurrences are in the northern portion of the Study Area, in the Angeles National Forest (CDFW 2025).
Taricha torosa (Monterey Co. south only)	California newt	None/SSC	Wet forests, oak forests, chaparral, and rolling grassland	Not expected to occur. Suitable habitat for the species is not present within the Project site. The only two occurrences within the Study Area are 12 miles east and northeast in the Angeles National Forest (CDFW 2025).

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
Reptiles				
Actinemys pallida	southwestern pond turtle	None/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter	Not expected to occur. Suitable habitat for the species is not present within the Project site. This species occurs in the northern portions of the Study Area, within the Angeles National Forest (CDFW 2025).
Anniella stebbinsi	southern California legless lizard	None/SSC	Coastal dunes, stabilized dunes, beaches, dry washes, valley–foothill, chaparral, and scrubs; pine, oak, and riparian woodlands; associated with sparse vegetation and moist sandy or loose, loamy soils	Not expected to occur. The surrounding areas have been significantly disturbed and highly urbanized for many years. Sparse amounts of habitat are not expected to sustain a viable population of this species. The nearest occurrence of this species is approximately 3.6 miles south and was found in a residential yard (CDFW 2025).
Arizona elegans occidentalis	California glossy snake	None/SSC	Commonly occurs in desert regions throughout southern California. Prefers open sandy areas with scattered brush. Also found in rocky areas.	Not expected to occur in the Project Site. The species could occur east of the Project site in the Verdugo Mountains; however, suitable habitat is not present within the Project site. There are three CNDDB occurrence for this species and are all historic, with the nearest being approximately 3.6 miles east (CDFW 2025).
Aspidoscelis tigris stejnegeri	coastal whiptail	None/SSC	Hot and dry areas with sparse foliage, including chaparral, woodland, and riparian areas.	Not expected to occur. The surrounding areas have been significantly disturbed and highly urbanized for many years. Sparse amounts of habitat are not expected to sustain a viable population of this species. CNDDB occurrences for this species are located to the north in the Angeles National Forest, and south in the Santa Monica Mountains (CDFW 2025).
Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral,	Not expected to occur. Suitable habitat is not present within the Project site. All nearby CNDDB occurrences are historic with recent

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
			valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats	occurrences focused to the northern sections of the Study Area (CDFW 2025).
Thamnophis hammondii	two-striped gartersnake	None/SSC	Streams, creeks, pools, streams with rocky beds, ponds, lakes, vernal pools	Not expected to occur in the Project site. This species is highly aquatic, and the Project site lacks suitable aquatic habitat.
Birds				
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	Not expected to occur in the Study Area. Suitable habitat for the species is not present in the Study Area. All occurrences within the Study Area are historic (CDFW 2025).
Buteo swainsoni (nesting)	Swainson's hawk	BCC/ST	Nests in open woodland and savanna, riparian, and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture	Not expected to occur for nesting in the Study Area but may occur as a transient during migration.
Coccyzus americanus occidentalis (nesting)	western yellow-billed cuckoo	FT/SE	Nests in dense, wide riparian woodlands and forest with well-developed understories	Not expected to occur. Suitable riparian habitat for the species is not present in the Study Area.
Coturnicops noveboracensis	yellow rail	BCC/SCC	Nesting requires wet marsh/sedge meadows or coastal marshes with wet soil and shallow, standing water	Not expected to occur. Suitable habitat is not present in the Project site.
Empidonax traillii extimus (nesting)	southwestern willow flycatcher	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration	Not expected to occur. Suitable habitat for the species is not present. This species prefers a mixture of dense riparian shrub and tree habitat, paired with aquatic or wetland area (Sogge and Marshall 2000). All CNDDB records for this species are historic (CDFW 2025).
Falco peregrinus anatum (nesting)	American peregrine falcon	FPD/SCD	Nests on cliffs, buildings, and bridges; forages in wetlands, riparian, meadows, croplands,	Not expected to occur for breeding or foraging but may be transient over the Study Area.

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
			especially where waterfowl are present	
Polioptila californica californica	coastal California gnatcatcher	FT/SSC	Nests and forages in various sage scrub communities, often dominated by California sagebrush and buckwheat; generally avoids nesting in areas with a slope of greater than 40%; majority of nesting at less than 1,000 feet above mean sea level	Not expected to occur for nesting or foraging. There is a 2009 occurrences of this species approximately 3.0 miles north in Hansen Dam Open Space, and a 1991 occurrence approximately 1.5 miles east, in the Verdugo Mountains (CDFW 2025).
Riparia riparia (nesting)	bank swallow	None/ST	Nests in riparian, lacustrine, and coastal areas with vertical banks, bluffs, and cliffs with sandy soils; open country and water during migration	Not expected to occur. Suitable habitat for the species is not present in the Project site. There are no occurrences for this species in the Study Area (CDFW 2025).
Setophaga petechia (nesting)	yellow warbler	BCC/SSC	Nests and forages in riparian and oak woodlands, montane chaparral, open ponderosa pine, and mixed-conifer habitats	Not expected to occur. Suitable habitat for the species is not present in the Project site.
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in riparian plant associations in close proximity to water; Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alder.	Not expected to occur. Suitable nesting and foraging habitat is not present in the Project site. There are recent CNDDB occurrences approximately 3.0 miles north in Hansen Dam Open Space; however these occurrences are separated from the Project site by dense urbanization.
Mammals				
Antrozous pallidus	pallid bat	None/SSC	Grasslands, shrublands, woodlands, forests; most common in open, dry habitats with rocky outcrops for roosting, but also roosts in man-made structures and trees	Not expected to occur. Some nesting habitat is present, however this species is relatively sensitive to urban disturbance due to its group nesting habits (WBWG 2017). Therefore, this species is not expected to use the project site due to the lack of nesting and foraging habitat. The most recent CNDDB

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
				occurrence for this species in the study area is from 1971 (CDFW 2025).
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, man-made structures, and tunnels	Not expected to occur for roosting but may forage over the Study Area. There is a historic occurrence of this species approximately 4.0 miles north of the Project site (CDFW 2025); however, this species is sensitive to human disturbance (Gruver and Keinath 2005) and not expected to occur within the Project site.
Dasypterus xanthinus	western yellow bat	None/SSC	Foothills, mountains, desert regions of southern California, including arid deserts, grasslands, and mixed-conifer forests; roosts in rock crevices and cliffs; feeds over water and along washes	Not expected to occur. Ornamental palm tress in the surrounding residential area could provide roosting habitat. Foraging may occur over drainage channels and catchment basins in the Study Area if water is present, but any occurrences in the Project alignment will likely be transitory and occur mainly at night.
Eumops perotis californicus	western mastiff bat	None/SSC	Valley–foothill riparian, desert riparian, desert wash, and palm oasis habitats; below 2,000 feet above mean sea level; roosts in riparian and palms	Not expected to occur for roosting but may forage over the Study Area. Suitable riparian habitat is distant from the Project site and there are no recent CNDDB occurrences in the nearby vicinity (CDFW 2025).
Microtus californicus stephensi	south coast marsh vole	None/SSC	Tidal marshes	Not expected to occur. Suitable marsh habitat is not present in the Project site or adjacent vicinity.
Neotoma lepida intermedia	San Diego desert woodrat	None/SSC	Coastal scrub, desert scrub, chaparral, cacti, rocky areas	Not expected to occur. Suitable habitat is not present in the Project site or adjacent vicinity.
Nyctinomops macrotis	big free-tailed bat	None/SCC	Low-lying arid areas in Southern California. Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	Not expected to occur. Suitable rocky roosting habitat is not found in the Project area. Foraging may occur over drainage channels and catchment basins in the Study Area if water is present, but any occurrences in the Project site will likely be transitory and occur mainly at night. There are no recent CNDDB occurrences for this species (CDFW 2025).

Scientific Name	Common Name	Status[1] (Federal/State)	Habitat	Potential to Occur[2]
Onychomys torridus ramona	southern grasshopper mouse	None/SSC	Grassland and sparse coastal scrub	Not expected to occur. Suitable habitat is not present in the Project site. There are no recent CNDDB occurrences of this species in the nearby vicinity (CDFW 2025).
Perognathus longimembris brevinasus	Los Angeles pocket mouse	None/SCC	Lower-elevation grassland, alluvial sage scrub, and coastal scrub	Not expected to occur. Suitable habitat is not present in the Project site. There are no recent CNDDB occurrences of this species in the nearby vicinity (CDFW 2025).
Puma concolor (Southern California/ Central Coast Evolutionarily Significant Unit)	mountain lion	None/CST	Scrubs, chaparral, riparian, woodland, and forest; rests in rocky areas and on cliffs and ledges that provide cover; most abundant in riparian areas and brushy stages of most habitats throughout California, except deserts	Not expected to occur. Suitable habitat and migration corridors do not occur in the study area.
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils	Not expected to occur. Suitable habitat not present in the Project site or in the vicinity.

Notes:

[1] **Status Abbreviations**

BCC: Bird of Conservation Concern (U.S. Fish and Wildlife Service)
FE: Federally listed as endangered
FT: Federally listed as threatened
FC: Federal candidate species (former Category 1 candidates)
FPD: Federally proposed for delisting
SE: State listed as endangered
ST: State listed as threatened
SCD: State candidate for delisting
CSE: Candidate for State Endangered
CST: Candidate for State Threatened
SSC: California Species of Special Concern
FP: California Fully Protected Species

[2] Refers to records within the Burbank and Van Nuys, California U.S. Geological Survey (USGS) 7.5-minute quadrangle and ten surrounding quadrangles (i.e., Oat Mountain, San Fernando, Canoga Park, Sunland, Condor Peak, Pasadena, Topanga, Beverly Hills, Hollywood, and Los Angeles)

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Appendix C

Cultural Resources Inventory, Evaluation, and Impact Assessment Report

Cultural Resources Inventory, Evaluation, and Impact Assessment Report

Cantara Trunk Line Replacement Project, Los Angeles County, California

SEPTEMBER 2025

Prepared for:

LOS ANGELES DEPARTMENT OF WATER AND POWER
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Primary Report Authors: This report was primarily prepared by Secretary of the Interior qualified Senior Archaeologist Ryan J. Glenn, MA, RPA, and Secretary of the Interior qualified Architectural Historian Katie Ahmanson, MHC.

Report Contributions: The report was prepared with contributions from Architectural Historian Claire Cancilla, MSHP, and Archaeologist Brenda Rogers, BA. Senior Architectural Historian Kathryn Haley, MA, and Senior Archaeologist Adam Giacinto, MA, RPA, provided senior-level review of the report.

Team Support: Christopher Starbird, GIS analyst, managed the geographic information system data and created the figures in the report.

Intended Use: This report is intended for the Client's and its representatives' exclusive use. Based on the results of Dudek's investigation, it contains professional conclusions and recommendations concerning the potential for project-related impacts to cultural resources. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the project described in lieu of review by the appropriate reviewing or permitting agency. This report should be submitted to the appropriate federal, state, and local review agencies for their comments prior to the commencement of the project.

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National Archaeological Database (NADB) Information

Authors:	Katie Ahmanson, Claire Cancilla, Kathryn Haley, and Ryan J. Glenn
Firm:	Dudek
Project Proponent:	Los Angeles Department of Water and Power
Report Date:	September 2025
Report Title:	Cantara Trunk Line Replacement Project, Los Angeles County, California
Type of Study:	Cultural Resources Inventory, Evaluation, and Impact Assessment
Resources:	***Archaeological:*** None
	Built Environment: Cantara Trunk Line, and San Fernando Road
USGS Quads:	Sections 35 and 36 of Township 02N, Range 15W; Van Nuys, California, 7.5-minute Quadrangle
Acreage:	32.02

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Summary of Findings

The Los Angeles Department of Water and Power (LADWP) retained Dudek to complete a Cultural Resources (archaeology and historic built environment) investigation for the proposed Cantara Trunk Line Replacement Project (project) in the City of Los Angeles, California. The project is in the northern portion of the City of Los Angeles in the Sun Valley community within Sections 35 and 36, Township 02N, Range 15W; Van Nuys, California, 7.5-minute U.S. Geological Survey Quadrangle map (Figure 1-1, Regional Location, and Figure 1-2, Project Location). The project proposes to install approximately 8,200 feet of 30-inch-diameter underground pipe along Strathern Street and Cantara Street, and to replace the aging and deteriorated existing Cantara Trunk Line along San Fernando Road with approximately 5,100 feet of 20-inch-diameter underground pipe. The project will also include improvements to the 7,010 feet of 8-inch distribution mainline along Cantara Street.

This report documents Dudek's efforts to identify Cultural Resources consistent with the requirements of the California Environmental Quality Act (CEQA). Dudek's efforts to investigate potential impacts to cultural resources included conducting a records search of the California Historical Resources Information System (CHRIS), develop an area of potential impacts (API), initiate correspondence with the Native American Heritage Commission (NAHC), conduct an intensive-level survey of the API for cultural resources, conduct background and archival research, develop of an appropriate context to assess cultural resources in the API, and record and evaluate historic built environment resources located in the API using the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), and Los Angeles Historic-Cultural Monuments (HCM) evaluation criteria. The records search did not identify any archaeological resources within the API and the results are included in Confidential Appendix A. The NAHC Sacred Lands File search was also negative for Native American cultural resources within 0.5 miles of the API (Appendix B).

A Dudek archaeologist conducted an intensive-level field survey of areas of exposed soils within the laydown area of the project API using standard archaeological procedures and techniques that meet the Secretary of the Interior (SOI) Standards and Guidelines for cultural resources inventory. Surface visibility was moderate (approximately 50%) throughout the laydown area due to dense non-native grasses. This survey was negative for archaeological resources.

Based on a lack of archaeological resources within and adjacent to the API, and in consideration of the previous disturbances within the API, there is a low potential for the inadvertent discovery of subsurface archaeological resources during project implementation. The recommended CEQA finding for archaeological resources is less than significant with mitigation incorporated. Further discussion of the recommended measures can be found in Section 6.2, Archaeological Resources Management Recommendations.

A Dudek architectural historian who meets the SOI's Professional Qualifications Standards for architectural history conducted an intensive-level field survey documenting all built environment resources in the API delineated for this project. Dudek's archival research and field survey found two historic-age resources within the API that required consideration as historical resources under CEQA. The Cantara Trunk Line and San Fernando Road (P-19-188007) were evaluated under NRHP, CRHR, and Los Angeles HCM criteria.

The Cantara Trunk Line was found not to meet any of the applicable criteria thresholds and associated integrity considerations. The recommended California Historical Resource Status (CHRS) Code for the trunk line is 6Z,

indicating that it was found ineligible for the NRHP, CRHR, and City of Los Angeles HCM list through survey evaluation.

The San Fernando Road was previously evaluated in 2012 and assigned a CHRS Code of 3S, indicating that it was found eligible for the NRHP individually through survey evaluation. Dudek agrees with the previous evaluation of San Fernando Road that the road is eligible under NRHP Criterion A and CRHR Criterion 1 for its contribution to the development of the state of California, the City of Los Angeles, and the San Fernando Valley area. As such the San Fernando Road is considered a CEQA historical resource.

Section 5 provides the CEQA Impacts Assessment and provides detailed analysis of potential effects to San Fernando Road that may result from project construction and implementation. Dudek recommends that the project would not have a significant impact on the segment of the San Fernando Road which qualifies as a historical resource in the API under CEQA. The recommended CEQA finding for built environment historical resources is less than significant; no mitigation is required.

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AB	Assembly Bill
ACHP	Advisory Council on Historic Preservation
AIN	Assessor's Identification Number
API	area of potential impacts
BERD	Built Environment Resource Directory
BV	Butterfly Valve
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
CHRS	California Historical Resource Status
CI	cast iron
City	City of Los Angeles
County	County of Los Angeles
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
HCM	Historic-Cultural Monument
HPOZ	Historic Preservation Overlay Zone
I	Interstate
LADOT	Los Angeles Department of Transportation
LADWP	Los Angeles Department of Water and Power
MLD	Most Likely Descendant
MWD	Metropolitan Water District
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PRC	Public Resources Code
project	Cantara Trunk Line Replacement Project
ROW	right-of-way
SOI	Secretary of the Interior
SR	State Route
SZ	System Elevation Zone
TCR	tribal cultural resources

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1 Introduction

This cultural resource inventory and evaluation report documents the identification and evaluation of cultural resources (archaeology and built environment) within or adjacent to the proposed Cantara Trunk Line Replacement Project (project) for compliance with the California Environmental Quality Act (CEQA). This report includes the following components: (1) an introduction including project location, description, regulatory context, and the area of potential impacts (API); (2) background research, which includes a focused records search review of previously recorded cultural resources included in the California Historical Resources Information System (CHRIS), archival research, and the field survey methodology; (3) the development of an applicable environmental and historic context for the project area; (4) results of identification and evaluation efforts; (5) Application of the Criteria of Adverse Effect; and (6) findings and management recommendations.

1.1 Project Location

The project is located within the Sun Valley community of the City of Los Angeles (City). Sun Valley is approximately 13 miles northwest of downtown Los Angeles. City of Los Angeles communities of Arleta, Pacoima, Sunland, Tujunga, Lake View Terrace, Shadow Hills, and East La Tuna Canyon are located to the north of Sun Valley, and the City of Burbank is to the east. City of Los Angeles communities of North Hollywood and Valley Village are to the south, and City of Los Angeles communities of Mission Hills, Panorama City, and North Hills are to the west.

Collectively, the areas where pipeline work would occur, including pipeline installation, abandonment, and connection work, will be termed “project alignment” in this report. Within Sun Valley, the project alignment is situated between the Hollywood Freeway (State Route [SR]-170) and the Interstate (I) 5 freeway. Figure 1-1 shows the project location within a regional context, and Figure 1-2 shows the project location within a local context.

1.2 Project Description

1.2.1 Project Overview

The Los Angeles Department of Water and Power (LADWP) proposes to install approximately 8,200 feet of 30-inch-diameter underground pipe along Strathern Street and Cantara Street and approximately 5,100 feet of 20-inch-diameter underground pipe along San Fernando Road in the Sun Valley community in the City of Los Angeles, which is within the County of Los Angeles. The installation of the new 20-inch-diameter distribution mainline and 30-inch-diameter trunk line would replace aging and deteriorated segments of the existing Cantara Trunk Line to provide greater operational flexibility for water flow and delivery and to improve system redundancy and resiliency. The project would also include approximately 7,010 feet of 8-inch-diameter distribution mainline improvements along Cantara Street.

1.2.2 Setting

The proposed project would occur within the public roadway right-of-way (ROW) of Cantara Street, Strathern Street, and San Fernando Road, as well as across the surface parking areas of private industrial parcels. Periodic intrusions into the sidewalks and/or parkways along these roadways would also occur for installation of pipeline

appurtenances (e.g., valves, hydrants, vacuum breakers, water service connections). Below are descriptions of each roadway and the surrounding land uses.

Cantara Street. Along the project alignment, Cantara Street is a two-way, east–west trending roadway with one lane in each direction. Parking is generally allowed on both sides of the roadway, and sidewalks and parkways are generally located on both sides of the roadway. Cantara Street is largely surrounded by residential properties. Exceptions include a church, a park (Sun Valley Recreation Center), and several industrial properties between Irvine Avenue and Lankershim Boulevard.

Strathern Street. Along the project alignment, Strathern Street is a two-way, east–west trending roadway with one lane in each direction. Left-turn pockets are striped along the roadway, and a bicycle lane is striped on both sides. Parking is generally allowed on both sides of the roadway, and sidewalks and parkways are generally located on both sides of the roadway. Land uses along the project alignment are generally residential in nature, with the exception of Jaime Beth Slavin Park, Strathern Park North, Strathern Street Elementary School, several churches, and commercial uses near the intersections with Laurel Canyon Boulevard and Lankershim Boulevard.

San Fernando Road. Along the project alignment, San Fernando Road is a two-way, northwest–southeast trending roadway with two lanes in each direction. Left-turn pockets or two-way left-turn lanes extend along the center of the roadway. Parking is generally allowed on the southwest side of the roadway, and the southwest side of the roadway is also lined with a sidewalk and street trees. Land uses along the southwest side of the roadway include commercial and industrial uses, including the Hollywood Burbank Airport and a motel. Along the northeast side of the roadway is a protected bicycle path, separated from the roadway with a vegetated strip. The project would not encroach into the bicycle path. Beyond the bicycle path is the Southern Pacific Railroad alignment, which trends northwest–southeast along San Fernando Road. The project would not encroach into the railroad ROW. Land uses to the northeast of the railroad alignment consist largely of commercial and industrial land uses.

Private Industrial Parcels. The project alignment is within the surface parking area for several one-story industrial warehouse buildings. The project alignment would specifically extend through Assessor's Identification Numbers (AINs) 2310-007-025 and 2310-006-008 and would abut AIN 2310-007-024 at this location. Ingress/egress to this parking area is provided via Lankershim Boulevard at the intersection with Cantara Street. Land uses to the north, south, and east include industrial uses. Land uses to the west include a government-owned utility parcel and industrial and residential uses.

1.2.3 Background

The Cantara Trunk Line, initially built in 1917, is part of the larger LADWP water distribution system. The Cantara Trunk Line receives water from City Trunk Line South (installed circa 2007) at the Coldwater Canyon Avenue/Cantara Street intersection and transmits it to the Sun Valley area. Trunk line components include isolation valves, blow-offs, combination air/vacuum valves, vacuum breakers, and distribution mainlines. Portions of the Cantara Trunk Line system are proposed for replacement or abandonment in place as part of this project to repair the potable water conveyance and distribution system in the project area. See Section 1.2.4, Project Design, and Figure 2-1, Project Components, for a list of system components proposed for replacement or abandonment.

The existing Cantara Trunk Line is located within Cantara Street, extending from Coldwater Canyon Avenue to San Fernando Road in Sun Valley, Los Angeles. In its current condition, the pipeline consists of riveted steel pipe

segments installed in 1917 and welded steel pipe segments installed in 1961 and 1965. The existing Trunk Line varies in diameter from 22 inches to 36.75 inches. Cantara Trunk Line is supplied mainly by City Trunk Line South, which is supplied by the Los Angeles Reservoir and the Van Norman Bypass Reservoir and transmits potable water from City Trunk Line South to the Sun Valley area of the 1134 System Elevation Zone (SZ). Figure 2-2, Pre-Project Trunk Line System, shows the existing network of trunk lines in the project area.

The proposed project would replace the aging and deteriorating riveted steel pipe sections of the Cantara Trunk Line, which currently contain 22 recorded leaks. The welded steel pipe sections would remain in service, except for a section of the existing Cantara Trunk Line within Irvine Avenue between Cantara Street and Strathern Street, which would be abandoned and slurry filled. The segments of the Cantara Trunk Line requiring replacement (dating to 1917) are located along Cantara Street from Potter Avenue to Irvine Avenue and from Fair Avenue to San Fernando Road. The segments of the Cantara Trunk Line to remain in service (dating to the 1960s) are located along Cantara Street from Coldwater Canyon Avenue to Potter Avenue, along Strathern Street from Irvine Avenue to Fair Avenue, and along Fair Avenue from Strathern Street to Cantara Street.

Connecting to the Cantara Trunk Line along San Fernando Road is a 20-inch cast-iron (CI) mainline (installed in 1960), which is an extension of the Cantara Trunk Line and supplies the 1134 SZ area bounded by the City of Burbank and the Hollywood Burbank Airport. The CI mainline has a history of leaks and is in poor condition with reduced wall thickness. The proposed project would replace damaged portions of the CI mainline along San Fernando Road.

Additionally, LADWP proposes to install approximately 7,010 feet of new 8-inch distribution mainline improvements along Cantara Street. The new distribution mainline within Cantara Street would not replace any existing distribution mainline but is needed due to the abandonment of existing segments of the Cantara Trunk Line along Cantara Street.

The proposed project would also include the installation of maintenance/access holes, isolation valves, blow-offs, vacuum breakers, air/vacuum valves, water service connections, and connections to hydrants. Some of these pipeline appurtenances would be visible above grade at intervals along the new pipeline alignments and would be located within sidewalks and parkways. All other components of the project would be below grade and would not be visible once installed.

The proposed project would increase the safety, capacity, and reliability of LADWP's water system in the Sun Valley area. The project would maintain supply to the 1449 SZ and Green Verdugo Reservoir via the Sheldon Pump Station during an emergency scenario in which both the Truesdale Trunk Line and the Foothill Trunk Line could be out of service.

1.2.4 Project Design

Overview

The proposed trunk line alignment is approximately 8,200 feet along Strathern Street and Cantara Street. On the west, the proposed trunk line would connect to the North Hollywood Collector Trunk Line east of SR-170. An approximately 60-foot-long segment of the North Hollywood Collector Trunk Line along Strathern Street would be removed in order to connect the replacement Cantara Trunk Line. The North Hollywood Collector Trunk Line, which was installed circa 1990, connects to City Trunk Line South at the intersection of Coldwater Canyon Avenue and

Strathern Street. As such, after project implementation, water would still ultimately flow from the City Trunk Line South to the Cantara Trunk Line.

On the east end of the Strathern Street alignment, the proposed trunk line would connect to the existing-to-remain Cantara Trunk Line at the Strathern Street/Irvine Avenue intersection. The proposed trunk line would resume along Cantara Street, where it would connect to the existing Cantara Trunk Line at Fair Avenue and continue easterly onto San Fernando Road, where it would transition to the new 20-inch-diameter distribution mainline along San Fernando Road to Ferncola Avenue. Approximately 5,100 feet of new 20-inch-diameter distribution mainline would be installed along San Fernando Road.

The 36.75-inch-diameter welded steel pipe section of the existing Cantara Trunk Line from Coldwater Canyon Avenue to Potter Avenue and the 32-inch-diameter welded steel pipe sections of the existing Cantara Trunk Line located along Strathern Street and Fair Avenue would not be replaced and would remain in service. At Cantara Street and Potter Avenue, a short segment of the existing Cantara Trunk Line would be removed, and the two resulting exposed pipe ends would be plugged. The existing Cantara Trunk Line west of the two plugs would remain in service and would include a new connection to an existing parallel distribution mainline. The existing Trunk Line east of the two plugs would be abandoned.

The project would also involve installation of appurtenant devices, including the following: one 60-inch Butterfly Valve (BV) would be installed on the North Hollywood Collector Trunk Line along Strathern Street, west of Whitsett Avenue; one 30-inch BV would be installed along Strathern Street, west of Whitsett Avenue; one 30-inch BV would be installed along Strathern Street, west of Laurel Canyon Boulevard; two 30-inch BVs would be installed along Strathern Street, west of Irvine Avenue; and one 30-inch BV would be installed along Cantara Street, east of Fair Avenue. The Cantara Trunk Line and associated 20-inch-diameter distribution mainline would utilize seismically resilient pipe to prevent or minimize potential service disruptions and maintain supply to the system in an earthquake event. LADWP would also install approximately 1,550 feet of new 8-inch-diameter distribution mainline along Cantara Street from Fair Avenue to San Fernando Road and another 5,460 feet of new 8-inch-diameter distribution mainline along Cantara Street from Rhodes Avenue to Irvine Avenue.

Project Details

Pipeline Installation

As shown in greater detail in Figure 2-1 the project alignment specifically includes the following pipeline segments proposed for installation:

- Replacement Cantara Trunk Line would extend along Strathern Street from a location just east of SR-170, eastward to the intersection of Strathern Street with Irvine Avenue.
- Replacement Cantara Trunk Line would extend along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Rhodes Avenue to the intersection of Cantara Street with Webb Avenue.
- New distribution mainline spur would extend approximately 400 feet west from the intersection of Lankershim Boulevard with Cantara Street across the surface parking lot of private industrial parcels.

- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Lankershim Boulevard to the intersection of Cantara Street with Irvine Avenue.
- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- Replacement distribution mainline would extend along San Fernando Road from the intersection of San Fernando Road with Cantara Street to the intersection of San Fernando Road with Ferncola Avenue.

Pipeline Abandonment

The project would involve pipeline abandonment along the segments listed below, as shown in Figure 2-1. Pipeline abandonment would involve filling the old pipe with cement slurry, which requires injection of slurry at the ends of each abandonment limit and intermittently along the abandoned segments. (While some segments proposed for abandonment extend across private property, most slurry injection activities would occur within the public roadway ROW. Slurry injection activities may occur in conjunction with an approximately 400-foot segment of open-trench excavation across several private industrial parcels located west of the intersection of Lankershim Boulevard with Cantara Street.)

- Existing Cantara Trunk Line would be abandoned along Cantara Street from the intersection of Cantara Street with Potter Avenue to the intersection of Cantara Street with Irvine Avenue.
- Existing Cantara Trunk Line would be abandoned along Irvine Avenue from the intersection of Irvine Avenue with Cantara Street to the intersection of Irvine Avenue with Strathern Street.
- Existing Cantara Trunk Line would be abandoned along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- Existing distribution mainline would be abandoned along San Fernando Road from the intersection of San Fernando Road with Cantara Street to the intersection of San Fernando Road with Ferncola Avenue.

Pipeline Connections and Tie-Ins

Construction of the new and replacement pipelines and abandonment of the above-listed existing pipeline segments would also require construction activities at certain connection points and tie-in locations, as listed below:

- At Cantara Street and Potter Avenue, a short segment of the existing Cantara Trunk Line would be removed and the two resulting exposed pipe ends would be plugged.
- The replacement Cantara Trunk Line would be connected to the existing North Hollywood Collector Trunk Line along Strathern Street, just east of SR-170.
- The replacement Cantara Trunk Line would be connected to an existing-to-remain segment of the Cantara Trunk Line at the intersection of Strathern Street and Irvine Avenue.
- The replacement Cantara Trunk Line would be connected to an existing-to-remain segment of the Cantara Trunk Line at the intersection of Cantara Street and Fair Avenue.
- The replacement Cantara Trunk Line would be reduced in size to 20 inches in diameter at the intersection of Cantara Street with San Fernando Road and would continue southeast along San Fernando Road as a 20-inch-diameter distribution mainline.
- The replacement distribution mainline within San Fernando Road would be connected to an existing 16-inch-diameter pipe near the intersection of San Fernando Road with Arvilla Avenue.

- The replacement distribution mainline within Cantara Street would be connected to existing pipelines at the intersection of Cantara Street with the following roadways: Rhodes Avenue, Laurelgrove Avenue, Saint Clair Avenue, Bellingham Avenue, Vantage Avenue, Laurel Canyon Boulevard, Agnes Avenue, Ben Avenue, Gentry Avenue (two connections), Burton Street, Radford Avenue, Hinds Avenue, Lankershim Boulevard (two connections), Troost Avenue, Irvine Avenue, Fair Avenue, Case Avenue, Ensign Avenue, Vineland Avenue, and San Fernando Road. These connections would involve a cross or a tee on the new 8-inch-diameter distribution mainline at each of these intersections.

Figure 2-3, Post-Project Trunk Line System, shows the permanent status of all associated trunk lines upon completion of the project.

To determine the appropriate size for the replacement pipes, LADWP analyzed the operating criteria for the pipelines, including the service areas' current and future demand. The predicted ultimate maximum day peak hour demand was used for the analysis; 30-inch-diameter pipe segments for the trunk line and 20-inch- and 8-inch-diameter pipe segments for the distribution mainlines were determined to be sufficient. The proposed sizes are fairly similar to existing pipe sizes. Existing riveted steel sections of Cantara Trunk Line along Cantara Street from Potter Avenue to Irvine Avenue, as well as from Fair Avenue to San Fernando Road, would be abandoned and slurry filled. Similarly, the existing distribution mainline along San Fernando Road would be abandoned and slurry filled.

1.2.5 Construction

The existing Cantara Trunk Line would remain in service during construction, and all related facilities would continue to operate normally. Several temporary shutdowns would be required in order to connect the trunk line replacements to the existing trunk lines and would take place while demand is low. Minimal interruptions in water service may occur during construction. Affected customers would be notified in advance of any brief service interruptions. The replacement pipe would be installed within existing public roadway ROW along the proposed alignment, and one distribution mainline spur would extend through a parking lot associated with private industrial properties.

Full road closures are not anticipated during construction. Within the vicinity of construction work areas on Strathern Street and San Fernando Road, one lane of travel is anticipated to be maintained in each direction. Within the vicinity of construction work areas on Cantara Street, half of the curb-to-curb width is expected to be closed, and the street would be reduced to one lane of travel for use by vehicles traveling in both directions. K-rails, traffic delineators, and signage would be stationed around work areas, and construction workers with flags may be deployed near work areas when neccessary. Bicycle lanes within the vicinity of construction work areas would be temporarily closed, though in most locations adjacent sidewalks would remain available for use.

Full sidewalk closures are not anticipated, although periodic intrusions into sidewalks and/or parkways would occur for installation of pipeline appurtenances. Specifically, along each proposed pipeline alignment, combination air/vacuum valves would be installed at intervals of approximately 1,200 feet within sidewalk or parkway areas along the alignment of the new pipeline segments. Each valve installation would require a small excavation area behind the curb, measuring approximately 3 feet wide, 3 feet long, and 4 feet deep. Valve installations would be limited to public sidewalks and/or parkways and would not intrude onto private properties. No trees would be removed. Appurtenance locations have been identified along the route to avoid tree removal.

Utility relocations, such as of sewer main lines, underground gas lines, water lines, fiber optics, and power lines, are not anticipated; however, several sewer laterals may need to be adjusted above or below new piping. Where trenching activities are situated adjacent to existing utilities, manual excavation may be used to ensure that such utilities are not inadvertently damaged. All construction staging would occur on site within the work areas, adjacent to the areas of excavation and within the public ROW (with the exception of the construction work area located within the surface parking area of private industrial parcels). No off-site staging would be needed.

Construction Methods

Construction of the proposed project would primarily occur along the existing public ROW of Cantara Street, Strathern Street, and San Fernando Road using open-trench and pipe jacking construction methods. Construction of an approximately 400-foot distribution mainline spur would occur within the surface parking area of private industrial parcels using open-trench construction methods. Due to high traffic volume and utility congestion at two intersections along Strathern Street, LADWP would utilize pipe jacking methods at these locations to minimize disruptions. For similar reasons, LADWP is also considering use of pipe jacking methods at two intersections along San Fernando Road. Because pipe jacking is more intensive than open-trench methods in terms of construction activity, this environmental document assumes that pipe jacking would be used at these two intersections. Figure 2-4A through 2-4I, Disturbance Areas, show the outer limits of where construction disturbance may occur. The precise locations for work areas would be established closer to construction, and actual work area width would be less than what is shown in Figure 2-4A through 2-4I.

Open-trench construction activities would last for approximately 58 months assuming one construction crew (15-16 persons). Pipe jacking activities would last approximately 20 months, assuming one construction crew. Slurry-filling activities for pipelines to be abandoned would generally coincide with pipeline installation. The general processes for open-trench construction, pipe jacking, and slurry filling are described below.

Open-Trench Excavation

Open-trench excavation is a construction method typically used to install pipelines and their appurtenances. In general, the process consists of site preparation, excavation, shoring, pipe installation, backfilling, and worksite restoration. The majority of construction would occur within the public ROW, with work areas divided into lengths of approximately 1,000 feet. The maximum length of open trench at any one time would be approximately 1,000 feet. Construction work areas would occur on the streets adjacent to the proposed pipelines and would move iteratively as construction progresses. A work area of approximately 1,000 feet in length can be used for both pipe installation activities and staging equipment. Work areas would be approximately 28 feet wide for pipeline installation on Strathern Street and San Fernando Road and 20 feet wide for pipeline installation on Cantara Street.

Work areas would be barricaded with chain-linked fences and K-rails (i.e., modular traffic barriers) to prevent vehicles and pedestrians from entering work areas throughout the construction duration of a given work area. During the open-trench construction processes, approximately 27 cubic yards of excavated material are expected to be removed and hauled off per day. Each work area would be occupied for approximately 4 months.

As discussed above in Section 1.2.4, a new distribution mainline spur would extend approximately 400 feet west from the intersection of Lankershim Boulevard with Cantara Street across the surface parking area of private industrial parcels. LADWP has an existing easement in this area to permit construction and operation of the proposed mainline within the private industrial parcels. Open-trench excavation for the pipeline installation would

be limited to a 400-foot segment across the surface parking area. Although construction may result in a temporary loss of private parking spaces, operation of the adjacent industrial warehouse buildings is not anticipated to be affected.

The following is a description of the phases of construction for open-trench excavation.

Site Preparation

Traffic control plans would be prepared in coordination with the City of Los Angeles Department of Transportation (LADOT) to delineate traffic lanes around work areas. The existing pavement along the project alignment would be removed from the project site and recycled, reused as backfill material, reused as pavement base material, or transported to an appropriate facility for recycling or disposal.

Excavation and Shoring

A trench would be excavated along the alignment using backhoes, excavators, or other types of excavation equipment. Portions of the trench adjacent to utilities may be manually excavated. Excavated soil would be placed directly into trucks and hauled off site.

A typical trench for 20-inch-diameter and 30-inch-diameter pipes would be 5.5 feet wide and 7–10 feet deep. A typical trench for 8-inch-diameter pipes would be 2.5 feet wide and 5 feet deep. Where perpendicular substructures must be avoided, trenches may be excavated deeper or shallower, as necessary. As noted above, the work area required for trenching would be approximately 1,000 feet in length and 28 feet wide, and the maximum area of trench left open at any one time would be approximately 1,000 feet in length. For the 8-inch distribution mainline installation, the work area width would reduce to 20 feet wide. Trenches greater than 5 feet in depth require shoring to prevent caving or collapse, per the requirements of the California Department of Industrial Relations, Division of Occupational Safety and Health. A variety of shoring techniques, including but not limited to premanufactured shoring and beam and plate, may be used during construction activities. Other utilities would be supported as excavation and shoring occurs. There may be abandoned substructures present (other utilities that are owned/operated by other agencies), which would be removed if encountered.

Pipe Installation and Backfilling

Once the trench has been excavated and shored, pipe laying would commence. Bedding material (crushed rock, sand, or slurry) would be placed and compacted at the bottom of the trench. Pipe segments would then be lowered into the trench and placed on the bedding. The segments would be welded or mechanically connected to one another at the joints. On average, approximately 20 linear feet of pipe would be installed per day by a construction crew (or 400 feet per month). Prior to backfilling, appurtenant structures would be installed as necessitated by design. After laying the pipe, the trench would be backfilled with cement slurry.

Work Site Restoration

Any portion of the roadway or private industrial parking lot damaged as a result of construction activities would be repaved and restored in accordance with all applicable City of Los Angeles Department of Public Works standards. Once the pavement has been restored, traffic delineation (striping) would also be restored.

Pipe Jacking Methods

Pipe jacking, which is a form of trenchless construction, would be used to reduce traffic disruptions at busy intersections. Pipe jacking would be used along Strathern Street at the intersections of Lankershim Boulevard and Laurel Canyon Boulevard. Along San Fernando Road, LADWP is considering use of pipe jacking (as opposed to open trench) at the intersections of Sunland Boulevard and Arvilla Avenue. Figure 2-4A through 2-4I show the locations where pipe jacking would occur, including the potential jacking locations along San Fernando Road.

The pipe jacking process would take less than 5 months at each of the four intersections, for a total of approximately 20 months of pipe jacking.

The installation of pipelines using pipe jacking would avoid the continuous surface disruption that would be required for open-trench construction. However, some surface disruption would still occur, since "jacking" and "receiving" pits would be used and would be excavated along the project alignment. Pipe jacking involves advancing a horizontal auger or a tunnel boring machine to remove material ahead of the jacking pipe. Powerful hydraulic jacking frames are used to push a steel jacking pipe from a launch (bore) pit to a receiving pit. As the tunneling machine is driven forward, a jacking pipe is added into the pipe string. The following is a description of the phases of construction for pipe jacking. During the pipe jacking process, approximately 50 cubic yards of excavated materials are expected to be removed and hauled off per day.

Site Preparation

Traffic control plans would be prepared in coordination with LADOT to delineate traffic lanes around work areas and to address any turn-lane pockets affected by the proposed project at major intersections. In preparation of excavating the jacking and receiving pits, the pavement would first be cut using a concrete/asphalt saw cutter. As with open-trench excavation, the pavement would be removed from the project site and recycled, reused as a backfill material, reused as pavement base material, or transported to an appropriate facility for recycling or disposal.

Excavation and Shoring

A jacking pit and a receiving pit would generally be used for each jacking location, one at each end of the pipe segment. The distance between the pits crossing Lauren Canyon Boulevard is 475 feet; crossing Lankershim Boulevard is 600 feet; crossing Sunland Boulevard is 380 feet; and crossing Arvilla Avenue is 400 feet.

Jacking pits would be approximately 16 feet wide and 40 feet long. Receiving pits would be approximately 14 feet wide and 24 feet long. The pits would be excavated with backhoes and other excavation equipment and would be approximately 35 feet deep. The excavated soil would be hauled to an off-site disposal facility or reused as backfill material. As excavation occurs, the pits would be shored using a beam-and-plate shoring system.

Pipe Installation

After construction and shoring of the pits, a horizontal hydraulic jacking frame would be placed at the bottom of the jacking pit. A steel casing would be lowered into the pit with a crane and placed in the frame. For pipe jacking along Laurel Canyon Boulevard and Lankershim Boulevard, the steel casing would measure 48 inches on its inner diameter; for pipe jacking at the intersection of Sunland Boulevard and Arvilla Avenue, the steel casing would

measure 42 inches on its inner diameter. Once a casing segment is pushed into the soil, a new segment would be lowered, set in place, and welded to the casing that has been pushed. Installation of the steel casing would be expected to progress at approximately 30–40 feet per day. Once the casing has been installed, the carrier pipe would be lowered and placed on the jacks, which would push the pipe into the steel casing using casing spacers.

Work Site Restoration

After completion of the pipe installation along the jacking locations, the shoring system would be disassembled. Pits would be backfilled with slurry and pavement would be restored. Once the pavement restoration is complete, traffic delineation (striping) would be restored.

Slurry-Filling Process

Pipelines proposed for abandonment would be slurry filled. Existing pipeline segments proposed for abandonment and slurry filling are listed in Section 1.2.4. The process for slurry filling involves excavations along the existing pipelines at intervals of 500 feet or more. Based on the depth of the existing pipelines, the intermittent excavations for slurry filling are anticipated to be approximately 10 feet in depth, 10 feet in width, and 10 feet in length. Where slurry-filling activities coincide with pipeline installation, work areas and excavations established for pipeline installation may also be used for slurry filling. Once the existing pipeline is exposed, it would be cut open. Flowable fill, such as slurry or cement concrete, would then be injected into the pipe until the subject section is full. The excavation area would then be backfilled and paved, and the construction crew would move onto the next point of slurry injection. The workers, equipment, and time necessary to complete slurry filling are included within the project's overall construction schedule and scenario that is analyzed in this document.

Although the majority of abandoned pipeline to be slurry filled is located within the public ROW, there is an approximately 900-foot segment of pipeline located between Webb Avenue and Lankershim Boulevard that runs through or along a private residential parcel (AIN 2310-007-001), two publicly owned utility parcels (AINs 2310-007-900 and 2310-006-900), and four industrial parcels (AINs 2310-005-018, 2310-006-008, 2310-007-025, and 2310-007-024). LADWP has existing easements that permit the proposed slurry-filling activities beneath these parcels, which are located approximately 10 feet below ground surface. Slurry injection for this segment of the pipeline may occur within the surface parking area for the industrial parcels (within AINs 2310-006-008 and 2310-007-025), as it would coincide with approximately 400 feet of open-trench excavation for installation of a new 8-inch distribution mainline spur. There would be no ground disturbance and no surface impacts within the private residential parcel, the publicly owned utility parcel, the industrial parcel closest to Webb Avenue on the west side of the utility parcel (AIN 2310-005-018), or the industrial parcel abutting the proposed 400-foot distribution mainline spur (AIN 2310-007-024).

In addition, an approximately 610-foot segment of pipeline to be slurry filled (located between Whitsett Avenue and Rhodes Avenue) runs underneath several private residential parcels (AINs 2308-018-007, 2308-018-010, 2308-018-009, 2308-020-009, and 2308-020-010). The flowable fill for this pipeline segment would be injected from excavation point(s) within the public ROW in the vicinity of these properties. LADWP has existing easements that permit the proposed slurry-filling activates beneath these private parcels, which are located approximately 10 feet below ground surface. As such, there would be no ground disturbance and no surface impacts within any of these private residential parcels.

1.2.6 Operations and Maintenance

The proposed replacement pipelines are anticipated to have an operational life of 100 years and replacement valves are anticipated to have an operational life of 70 years; however, due to the limitations of the staff associated with large valve replacement, as well as shutdown limitations, valves are replaced as they begin to show signs of failure. The pipelines would be underground and would not be visible from the ground level during operation. Operational activities would be limited to scheduled maintenance and repair. Maintenance activities would be minimal and would be similar to those that occur under existing conditions. Maintenance would occur every 1-3 years and include exercising valves and replacing or repairing worn appurtenances to ensure proper performance over the life of the facilities. No permanent workers would be required to operate or maintain the proposed project. Activities associated with long-term operations and maintenance would, therefore, be minimal.

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SOURCE: Bing Maps, OpenStreetMaps

Los Angeles Department of Water & Power

0 0.5 1 Miles

FIGURE 1-1

Regional Location

Cantara Trunk Line Replacement Project

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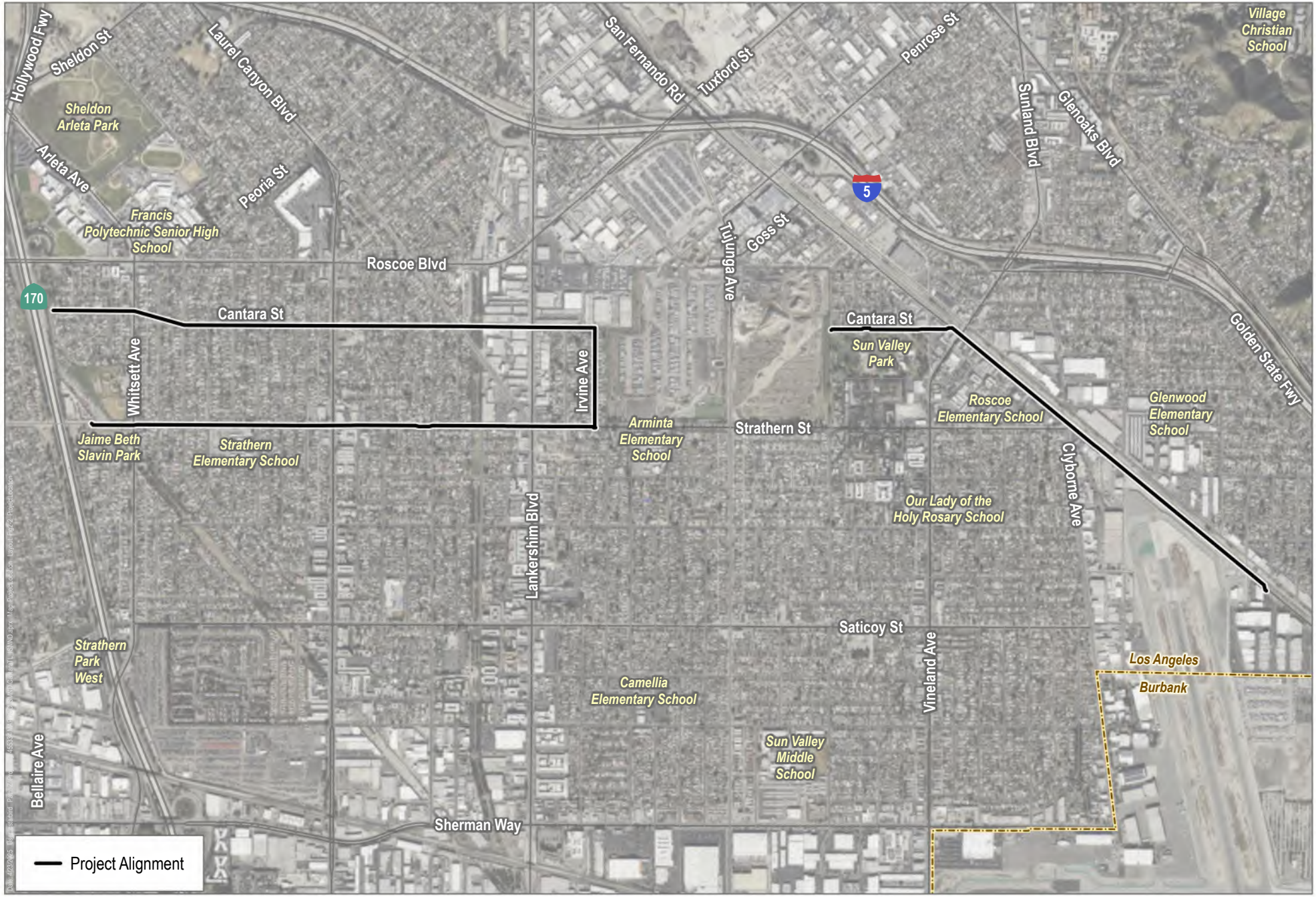

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 850 1,700 Feet

FIGURE 1-2

Project Location

Cantara Trunk Line Replacement Project

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- New Connection to Existing Trunk Line or Distribution Mainline
- New Cross or Tee Connection Between Existing and New Distribution Mainlines
- Cut and Plug Existing Trunk Line
- Pipe Jacking Pit
- New Trunk Line
- Existing Trunk Line to be Abandoned
- New Distribution Mainline
- Existing Trunk Line (no change)

SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

0 335 670 Feet

FIGURE 2-1A

Project Components

Cantara Trunk Line Replacement Project

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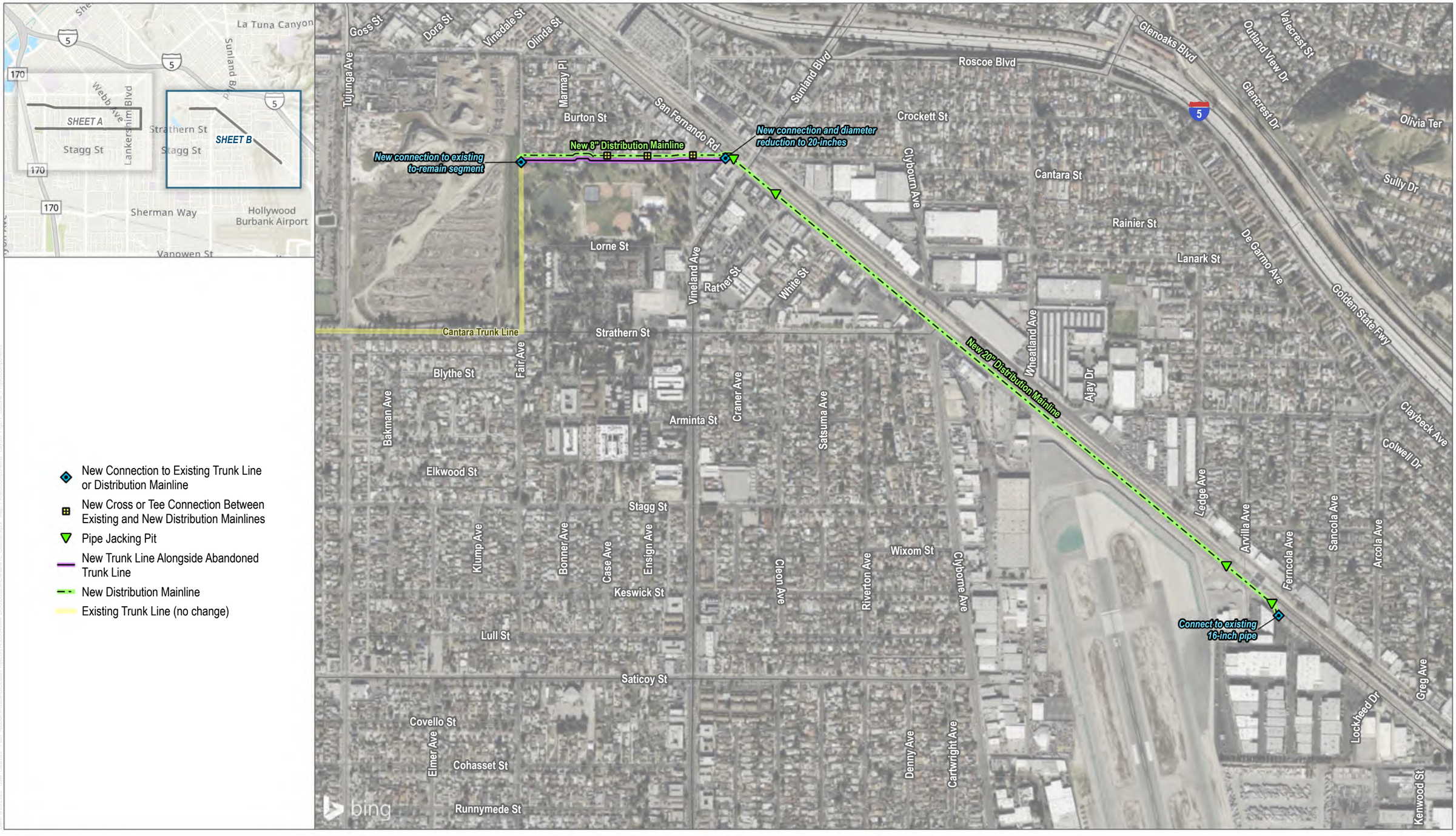

SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

0 335 670 Feet

FIGURE 2-1B

Project Components

Cantara Trunk Line Replacement Project

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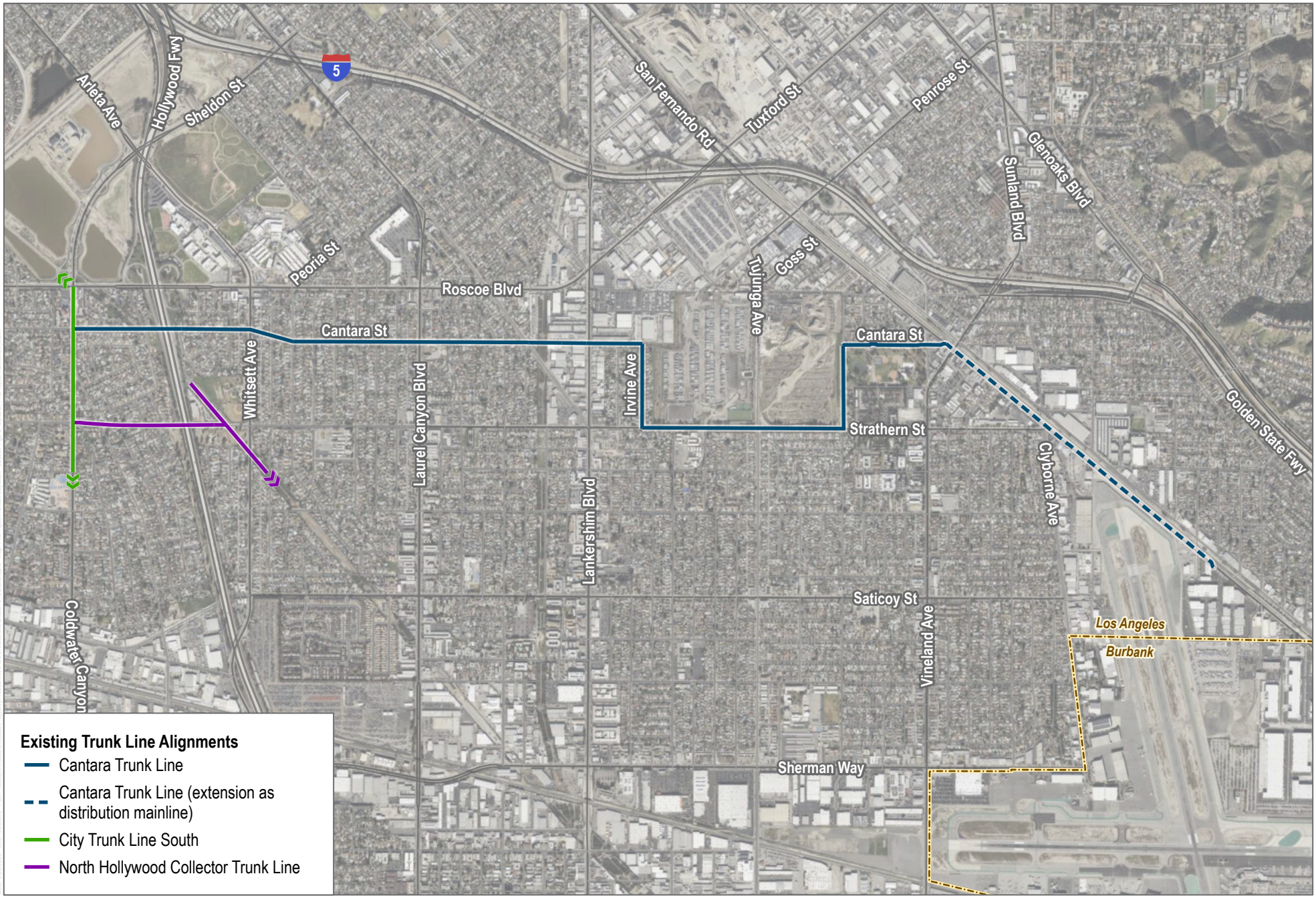

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 1,000 2,000 Feet

FIGURE 2-2

Pre-Project Trunk Line System

Cantara Trunk Line Replacement Project

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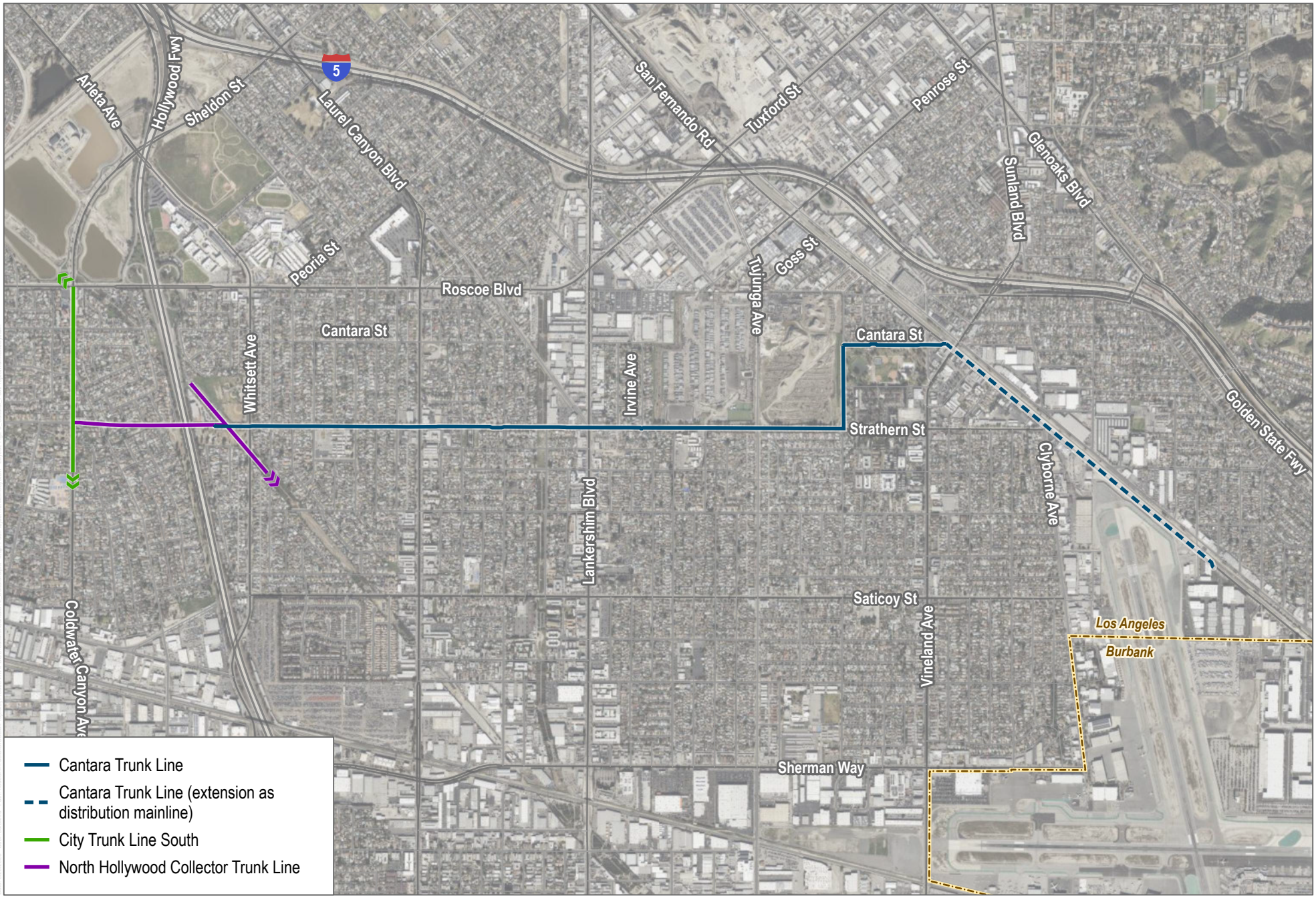

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 1,000 2,000 Feet

FIGURE 2-3

Post-Project Trunk Line System

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4A

Disturbance Areas

Cantara Trunk Line Replacement Project

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Parcel Boundary

Potential Construction Areas by Activity (max potential disturbance area)

Pipe Jacking/Receiving Pit

New Trunk Line Installation

SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

Los Angeles Department of Water & Power

N

0 100 200 Feet

FIGURE 2-4B

Disturbance Areas

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

LA DWP Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4C

Disturbance Areas

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4D

Disturbance Areas

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4E

Disturbance Areas

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

Los Angeles Department of Water & Power

N

0 100 200 Feet

FIGURE 2-4F

Disturbance Areas

Cantara Trunk Line Replacement Project

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Existing Trunk Line (no change)

Parcel Boundary

Potential Construction Areas by Activity (max potential disturbance area)

- Pipe Jacking/Receiving Pit
- New Trunk Line Installation, Slurry Filling, and Distribution Mainline Installation
- Slurry Filling and Distribution Mainline Installation

SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

LA DWP Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4G

Disturbance Areas

Cantara Trunk Line Replacement Project

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Parcel Boundary

Potential Construction Areas by Activity (max potential disturbance area)

Slurry Filling and Distribution Mainline Installation

SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

LA DWP Los Angeles Department of Water & Power

N

0 100 200 Feet

FIGURE 2-4H

Disturbance Areas

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap, County of Los Angeles

LA DWP Los Angeles Department of Water & Power

0 100 200 Feet

FIGURE 2-4I

Disturbance Areas

Cantara Trunk Line Replacement Project

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1.3 Regulatory Context

While the project as currently planned is subject only to state and local regulatory conditions, federal regulations are also provided here for reference should they be relevant in the future. The following sections provide a brief overview of the federal and state regulatory framework under which historic properties and historical resources are identified and evaluated.

1.3.1 Federal

National Historic Preservation Act of 1966

Enacted in 1966, the National Historic Preservation Act (NHPA) declared a national policy of historic preservation and instituted a multifaceted program, administered by the National Parks Service, to encourage the achievement of preservation goals at the federal, state, and local levels. The NHPA authorized the expansion and maintenance of the National Register of Historic Places (NRHP), established the position of State Historic Preservation Officer and provided for the designation of State Review Boards, set up a mechanism to certify local governments to carry out the purposes of the NHPA, assisted Native American tribes to preserve their cultural heritage, and created the Advisory Council on Historic Preservation (ACHP). Section 106 of the NHPA states that federal agencies with direct or indirect jurisdiction over federally funded, assisted, or licensed undertakings must take into account the effect of the undertaking on any historic property that is included in, or eligible for inclusion in, the NRHP, and that the ACHP must be afforded an opportunity to comment, through a process outlined in the ACHP regulations at 36 Code of Federal Regulations (CFR) Part 800, on such undertakings.

National Historic Preservation Act and the National Register of Historic Places

The NHPA established the NRHP and the ACHP. Under the NHPA, significant cultural resources are referred to as historic properties, which include any prehistoric or historic district, site, building, structure, or object included in, or determined eligible for inclusion in, the NRHP. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization. Historic properties that are designated by the Secretary of the Interior (SOI) to be National Historic Landmarks are nationally significant historic places that possess exceptional value or quality in illustrating or interpreting the heritage of the United States. A property is considered historically significant if it meets one of the NRHP criteria and retains sufficient historic integrity to convey its significance.

The NRHP is the United States' official list of districts, sites, buildings, structures, and objects worthy of preservation. Overseen by the National Park Service, under the U.S. Department of the Interior, the NRHP was authorized under the NHPA, as amended. Its listings encompass all National Historic Landmarks, as well as historic areas administered by the National Park Service.

The NRHP criteria for evaluation (36 CFR Section 60.4) considers the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures., For a property to be listed in or determined eligible for listing, it must meet at least one of the following criteria:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity. Integrity is the ability of a property to convey its significance. Because the concept of integrity is based on significance, the assessment of a property's integrity can only proceed after its significance has been fully established. The assessment of integrity requires consideration under the following seven aspects or qualities: location, design, materials, workmanship, setting, feeling, and association. To retain integrity, a property will always possess several, and generally most, of these aspects (NPS 1995: 44).

Implementing Regulations for Section 106 of the National Historic Preservation Act (36 CFR Part 800)

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. The Section 106 process consists of four principal steps: (1) initiation of the Section 106 process, which includes identifying and initiating consultation with Native American tribes, local governments, and other interested parties; (2) identification of historic properties; (3) assessment of adverse effects; and (4) delineation of stipulations to resolve adverse effects in an agreement document.

Section 106 affords the ACHP and the State Historic Preservation Officer, as well as other consulting parties, a reasonable opportunity to comment on any project that would adversely affect historic properties. The ACHP is an independent administering agency that develops procedures at the federal level to protect cultural resources included in, or eligible for inclusion in, the NRHP. The State Historic Preservation Officers administer the national historic preservation program at the state level, in addition to reviewing NRHP nominations, maintaining data on historic properties, and consulting with federal agencies during the Section 106 review.

Native American Graves Protection and Repatriation Act of 1990

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 sets provisions for the intentional removal and inadvertent discovery of human remains and other cultural items from federal and tribal lands. It clarifies the ownership of human remains and sets forth a process for repatriation of human remains and associated funerary objects and sacred religious objects to the Native American groups claiming to be lineal descendants or culturally affiliated with the remains or objects. It requires any federally funded institution housing Native American remains or artifacts to compile an inventory of all cultural items within the museum or with its agency and to provide a summary to any Native American tribe claiming affiliation.

1.3.2 State

California Register of Historical Resources

California Public Resources Code (PRC) Section 5024.1 establishes the California Register of Historical Resources (CRHR), which lists all significant resources in California that are considered to be historical resources. In California,

the term historical resource includes, but is not limited to, "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC Section 5020.1[j]). The CRHR is "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP. As such, a resource is considered historically significant if it meets at least one of the following criteria outlined under PRC Section 5024.1(c):

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
- Is associated with the lives of persons important in our past.
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
- Has yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one of the significance criteria described in PRC Section 5024.1(c), a resource must also possess sufficient integrity to qualify for listing in the CRHR. Integrity as defined in 14 California Code of Regulations (CCR) Section 4852(c) as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" as evaluated with regard to the resource's retention of location, design, setting, materials, workmanship, feeling, and association. Historical resources that lack sufficient integrity to meet the criteria for listing in the NRHP may still be eligible for listing in the CRHR if they have the potential to yield significant scientific, historical information, specific data.

The CRHR includes not only listed prehistoric and historic cultural resources but also California Historical Landmarks (numbered 770 and above), California Points of Historical Interest designated by the State Historical Resources Commission, and resources that are identified through local historical resource surveys or designated under local ordinances provided the survey and ordinance meet the criteria in 14 CCR 4852(e) and (f).

California Environmental Quality Act

CEQA requires that the lead agency consider the impacts of a project on historical resources. PRC Section 21084.1 defines historical resources as those listed, or eligible for listing, in the CRHR, or those officially designated or recognized as historically significant by a local government pursuant to a local county or city ordinance or jurisdiction, unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant. Historical resources also include "historic properties" in California that are listed, or determined eligible for listing, in the NRHP and CRHR. The CEQA Guidelines provide specific guidance for determining the significance of impacts on historical resources. As described in in Section 15064.5(b) of the CEQA Guidelines, a "project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment."

- A "substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings

such that the significance of an historical resource would be materially impaired (Section 15064.5[b][1]).

- The significance of an historical resource is materially impaired when a project:
  - Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register of Historical Resources (Section 15064.5[b][2][A]); or
  - Demolishes or materially alters in an adverse manner those physical characteristics that account for it inclusion in a local register of historical resources pursuant to section 5020.1[k] of the Public Resources Code or its identification in an historical resources survey meeting the requirements of section 5024.1[g] of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of the evidence that the resource is not historically or culturally significant (Section 15064.5[b][2][B]); or
  - Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historic significance and that justify its inclusion in the California Register of Historical Resources as determined by a lead agency for purposes of CEQA (Section 15064.5[b][2][B]); or

The CEQA Guidelines also provide guidance on minimizing or avoiding significant adverse impacts on historical resources as outlined in the following provisions of Section 15064.5(b)(3)-(5).

- Generally, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995), Weeks and Grimmer, shall be considered as mitigated to a level of less than a significant impact on the historical resource (Section 15064.5[b][3]).
- A lead agency shall identify potentially feasible measures to mitigate significant adverse changes in the significance of an historical resource. The lead agency shall ensure that any adopted measures to mitigate or avoid significant adverse changes are fully enforceable through permit conditions, agreements, or other measures (Section 15064.5[b][4]).
- When a project will affect state-owned historical resources, as described in Public Resources Code Section 5024, and the lead agency is a state agency, the lead agency shall consult with the State Historic Preservation Officer as provided in Public Resources Code Section 5024.5. Consultation should be coordinated in a timely fashion with the preparation of the environmental documents (Section 15064.5[b][5]).

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Section 21083.2[a], [b], and [c]).

Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact (PRC Section 21083.2[a]; CEQA Guidelines Section 15064.5[c][4]). However, if a non-unique archaeological resource qualifies as tribal cultural resource (TCR) (PRC 21074[c]; 21083.2[h]), further consideration of significant impacts is required.

CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. As described below, these procedures are detailed in PRC Section 5097.98.

California Health and Safety Code

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the County coroner has examined the remains (Section 7050.5b). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) within 24 hours (Section 7050.5c). The NAHC will notify the Most Likely Descendant (MLD). With the permission of the landowner, the MLD may inspect the site of discovery. Recommendations from the tribe must be provided within 48 hours of notification of the MLD by the NAHC. The MLD may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act (California Repatriation Act), enacted in 2001, required all state agencies and museums that receive state funding and that have possession or control over collections of human remains or cultural items, as defined, to complete an inventory and summary of these remains and items on or before January 1, 2003, with certain exceptions. The California Repatriation Act also provides a process for the identification and repatriation of these items to the appropriate tribes. New collections generated and transferred to a repository, such as a collection that would be generated as a result of archaeological fieldwork conducted within the project area prior to or during project implementation, may ultimately be subject to the California Native American Graves Protection and Repatriation Act of 2001 (i.e., “CalNAGPRA”).

California State Assembly Bill 52

Assembly Bill (AB) 52 of 2014 amended PRC Section 5097.94 and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3. AB 52 established that TCRs must be considered under CEQA and also provided for additional Native American consultation requirements for the lead agency. Section 21074 describes a TCR as a site, feature, place, cultural landscape, sacred place, or object that is considered of cultural value to a California Native American tribe and that is either:

- On or determined to be eligible for the California Register of Historical Resources or a local historic register; or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1.

AB 52 formalizes the lead agency–tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the API, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on TCRs should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to TCRs, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

1.3.3 Local

Los Angeles Historic-Cultural Monuments

Local landmarks in the City of Los Angeles are known as Historic-Cultural Monuments (HCMs) and are under the aegis of the Planning Department, Office of Historic Resources. They are defined in the Cultural Heritage Ordinance as follows (Los Angeles Municipal Code Section 22.171.7, added by Ordinance No. 178,402, effective April 2, 2007):

> Historic-Cultural Monument (Monument) is any site (including significant trees or other plant life located on the site), building or structure of particular historic or cultural significance to the City of Los Angeles, including historic structures or sites in which the broad cultural, economic or social history of the nation, State or community is reflected or exemplified; or which is identified with historic personages or with important events in the main currents of national, State or local history; or which embodies the distinguishing characteristics of an architectural type specimen, inherently valuable for a study of a period, style or method of construction; or a notable work of a master builder, designer, or architect whose individual genius influenced his or her age.

For the purposes of Survey LA, this definition has been broken down into the following four HCM designation criteria that closely parallel the existing NRHP and CRHR criteria:

1. Is identified with important events in the main currents of national, State or local history, or exemplifies significant contributions to the broad cultural, political, economic or social history of the nation, state, city, or community; or
2. Is associated with the lives of Historic Personages important to national, state, city, or local history; or
3. Embodies the distinctive characteristics of a style, type, period, or method of construction; or represents a notable work of a master designer, builder or architect whose genius influenced his or her age; or possesses high artistic values; or
4. Has yielded, or has the potential to yield, information important to the pre-history or history of the nation, state, city or community.

Historic Preservation Overlay Zones

As described by the City of Los Angeles Office of Historic Resources, the Historic Preservation Overlay Zone (HPOZ) Ordinance was adopted in 1979 and amended in 2004 to identify and protect neighborhoods with distinct architectural and cultural resources. HPOZs, commonly known as historic districts, provide for review of proposed exterior alterations and additions to historic properties within designated districts.

Regarding HPOZ eligibility, City of Los Angeles Ordinance Number 175891 states (Los Angeles Municipal Code Section 12.20.3):

> Features designated as contributing shall meet one or more of the following criteria:
>
> 1. adds to the Historic architectural qualities or Historic associations for which a property is significant because it was present during the period of significance, and possesses Historic integrity reflecting its character at that time; or
> 2. owing to its unique location or singular physical characteristics, represents an established feature of the neighborhood, community or city; or
> 3. retaining the building, structure, Landscaping, or Natural Feature, would contribute to the preservation and protection of an Historic place or area of Historic interest in the City.

Regarding effects on federal and locally significant properties, Los Angeles Municipal Code states the following (Section 91.106.4.5, Permits for Historical and Cultural Buildings):

The department shall not issue a permit to demolish, alter or remove a building or structure of historical, archaeological or architectural consequence if such building or structure has been officially designated, or has been determined by state or federal action to be eligible for designation, on the NRHP, or has been included on the City of Los Angeles list of HCMs, without the department having first determined whether the demolition, alteration or removal may result in the loss of or serious damage to a significant historical or cultural asset. If the department determines that such loss or damage may occur, the applicant (LADWP) shall file an application and pay all fees for the CEQA Initial Study and Check List, as specified in Section 19.05 of the Los Angeles Municipal Code. If the Initial Study and Check List identifies the historical or cultural asset as significant, the permit shall not be issued without

the department first finding that specific economic, social or other considerations make infeasible the preservation of the building or structure.

1.4 Area of Potential Impacts

The project API for cultural resources is shown in Figures 3A through 3L, Project API. The API is the study area delineated to assess potential effects from the construction and operation of a project on both archaeological and historic built environment resources. The API encompasses the geographic area or areas within which the project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The API is influenced by the scale and nature of the project and may vary for different kinds of effects caused by the project (36 CFR 800.16[d]).

The API is the study area delineated to assess potential impacts from the construction and operation of the project on both archaeological and historic built environment resources. The API for built environment resources encompasses the geographic area or areas within which the project may directly or indirectly cause a substantial adverse change in the significance of a known or unknown historical resource. A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource is materially impaired (14 CCR 15064.5[b][1]). Under CEQA, material impairment of a historical resource is considered a significant impact (or effect), which can be direct, indirect, or cumulative.[1]

A direct or primary effect on a historical resource is one that is caused by the project and occurs at the same time and place (14 CCR 15358[a][1]). Examples of direct effects that are caused by, and immediately related to, the project include, but are not limited to, demolition, destruction, relocation, and alteration of a historical resource as a result of ground disturbance and other construction activities. Direct effects, however, are not limited to physical effects and, in certain circumstances, can be visual, vibratory, auditory, or atmospheric in nature if the effect is immediate and it results in the material impairment of the significance of a historical resource. Visual intrusions within the viewshed of a historical resource, for example, could result in the material impairment of the resource's integrity of setting if an unencumbered view of the surrounding area or a specific area is a characteristic that contributes to the significance of the resource. Similarly, operational noise that exceeds the ambient level of a sensitive noise receptor can cause material impairment to a historical resource that derives part or all its significance from an inherently quiet auditory setting.[2] Finally, atmospheric intrusions, such as those caused by the introduction of high levels of fugitive dust emissions or chemical pollutants, can result in adverse effects that directly and physically affect biological landscape features that have been identified as historical resources for the purposes of CEQA. Overall, while direct effects clearly include physical effects, they may also include other types of effects that are visual, vibratory, auditory, or atmospheric in nature if the effect is caused by and occurs at the same time and place as the project and there is no other intervening cause between the activities or components of the project and the historical resource.

1 As used in the CEQA Guidelines and 14 CCR 15358, the terms "effects" and "impacts" are synonymous in this report.

2 Construction noise that exceeds the ambient level of a sensitive noise receptor is not analyzed because it is considered a temporary impact that would not have an adverse effect on historical resources because it would not cause physical damage and would not permanently alter or diminish the integrity of such resources. Temporary construction noise would not result in a substantial adverse change in the significance of a historical resource and, therefore, would not cause a significant impact under CEQA.

By contrast, an indirect or secondary effect is a reasonably foreseeable effect caused by the project that occurs later in time or is farther removed in distance. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (14 CCR 15358[a][2]). Because these types of effects are not immediately related to the project, they are considered secondary effects.

Cumulative impacts refer to two or more individual effects that, when considered together, are considerable or compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (14 CCR 15355[a]-[b]). The API for cumulative impacts, if any exist, would include the API for direct effects, indirect effects, or both because in order for a cumulative impact to exist, a historical resource must first be directly or indirectly affected by the project.

1.4.1 Archaeological Resources Area of Potential Impacts Delineation

The API for archaeological resources (Figures 3A through 3L) includes all areas where ground-disturbing activities associated with the proposed project have the potential to impact archaeological resources. Proposed ground disturbance activities with potential impacts to archaeological resources within the API are limited to the extent of project components, which consist of the Cultural API, as shown in Figures 3A through 3L. The project API is approximately 32.02 acres. The maximum vertical extent of trenching in the API is not expected to exceed 35 feet in depth.

1.4.2 Built Environment Area of Potential Impacts Delineation

Delineation of the API considered the proposed project activities in conjunction with historic era-built resources that are 45 years of age or older (those built in or prior to 1980) that may sustain impacts due to the construction or operation of the project.[3]

In consideration of potential impacts to built environment resources, the API is limited to the extent of the proposed project components, which include the Cultural API and staging areas, as illustrated in Figure 3.

The extent of the work and staging areas are located within the existing road ROW and are limited to construction related to modifications and improvements of elements of the existing Cantara Trunk Line, which is an underground

[3] While the 50-year threshold is generally used for listing resources in the National Register of Historic Places (NRHP) and the California Register of Historical resources (CRHR), the California Office of Historic Preservation's (OHP) Instructions for Recording Historical Resources recommends recording "any physical evidence of human activities over 45 years… for the purposes of inclusion in the OHP's filing system." It also allows for the "documentation of resources less than 45 years… if those resources have been formally evaluated, regardless of the outcome of the evaluation." Further, the guidance notes that the 45-year threshold recognizes that there is commonly a 5-year lag between resource identification and the date that planning decisions are made, and thus it explicitly encourages the collection of data about resources that may become eligible for the NRHP or CRHR within that planning period. More restrictive criteria must be met before the resources included in OHP's filing system are listed, found eligible for listing, or otherwise determined to be important in connection with federal, state, and local legal statuses and registration programs (OHP 1995: 2).

historic-era structure initially constructed in 1917. Portions of the Cantara Trunk Line would be abandoned in place and filled with cement slurry. These portions of the trunk line will no longer function following project construction. As stated in the project description, the existing trunk line would remain in service during construction, and interruptions in water service would not occur during the construction process.

The new trunk line structure, that is replacing the existing Cantara Trunk Line in several places, would be connected to portions of the existing Cantara Trunk Line that would remain in place with the exception of one area where a connection would be made to the North Hollywood Collector Trunk Line. This connection point is located on the west portion of the API along Strathern Street. The North Hollywood Collector Trunk Line was installed around 1990 and is a newer part of the LADWP Trunk Line system. This type of connection is considered standard routine maintenance for the large water conveyance system. All the other existing trunk line branches would remain intact and continue to operate as originally constructed following construction. This type of maintenance work on an underground water conveyance structure does not constitute an adverse effect for this type of resource. Additionally, the North Hollywood Collector Trunk Line is not over 45 years old as such, the only part of the LADWP Trunk Line system that requires consideration in the API is the Cantara Trunk Line.

A portion of the pipeline to be slurry filled (located between Whitsett Avenue and Rhodes Avenue) runs underneath several private residential parcels (AINs 2308-018-007, 2308-018-010, 2308-018-009, 2308-020-009, and 2308-020-010). The flowable fill for this pipeline segment would be injected from excavation point(s) within the public ROW in the vicinity of these properties. As such, there would be no ground disturbance and no surface impacts within any of these private residential parcels, and the properties do not require consideration in the API.

Additionally, proposed work within the industrial area shown in Figure 2-4 would be limited to slurry filling and distribution mainline work within a parking area. No buildings near this parking area would sustain impacts related to the proposed work. Consequently, adjacent buildings in this proposed construction area are not included in the API.

In consideration of the extent of the project and potential impacts to historic era-built environment resources, the subject segment of the Cantara Trunk Line, initially constructed in 1917, would be abandoned with some sections removed and would no longer function as a water conveyance structure following project construction. This structure is addressed in detail in this report.

In consideration of the extent of the project and potential impacts to historic era-built environment resources, the API includes two historic-age resources that require inventory and evaluation: the Cantara Trunk Line and San Fernando Road. The subject segment of the Cantara Trunk Line, originally constructed in 1917, would be abandoned, with some sections removed, and would no longer function as a water conveyance structure following project construction. San Fernando Road was previously evaluated by Candance Ehringer of Environmental Science Associates in 2012 and was recommended as eligible for inclusion in the NRHP for its contribution to the development of the surrounding area from c. 1924 to 1963. Open-trench and pipe-jacking construction methods would occur along San Fernando Road within the API to abandon and slurry fill portions of the Cantara Trunk Line's associated main line along the road. Table 1 below provides a list of the resources within the cultural resources API that are addressed in detail in this report.

Table 1. Built Environment Cultural Resources Within the API

Resource Name	Property Type	Address/AIN	Year Built	Prior CRHR Evaluation Status
Cantara Trunk Line	Trunk line	N/A	1917	Not evaluated
San Fernando Road	Road	N/A	c. 1924	3S

Notes: API = area of potential impacts; AIN = Assessor's Identification Number; CRHR = California Register of Historical Resources; N/A = not applicable.
California Historical Resource Status Codes 3S = Appears eligible for CRHR individually through survey evaluation.

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SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 125 250 Feet

FIGURE 3A

Project API

Cantara Trunk Line Replacement Project

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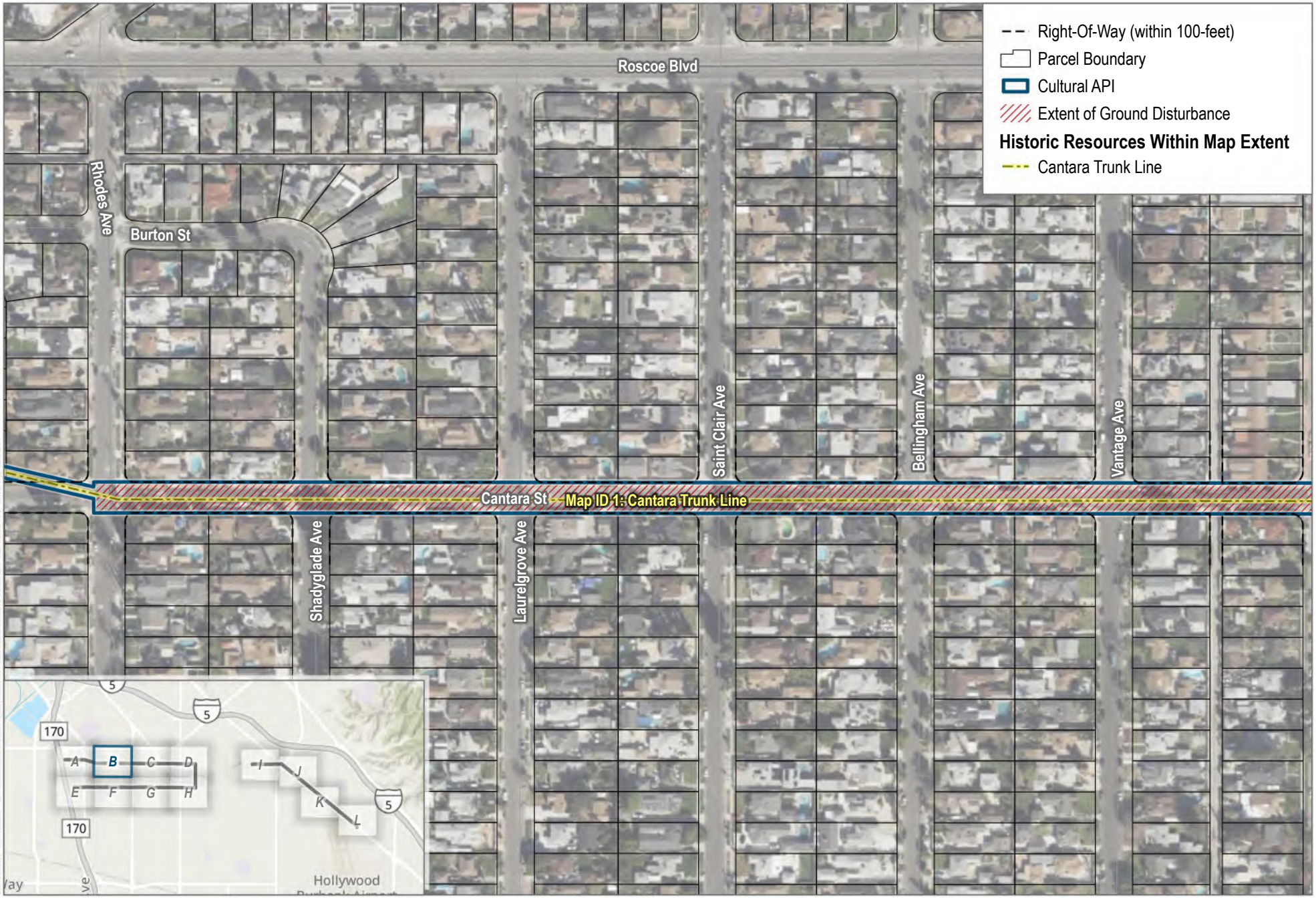

SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

0 125 250 Feet

FIGURE 3B

Project API

Cantara Trunk Line Replacement Project

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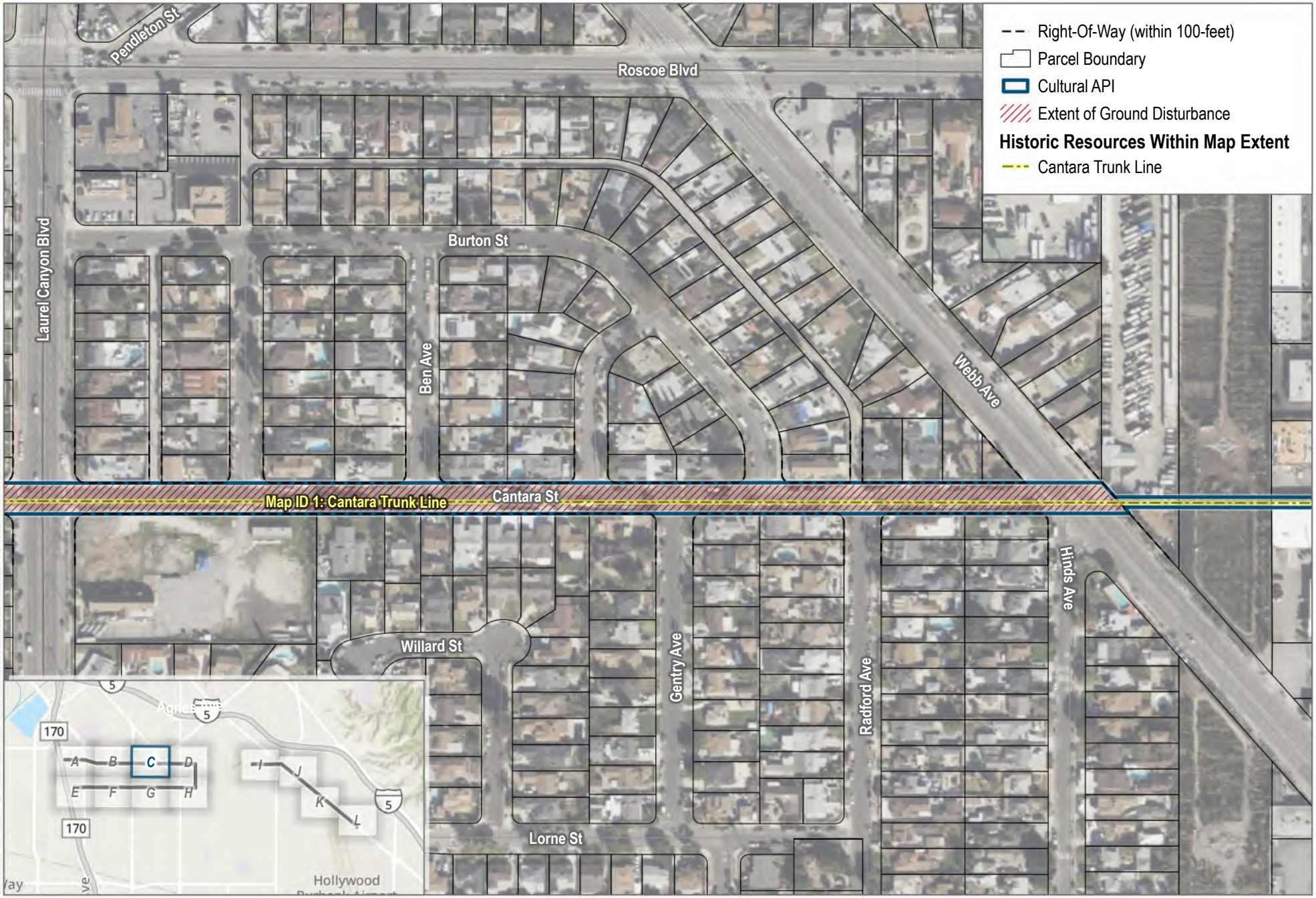

SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

0 125 250 Feet

FIGURE 3C

Project API

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3D

Project API

Cantara Trunk Line Replacement Project

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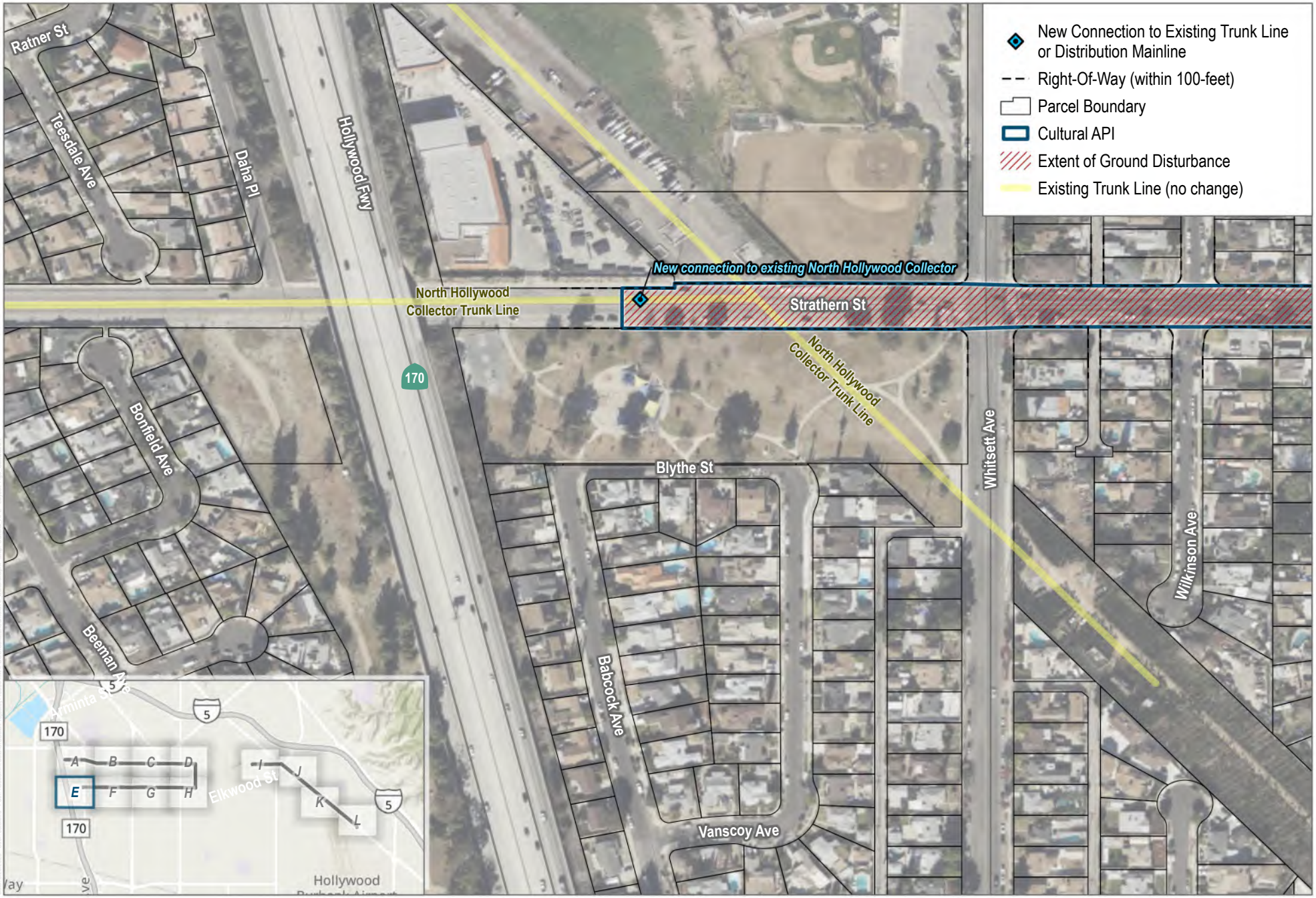

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3E

Project API

Cantara Trunk Line Replacement Project

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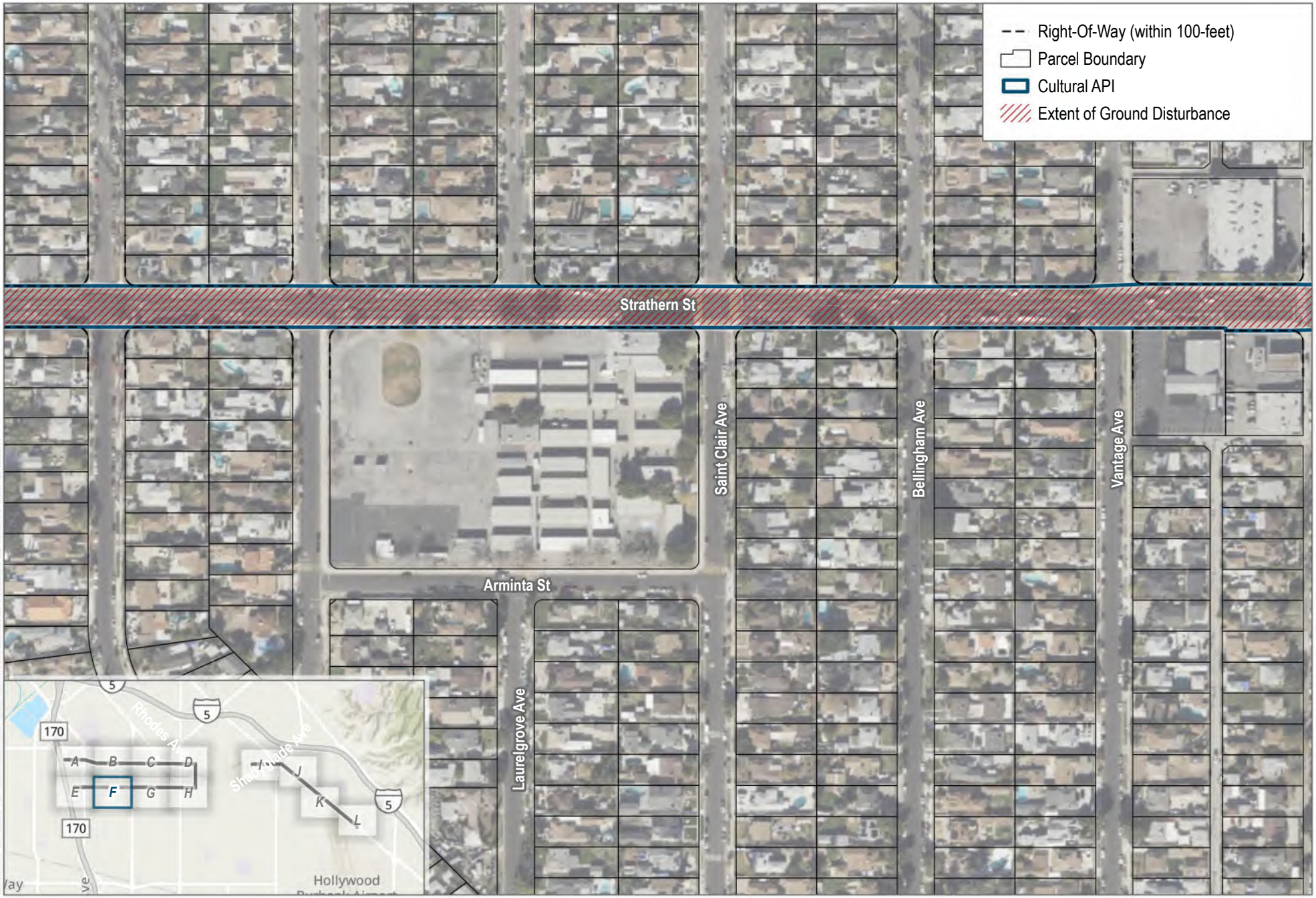

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3F

Project API

Cantara Trunk Line Replacement Project

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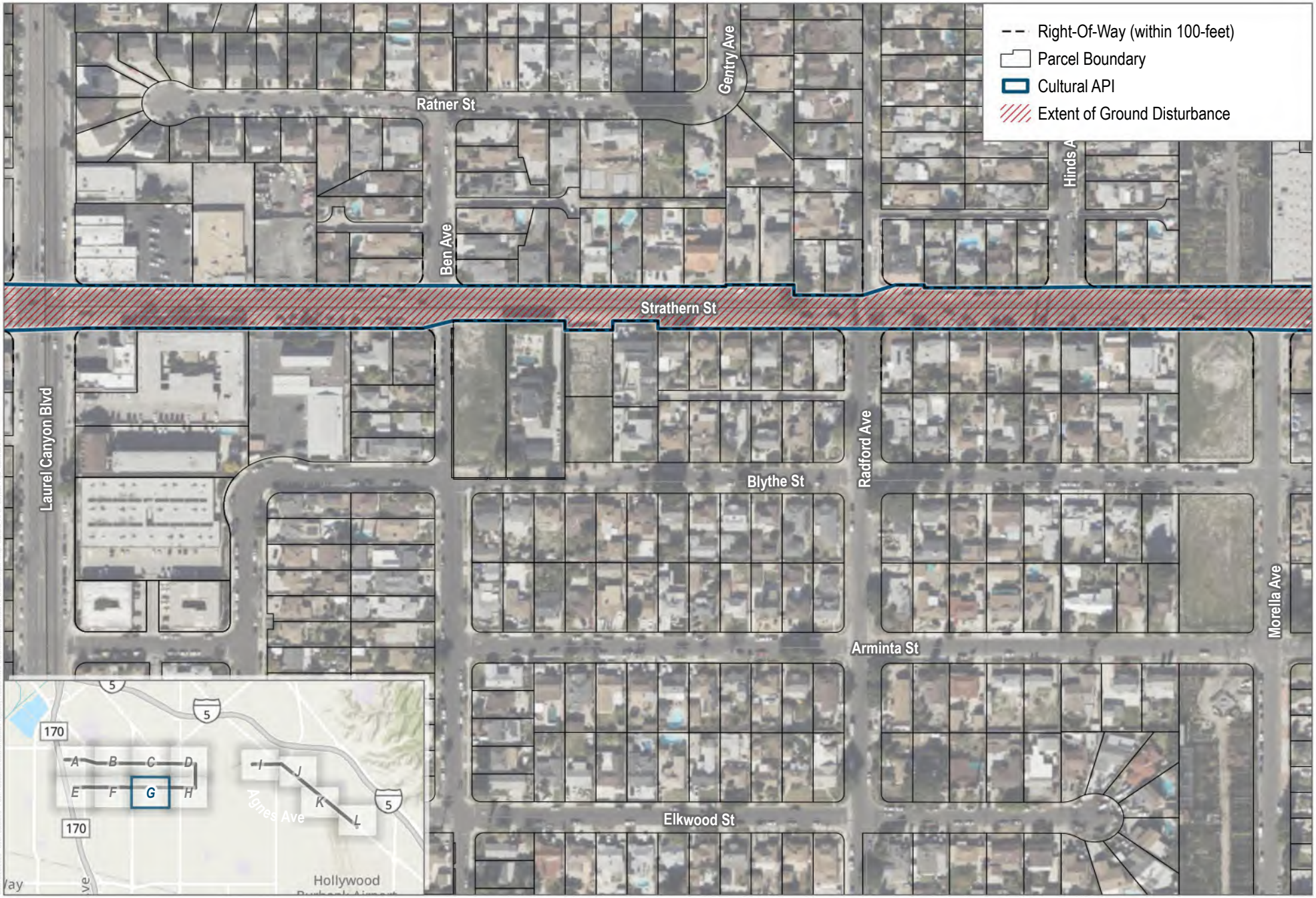

SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

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FIGURE 3G

Project API

Cantara Trunk Line Replacement Project

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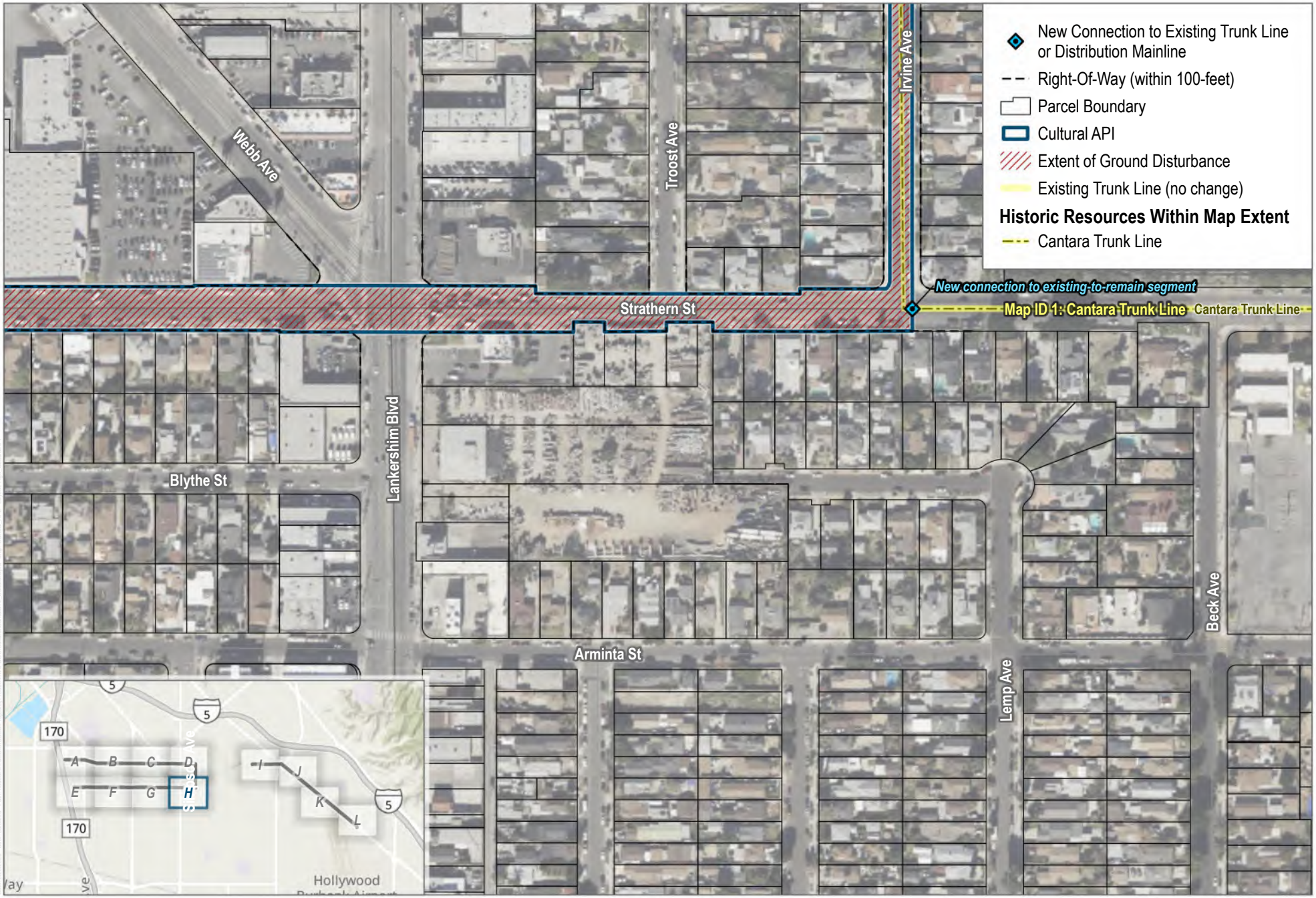

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3H

Project API

Cantara Trunk Line Replacement Project

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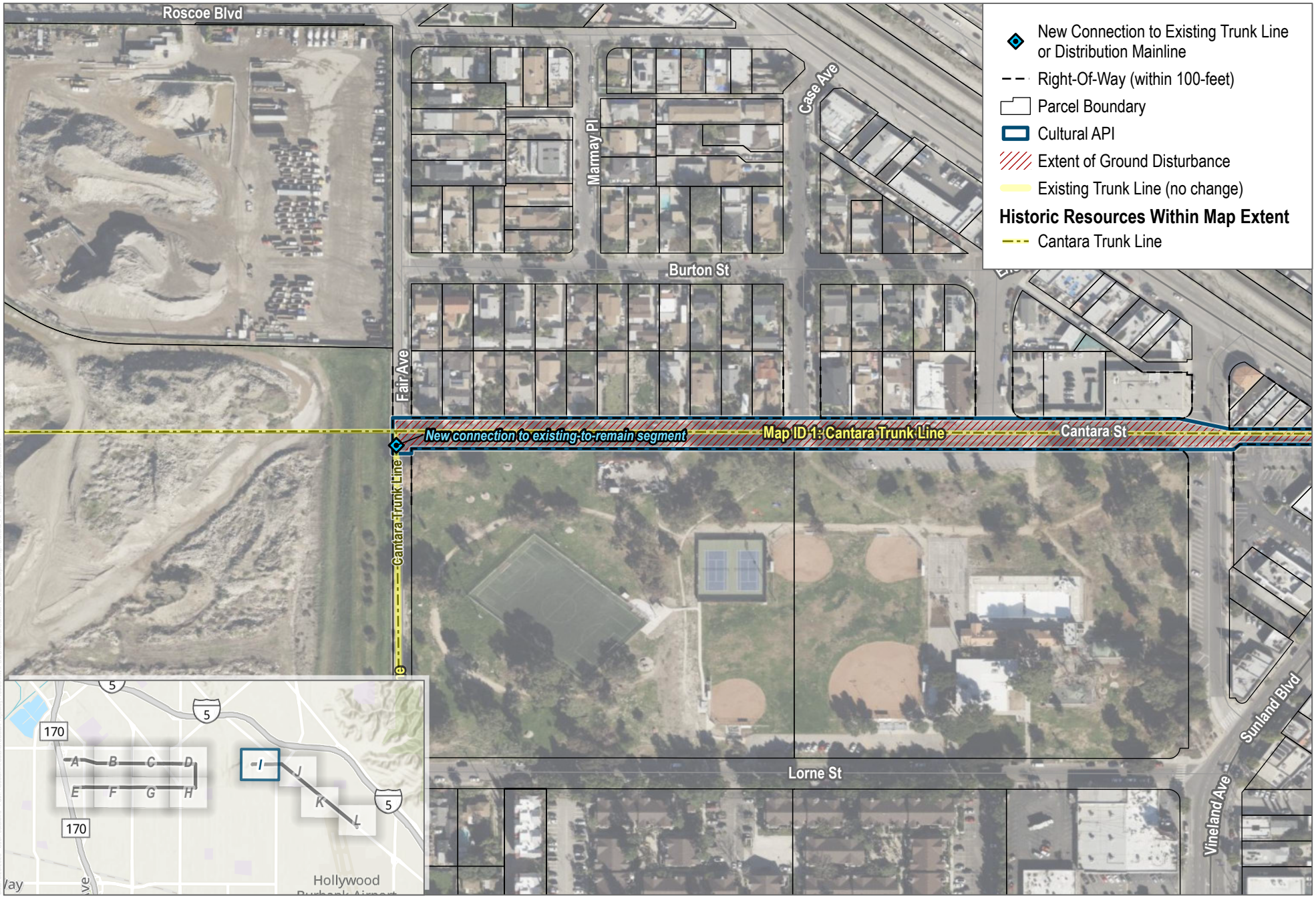

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3I

Project API

Cantara Trunk Line Replacement Project

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SOURCE: Bing Maps, OpenStreetMap

LA DWP Los Angeles Department of Water & Power

0 125 250 Feet

FIGURE 3J

Project API

Cantara Trunk Line Replacement Project

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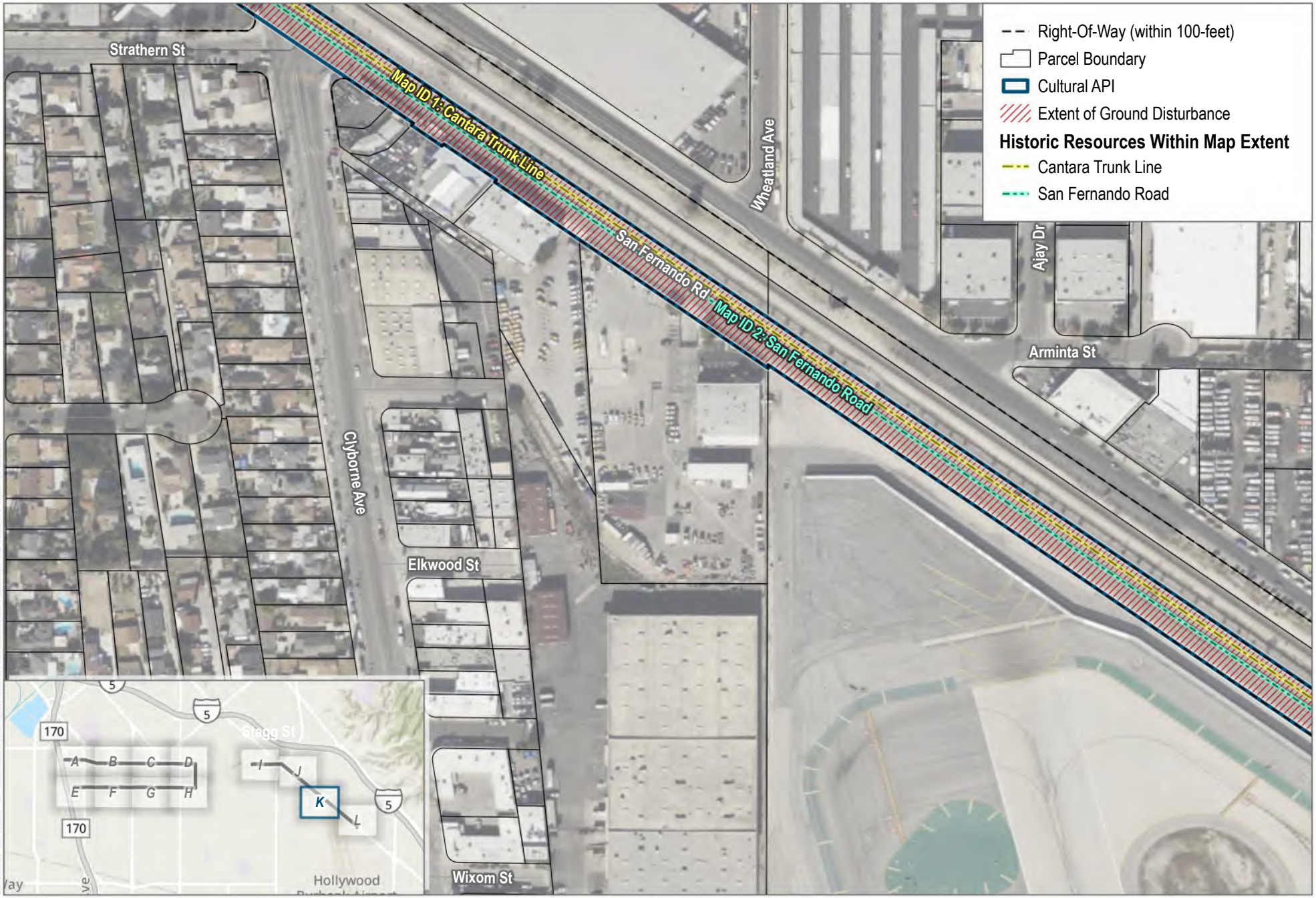

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3K

Project API

Cantara Trunk Line Replacement Project

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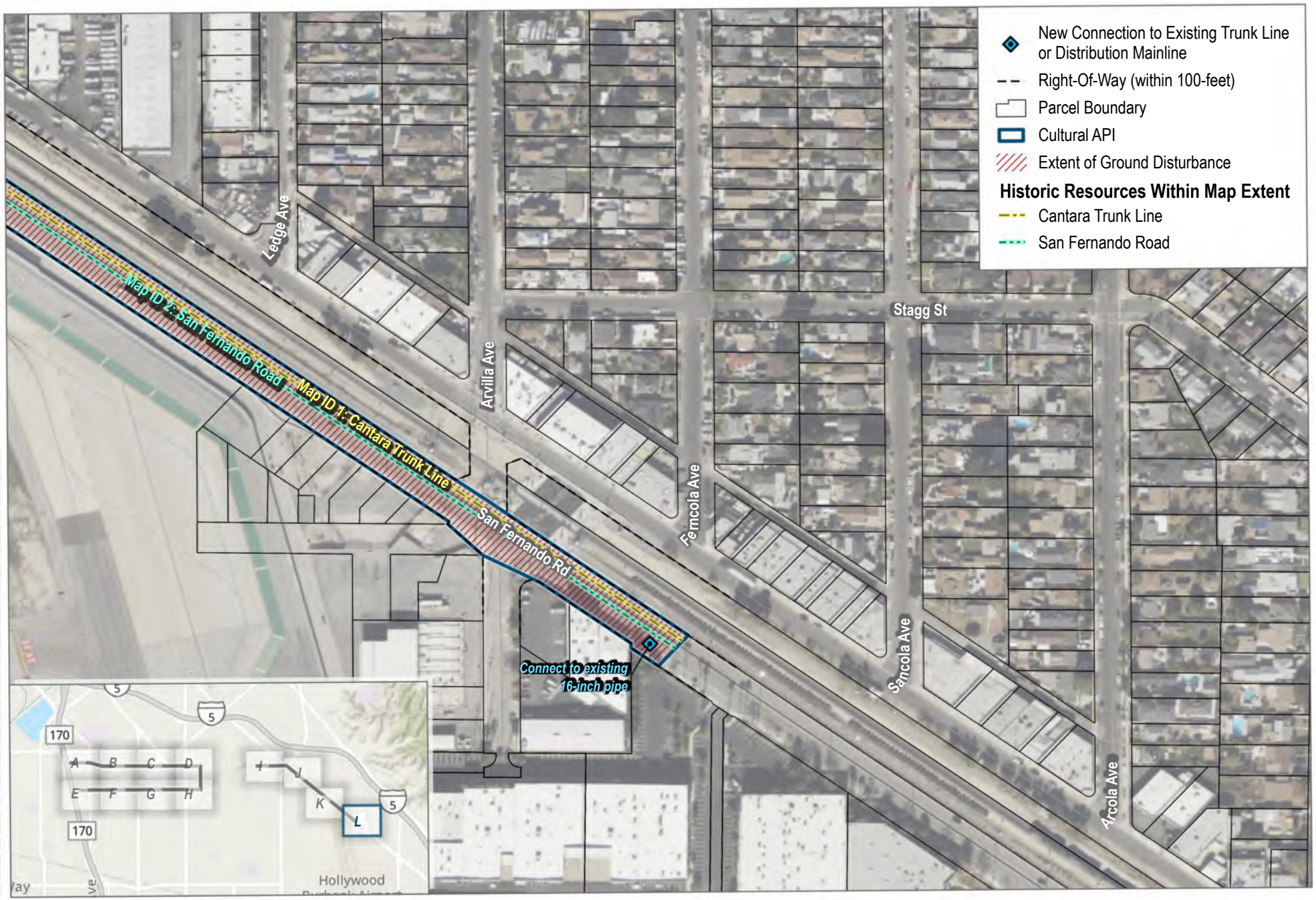

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

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FIGURE 3L

Project API

Cantara Trunk Line Replacement Project

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2 Literature Review, Background Research, and Methods

This section provides the results of the CHRIS records search at the South Central Coastal Information Center, a summary of archival research methods and additional records reviews, a narrative description of historic aerial photographs of the subject properties and surrounding area. The consultation with interested parties will be initiated once the CEQA process is initiated by the lead agency.

2.1 California Historical Resources Information System

A records search of the CHRIS was completed for the current proposed project, and it included the extent of the Work Area along with a 0.5-mile radius buffer. This records search was conducted in-person by Dudek staff at the South Central Coastal Information Center on December 10 and 12, 2024 (Confidential Appendix A). This search included a review of their collection of mapped prehistoric, historical, and built environment resources, Department of Parks and Recreation (DPR) site records, technical reports, historical maps, and local inventories. Additional consulted sources included the NRHP, California Inventory of Historical Resources/CRHR and listed Office of Historic Preservation (OHP) Archaeological Determinations of Eligibility, California Points of Historical Interest, and California Historical Landmarks. The results of the records search are presented in Section 4.

2.2 Native American Heritage Commission and Tribal Correspondence

LADWP requested a search of the NAHC Sacred Lands File for the project alignment and a 0.5-mile buffer. The NAHC results, received December 21, 2023, indicated the Sacred Lands File search failed to identify any cultural resources within the records search area. The Sacred Lands File results are included in Appendix B of this report. The NAHC then provided a list of Native American tribes culturally affiliated with the project area and recommended contacting them for further information. LADWP contacted all 21 of the Native American individuals and/or tribal organizations on the NAHC list. The Gabrieleno Band of Mission Indians-Kizh Nation, Gabrielino Tongva Indians of California Tribal Council, Gabrieleno Tongva San Gabriel Band of Mission Indians, and Fernandeño Tataviam Band of Mission Indians have requested consultation regarding the proposed project pursuant to CEQA/AB 52. Consulting tribes indicated some potential for encountering tribal cultural resources and provided recommended mitigation measures that were considered and incorporated into the project's CEQA document. Summaries of consultation findings were submitted to each respective tribe on September 8, 2025, via email. All records of correspondence related to CEQA/AB 52 consultations are on file with LADWP.

2.2.1 Interested Party Correspondence

Interested parties' correspondence for the project was conducted by LADWP. The letter provided a brief description of the proposed project and requested information about historic and cultural components in or near the project area. The letter was provided to the Los Angeles Conservancy, Los Angeles City Historical Society, San Fernando Valley Historical Society, and Burbank Historical Society. The Los Angeles Conservancy responded on May 8, 2025, with information regarding three eligible resources located within the vicinity of the project and asked to be included

as an interested party should the project impact any of these historic resources. The three resources include 1123 West Cantara Street, Roscoe Elementary Schoolhouse at 10765 West Strathern Street, and the Metropolitan Water District Water Treatment Plan at 7550 North Greg Avenue, none of which are located in the project API. To date, no further responses have been received. Copies of the interested party correspondence have been submitted in conjunction with this project, and all responses are in Appendix C.

2.3 Archival Research

Dudek conducted additional background research to arrive at a general understanding of the settlement and development of the API. This information was used to understand the history of the area and how the area has changed over time.

2.3.1 Built Environment Resource Directory

The California OHP maintains the Built Environment Resource Directory (BERD), an inventory of built environment cultural resources that are processed through OHP's office. On April 14, 2025, Dudek searched for the Cantara Trunk Line and San Fernando Road in the BERD for Los Angeles County. Neither resource was included in the BERD. However, two LADWP resources were listed, the LADWP Bridge and the LADWP Distribution Station 26, which are not located in the API.

2.3.2 Calisphere

Calisphere provides access to 2,000 collections contributed by more than 300 cultural heritage organizations in California, including universities, libraries, archives, museums, and historical societies. Dudek searched for information regarding the Cantara Trunk Line and San Fernando Road on Calisphere on April 14, 2025. This search did not identify any materials pertaining to the API.

2.3.3 Online Archive of California

The Online Archive of California provides free public access to detailed descriptions of primary resource collections maintained by more than 300 contributing institutions, including libraries, special collections, archives, historical societies, and museums throughout California and collections maintained by the 10 University of California campuses. Dudek searched for materials associated with the API on the Online Archive of California on April 14, 2025, and did not identify any relevant information.

2.3.4 Historical Newspapers

Dudek reviewed historical newspapers from the California Digital Newspaper Collection and Newspapers.com covering the City and County of Los Angeles and the surrounding area to understand the development of the API. These documents were used in the preparation of Section 3.3, Historic Context.

2.4 Aerial Photograph and Historic Map Review

Dudek consulted historic maps and aerial photographs to understand the development of the proposed project API and vicinity. Historical aerial photographs were reviewed for the proposed project API for the following years: 1947, 1952, 1953, 1954, 1964, 1967, 1972, 1977, 1980, 1982, 1985, 1989, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2003, 2004, 2005, 2009, 2010, 2012, 2014, 2016, 2018, 2020, and 2022 (NETR 2025a). Historical topographical maps were also reviewed for the proposed project API for the following years: 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1913, 1915, 1921, 1924, 1926, 1927, 1932, 1933, 1939, 1941, 1942, 1948, 1949, 1955, 1960, 1962, 1967, 1975, 1977, 1980, 1981, 1987, 1994, 2012, 2015, 2018, and 2022 (NETR 2025b).

The first aerial photograph depicting the proposed project API dates to 1947 and shows the API as being comprised of residential, commercial, and agricultural lands. The Hollywood Burbank Airport was also present at this time. The 1964 aerial photograph depicts the API as being completely developed, and the agricultural lands have been developed into residential neighborhoods. Development continues and the residential properties become denser, but there is very little observable difference between the 1972 aerial photograph and the 2022 aerial photograph (NETR 2025a).

The first topographic map showing the proposed project API dates to 1896 and shows the proposed project API as largely undeveloped land, though there are a few small developments along what would become Lankershim Boulevard. The Southern Pacific Railroad and San Fernando Road are present, along with several other roads that run through the API. There are no changes on topographic maps until 1921. On the 1921 topographic map, many areas had been completely subdivided, and there was a large amount of new development, primarily along what would become Laurel Canyon Boulevard, Lankershim Boulevard, and Vineland Avenue, which run through the API. By the 1941 topographic map, the API had undergone extensive development, though it had not yet reached its current extent, and the extant freeways running through the areas had not yet been developed. Development continued at a steady pace through the 1940s and 1950s. By 1967, the topographic map shows that I-5 and Hollywood Freeway (SR-170) have been constructed and are present in the vicinity of the API According to the 1974 topography map, the API appears to be completely developed. Between 1974 and 2022, there were very few observable changes to the API and the surrounding area (NETR 2025b).

2.5 Field Survey Methods

The field surveys were conducted by or were overseen by archaeologists and architectural historians who meet the Secretary of the Interior Professional Qualifications Standards for their respective fields.

2.5.1 Archaeological Survey

Dudek archaeologist Ryan J. Glenn, M.A., RPA, conducted a reconnaissance-level pedestrian survey of the exposed soils within the Cultural API on February 21, 2025. The areas of exposed soils were very limited within the API due to the presence of pavement, sidewalks, and landscaping. Standard archaeological procedures and techniques consistent with the SOI Standards for Archaeology and Historic Preservation were employed during the pedestrian survey. When possible, 10-meter interval survey transects were conducted and oriented in cardinal directions, east to west. Where visible, the ground surface was examined for prehistoric artifacts (e.g., flaked stone tools,

tool-making debris, stone milling tools, ceramics, fire-affected rock, imported marine shell), soil discoloration that might indicate the presence of a cultural midden, soil depressions, features indicative of the current or former presence of structures or buildings (e.g., standing exterior walls, post holes, foundations), and historic artifacts (e.g., metal, glass, ceramics, building materials). Ground disturbances such as rodent/reptile burrows, cut banks, and drainages were also visually inspected for exposed subsurface materials. All fieldwork was documented using field notes and Apple Generation 14 (iPhone) equipped with Esri Field Maps and Avenza PDF Maps software with close-scale georeferenced field maps of the proposed project API. All field notes, photographs, and records related to the study are on file at Dudek's Pasadena, California, office. A discussion of existing conditions and survey results are provided in Section 4.2.1, Archaeology.

2.5.2 Built Environment Survey

Dudek architectural historian Katie Ahmanson, MHC, conducted an intensive-level survey of the API on February 21, 2025. The survey entailed driving through the API, documenting the area with notes and photographs, specifically noting character-defining features, spatial relationships, observed alterations, and examining any historic features in the area.

3 Project Context

3.1 Environmental Context

The proposed project API is located in a highly urbanized area in the community of Sun Valley, located in the City of Los Angeles, Los Angeles County, characterized primarily by dense residential and commercial developments. The proposed project API is generally 13 miles northwest of downtown Los Angeles, less than 1 mile southwest of the Verdugo Mountains, and adjacent to the Hollywood Burbank Airport. The proposed project API is underlain primarily by the urban land-Palmview-Tujunga Complex, urban land-Soboba Complex, and urban land-Tujunga-Typic Xerorthents, sandy substratum complex. These soils are made up primarily by urban land, which is characterized by alluvial fan remnants and flood plains on disturbed, developed land. The remaining soil types are characterized by discontinuous human-transported material layered over alluvium derived from granite (USDA 2025). The entire proposed project API is completely developed and all native subsurface soils with potential to support the presence of cultural deposits have been substantially disturbed.

3.2 Cultural Context

This context provides an overview of the prehistoric and historic periods in the API.

3.2.1 Prehistoric Period Overview

Evidence for continuous human occupation in Southern California spans the last 10,000 years. Various attempts to parse out variability in archaeological assemblages over this broad period have led to the development of several cultural chronologies; some of these are based on geologic time, most are based on temporal trends in archaeological assemblages, and others are interpretive reconstructions. To be more inclusive, this research employs a common set of generalized terms used to describe chronological trends in assemblage composition: Paleoindian (pre-5500 BC), Archaic (8000 BC–AD 500), Late Prehistoric (AD 500-1769), and Ethnohistoric (post-AD 1769).

Paleoindian Period (pre-5500 BC)

Evidence for Paleoindian occupation in the region is tenuous. Our knowledge of associated cultural pattern(s) is informed by a relatively sparse body of data that has been collected from within an area extending from coastal San Diego, through the Mojave Desert, and beyond. One of the earliest dated archaeological assemblages in the region is located in coastal Southern California (though contemporaneous sites are present in the Channel Islands) derives from SDI-4669/W-12 in La Jolla. A human burial from SDI-4669 was radiocarbon dated to 9,590–9,920 years before present (95.4% probability) (Hector 1984). The burial is part of a larger site complex that contained more than 29 human burials associated with an assemblage that fits the Archaic profile (i.e., large amounts of ground stone, battered cobbles, and expedient flake tools). In contrast, typical Paleoindian assemblages include large stemmed projectile points, high proportions of formal lithic tools, bifacial lithic reduction strategies, and relatively small proportions of ground stone tools. Prime examples of this pattern are sites that were studied by Emma Lou Davis and colleagues (1978) on Naval Air Weapons Station China Lake near Ridgecrest, California. These sites contained fluted and unfluted stemmed points and large numbers of formal flake tools (e.g., shaped scrapers, blades). Other typical Paleoindian sites include the Komodo site (MNO-679), a multi-component fluted

point site, and MNO-680, a single component Great Basined Stemmed point site (see Basgall and Hall 2002). At MNO-679 and MNO-680, ground stone tools were rare while finely made projectile points were common.

Warren et al. (2004) claimed that a biface (prehistoric stone tool that has been flaked on both faces), manufacturing tradition present at the Harris site complex (SDI-149) is representative of typical Paleoindian occupation in the region that possibly dates between 10,365 and 8,200 BC (Warren et al. 2004). Termed San Dieguito (see also Rogers 1945), assemblages at the Harris site are qualitatively distinct from most others in region because the site has large numbers of finely made bifaces (including projectile points), formal flake tools, a biface reduction trajectory, and relatively small amounts of processing tools (Warren 1968). Despite the unique assemblage composition, the definition of San Dieguito as a separate cultural tradition is hotly debated. Gallegos (1987) suggested that the San Dieguito pattern is simply an inland manifestation of a broader economic pattern. Gallegos's interpretation of San Dieguito has been widely accepted in recent years, in part because of the difficulty in distinguishing San Dieguito components from other assemblage constituents. In other words, it is easier to ignore San Dieguito as a distinct socioeconomic pattern than it is to draw it out of mixed assemblages.

The large number of finished bifaces (i.e., projectile points and non-projectile blades), along with large numbers of formal flake tools at the Harris site complex, is very different than nearly all other assemblages throughout the region, regardless of age. Warren et al. (2004) made this point, tabulating basic assemblage constituents for key early Holocene sites. Producing finely made bifaces and formal flake tools implies that relatively large amounts of time were spent for tool manufacture. Such a strategy contrasts with the expedient flake-based tools and cobble-core reduction strategy that typifies non-San Dieguito Archaic sites. It can be inferred from the uniquely high degree of San Dieguito assemblage formality that the Harris site complex represents a distinct economic strategy from non-San Dieguito assemblages.

San Dieguito sites are rare in the inland valleys, with one possible candidate, RIV-2798/H, located on the shore of Lake Elsinore. Excavations at Locus B at RIV-2798/H produced a toolkit consisting predominantly of flaked stone tools, including crescents, points, and bifaces, and lesser amounts of ground stone tools, among other items (Grenda 1997). A calibrated and reservoir-corrected radiocarbon date from a shell produced a date of 6630 BC. Grenda (1997) suggested this site represents seasonal exploitation of lacustrine resources and small game and resembles coastal San Dieguito assemblages and spatial patterning.

If San Dieguito truly represents a distinct socioeconomic strategy from the non-San Dieguito Archaic processing regime, its rarity implies that it was not only short-lived, but that it was not as economically successful as the Archaic strategy. Such a conclusion would fit with other trends in Southern California deserts, where hunting-related tools were replaced by processing tools during the early Holocene (Basgall and Hall 1990).

Archaic Period (8000 BC–AD 500)

The more than 2,500-year overlap between the presumed age of Paleoindian occupations and the Archaic period highlights the difficulty in defining a cultural chronology in Southern California. If San Dieguito is the only recognized Paleoindian component in the coastal Southern California, then the dominance of hunting tools implies that it derives from Great Basin adaptive strategies and is not necessarily a local adaptation. Warren et al. (2004) admitted as much, citing strong desert connections with San Dieguito. Thus, the Archaic pattern is the earliest local socioeconomic adaptation in the region (Hale 2001, 2009).

The Archaic pattern, which has also been termed the Millingstone Horizon (among others), is relatively easy to define with assemblages that consist primarily of processing tools, such as milling stones, hand stones, battered cobbles, heavy crude scrapers, incipient flake-based tools, and cobble-core reduction. These assemblages occur in all environments across the region with little variability in tool composition. Low assemblage variability over time and space among Archaic sites has been equated with cultural conservatism (Basgall and Hall 1990; Byrd and Reddy 2002; Warren 1968; Warren et al. 2004). Despite enormous amounts of archaeological work at Archaic sites, little change in assemblage composition occurred until the bow and arrow was adopted around AD 500, as well as ceramics at approximately the same time (Griset 1996; Hale 2009). Even then, assemblage formality remained low. After the bow was adopted, small arrow points appear in large quantities and already low amounts of formal flake tools are replaced by increasing amounts of expedient flake tools. Similarly, shaped milling stones and hand stones decreased in proportion relative to expedient, unshaped ground stone tools (Hale 2009). Thus, the terminus of the Archaic period is equally as hard to define as its beginning because basic assemblage constituents and patterns of manufacturing investment remain stable, complemented only by the addition of the bow and ceramics.

Late Prehistoric Period (AD 500–1769)

The period of time following the Archaic and before Ethnohistoric times (AD 1769) is commonly referred to as the Late Prehistoric (Rogers 1945; Wallace 1955; Warren et al. 2004); however, several other subdivisions continue to be used to describe various shifts in assemblage composition. In general, this period is defined by the addition of arrow points and ceramics, as well as the widespread use of bedrock mortars. The fundamental Late Prehistoric assemblage is very similar to the Archaic pattern but includes arrow points and large quantities of fine debitage from producing arrow points, ceramics, and cremations. The appearance of mortars and pestles is difficult to place in time because most mortars are on bedrock surfaces. Some argue that the Ethnohistoric intensive acorn economy extends as far back as AD 500 (Bean and Shipek 1978). However, there is no substantial evidence that reliance on acorns, and the accompanying use of mortars and pestles, occurred before AD 1400. Milling stones and hand stones persisted in higher frequencies than mortars and pestles until the last 500 years (Basgall and Hall 1990); even then, weighing the economic significance of milling stone–hand stone versus mortar-pestle technology is tenuous due to incomplete information on archaeological assemblages.

3.2.2 Ethnographic Overview

The history of the Native American communities prior to the mid-1700s has largely been reconstructed through later mission-period and early ethnographic accounts. The first records of the Native American inhabitants of the region come predominantly from European merchants, missionaries, military personnel, and explorers. These brief, and generally peripheral, accounts were prepared with the intent of furthering respective colonial and economic aims and were combined with observations of the landscape. They were not intended to be unbiased accounts regarding the cultural structures and community practices of the newly encountered cultural groups. The establishment of the missions in the region brought more extensive documentation of Native American communities, though these groups did not become the focus of formal and in-depth ethnographic study until the early twentieth century (Bean and Shipek 1978; Boscana 1846; Geiger and Meighan 1976; Harrington 1934; Laylander 2000; Sparkman 1908; White 1963). The principal intent of these researchers was to record the pre-contact, culturally specific practices, ideologies, and languages that had survived the destabilizing effects of missionization and colonialism. This research, often understood as “salvage ethnography,” was driven by the understanding that traditional knowledge was being lost due to the impacts of modernization and cultural

assimilation. Alfred Kroeber applied his "memory culture" approach (Lightfoot 2005: 32) by recording languages and oral histories within the region. Ethnographic research by Dubois, Kroeber, Harrington, Spier, and others during the early twentieth century seemed to indicate that traditional cultural practices and beliefs survived among local Native American communities.

Even though there were many informants for these early ethnographies who were able to provide information from personal experiences about native life before the Europeans, a significantly large proportion of these informants were born after 1850 (Heizer and Nissen 1973); therefore, the documentation of pre-contact, aboriginal culture was being increasingly supplied by individuals born in California after considerable contact with Europeans. As Robert F. Heizer (1978) stated, this is an important issue to note when examining these ethnographies, since considerable culture change had undoubtedly occurred by 1850 among the Native American survivors of California. This is also a particularly important consideration for studies focused on TCRs, where concepts of "cultural resource" and the importance of traditional cultural places are intended to be interpreted based on the values expressed by present-day Native American representatives and may vary from archaeological values (Giacinto 2012).

Based on ethnographic information, it is believed that at least 88 different languages were spoken from Baja California Sur to the southern Oregon state border at the time of Spanish contact (Johnson and Lorenz 2006: 34). The distribution of recorded Native American languages has been dispersed as a geographic mosaic across California through six primary language families (Golla 2007).

Victor Golla has contended that one can interpret the amount of variability within specific language groups as being associated with the relative "time depth" of the speaking populations (Golla 2007: 80). A large amount of variation within the language of a group represents a greater time depth then a group's language with less internal diversity. One method that he has employed is by drawing comparisons with historically documented changes in Germanic and Romantic language groups. Golla (2007: 71) has observed that the "absolute chronology of the internal diversification within a language family" can be correlated with archaeological dates. This type of interpretation is modeled on concepts of genetic drift and gene flows that are associated with migration and population isolation in the biological sciences.

The tribes of this area have traditionally spoken Takic languages that may be assigned to the larger Uto–Aztecan family (Golla 2007: 74). These groups include the Gabrielino, Cahuilla, and Serrano. Golla has interpreted the amount of internal diversity within these language-speaking communities to reflect a time depth of approximately 2,000 years. Other researchers have contended that Takic may have diverged from Uto–Aztecan ca. 2600 BC-AD 1, which was later followed by the diversification within the Takic speaking tribes, occurring approximately 1500 BC-AD 1000 (Laylander 2010).

Gabrielino/Tongva

The archaeological record indicates that the Gabrielino arrived in the Los Angeles Basin around 500 BC. Surrounding native groups included the Chumash and Tataviam to the northwest, the Serrano and Cahuilla to the northeast, and the Juaneño and Luiseño to the southeast.

The name "Gabrielino" denotes those people who were administered by the Spanish from the San Gabriel Mission, which included people from the Gabrielino area proper and other social groups (Bean and Smith 1978; Kroeber 1976). Therefore, in the post-contact period, the name does not necessarily identify a specific

ethnic or tribal group. The names by which Native Americans in Southern California identified themselves have, for the most part, been lost. Many modern Gabrielino identify themselves as descendants of the indigenous people living across the plains of the Los Angeles Basin and refer to themselves as the Tongva (King 1994). This term is used in the remainder of this section to refer to the pre-contact inhabitants of the Los Angeles Basin and their descendants.

Tongva lands encompassed the greater Los Angeles Basin and three Channel Islands, San Clemente, San Nicolas, and Santa Catalina. The Tongva established large, permanent villages in the fertile lowlands along rivers and streams and in sheltered areas along the coast, stretching from the foothills of the San Gabriel Mountains to the Pacific Ocean. A total tribal population has been estimated of at least 5,000 (Bean and Smith 1978), but recent ethnohistoric work suggests a number approaching 10,000 (O'Neil 2002). Houses constructed by the Tongva were large, circular, domed structures made of willow poles thatched with tule that could hold up to 50 people (Bean and Smith 1978). Other structures served as sweathouses, menstrual huts, ceremonial enclosures, and probably communal granaries. Cleared fields for races and games, such as lacrosse and pole throwing, were created adjacent to Tongva villages (McCawley 1996). Archaeological sites composed of villages with various sized structures have been identified.

The largest, and best documented, ethnographic Tongva village in the vicinity was that of *Yanga* (also known as Yaangna, Janga, and Yabit), which was in the vicinity of the downtown Los Angeles (McCawley 1996:56-57; NEA and King 2004). This village was reportedly first encountered by the Portola expedition in 1769. In 1771, Mission San Gabriel was established. Yanga provided a large number of the recruitments to this mission; however, following the founding of the Pueblo of Los Angeles in 1781, opportunities for local paid work became increasingly common, which had the result of reducing the number of Native American neophytes from the immediately surrounding area (NEA and King 2004). Mission records indicate that 179 Gabrieleno inhabitants of Yanga were recruited to San Gabriel Mission (NEA and King 2004: 104). Based on this information, Yanga may have been the most populated village in the Western Gabrieleno territory. Second in size, and less thoroughly documented, the village of Cahuenga was located slightly closer, just north of the Cahuenga Pass.

The La Brea Tar Pits area (CA-LAN-159) was a known area of Native American use for hunting and the gathering of tar (Westec 1983: 4-38). Father Juan Crespi, a member of the Portola expedition, passed through the area near this area on August 3, 1769. The pertinent sections from his translated diary are provided here (Brown 2001: 341):

> The Captain told me that when they scouted here, in a ravine about half a league to the westward they came upon about forty springs of pitch, or tar, boiling in great surges up out of the ground, and saw very large swamps of this tar, enough to have caulked many ships.

Crespi later returned north of the project API, moving southeast through the Cahuenga Pass on January 16, 1770. He identifies the two villages located on the 1938 Kirkman-Harriman historical Los Angeles map. Here he noted (Brown 2001: 663):

> The mountains make an opening on the southwest of the plain, and in a depression at the foot of it we saw a stream, or ponded up water, at which there were two villages belonging to the very good heathens of this place, who came unarmed as soon as they saw us in order to greet us, and were very happy to see us again. They brought us some gruel, and the chief of one village guided us through the aforesaid opening in the southwestern range; and we came into a small hollow, in which upon two sides we came across a good deal of water, with a good deal of small watering

places of the small hollow of *Los Santos Martires San Cleto y San Marcelino*, the Holy Martyrs Saint Cletus and Saint Marcellinus.

The Tongva subsistence economy was centered on gathering and hunting. The surrounding environment was rich and varied, and the tribe exploited mountains, foothills, valleys, deserts, riparian, estuarine, and open and rocky coastal eco-niches. Like that of most native Californians, acorns were the staple food (an established industry by the time of the early Intermediate Period). Acorns were supplemented by the roots, leaves, seeds, and fruits of a wide variety of flora (e.g., islay, cactus, yucca, sages, and agave). Fresh water and saltwater fish, shellfish, birds, reptiles, and insects, as well as large and small mammals, were also consumed (Bean and Smith 1978: 546; Kroeber 1976; McCawley 1996).

A wide variety of tools and implements were used by the Tongva to gather and collect food resources. These included the bow and arrow, traps, nets, blinds, throwing sticks and slings, spears, harpoons, and hooks. Groups residing near the ocean used oceangoing plank canoes and tule balsa canoes for fishing, travel, and trade between the mainland and the Channel Islands (McCawley 1996).

Tongva people processed food with a variety of tools, including hammer stones and anvils, mortars and pestles, manos and metates, strainers, leaching baskets and bowls, knives, bone saws, and wooden drying racks. Food was consumed from a variety of vessels. Catalina Island steatite was used to make ollas and cooking vessels (Blackburn 1963; Kroeber 1976; McCawley 1996).

At the time of Spanish contact, the basis of Tongva religious life was the Chinigchinich cult, centered on the last of a series of heroic mythological figures. Chinigchinich gave instruction on laws and institutions and also taught the people how to dance, the primary religious act for this society. He later withdrew into heaven, where he rewarded the faithful and punished those who disobeyed his laws (Kroeber 1976). The Chinigchinich religion seems to have been relatively new when the Spanish arrived. It was spreading south into the Southern Takic groups even as Christian missions were being built and may represent a mixture of native and Christian belief and practices (McCawley 1996).

Deceased Tongva were either buried or cremated, with inhumation more common on the Channel Islands and the neighboring mainland coast and cremation predominating on the remainder of the coast and in the interior (Harrington 1942; McCawley 1996). Cremation ashes have been found in archaeological contexts buried within stone bowls and in shell dishes (Ashby and Winterbourne 1966), as well as scattered among broken ground stone implements (Cleland et al. 2007). Archaeological data such as these correspond with ethnographic descriptions of an elaborate mourning ceremony that included a wide variety of offerings, including seeds, stone grinding tools, otter skins, baskets, wood tools, shell beads, bone and shell ornaments, and projectile points and knives. Offerings varied with the sex and status of the deceased (Heizer 1968; Johnston 1962; McCawley 1996). At the behest of the Spanish missionaries, cremation essentially ceased during the post-contact period (McCawley 1996).

Tataviam

Tataviam territories included the upper reaches of the Santa Clara River drainage east of Piru Creek but also encompassed the Sawmill Mountains to the north and the southwestern portion of the Antelope Valley (King and Blackburn 1978). Tataviam territory is bound by various branches of Chumash to the north and west (including the Ventureño to the west, and Castac and Emigdiano to the northwest), Kitanemuk to the northeast, Serrano to the east, and Gabrieliño to the south (King and Blackburn 1978).

Note that there is limited ethnographic data (i.e., data acquired by means of observation or taken from people who practiced native lifeways) available concerning the Tataviam and their native lifeways. Most of what is known today about the Tataviam comes in the form of ethnohistory (i.e., historical accounts developed through examination of historical records and oral histories) as presented in the works of anthropologists Alfred L. Kroeber (1915, 1925) and John P. Harrington (1935). Their data is largely based on interviews conducted in the early 1900s with a Native American consultant named Juan José Fustero, a man who spoke Kitanemuk and claimed that his grandparents were born near the town of Newhall and spoke a language that is no longer extant (Bright 1975). Most of the subsequent works published on the Tatatviam (Bright 1975; Hudson 1982; King and Blackburn 1978), including discussions of their cultural and geographic affiliations, were based on the Kroeber and Harrington interviews with Fustero and several other Kitanemuk consultants. Other studies have analyzed Spanish mission baptismal, marriage, and burial registers in an attempt to better understand the distribution of historic village settlements and kinship ties between settlements (Johnson 1978 and 1997; NEA and King 2004).

Early ethnologies referred to the Tataviam as Ataplili'ish (Kroeber 1915), but Kroeber found this name to be too general since it had already been used to describe other indigenous groups (namely the Gabrieliño). Kroeber changed the term to Alliklik (1925), which was noted to be a Ventureño Chumash name for the group (although it is believed to be a derogatory term for the sound of the language) but offered almost no information concerning their native lifeways. One account of the Tataviam, provides a narrative that they held the river up from a point between Sespe and Piru, most of Piru Creek, Castaic Creek, and probably Pastoria Creek across the mountains in the San Joaquin Valley drainage and adjacent to the Yokuts (Kroeber 1925:613-614).

The Tataviam are linguistically classified as an Uto-Aztecan Serran sub-branch of Takic speaking groups consisting of Kitanemuk, Serrano (including Vanyume), and Tataviam (Golla 2011; Sutton 1980). William Bright has suggested that Tataviam was actually a separate language with Takic affinities, or perhaps a "remnant, influenced by Takic, of a language family otherwise unknown in southern California" (Bright 1975:230). However, the current and most widely accepted view is that Tataviam is in fact a Takic language (King and Blackburn 1978; Johnson and Earle 1990; Sutton et al. 2007).

King and Blackburn (1978:536) noted several Tataviam settlements based on information provided by Harrington and other sources, including mission registers. Among these is the putative village of tsawayung (also referred to as Chaguayabit, Chaguayanga, takuyama'm), which some believe was located near Castaic Junction at the site of Rancho San Francisco. However, there is a lack of consensus as to the village's exact location. Harrington's own notes reflect this uncertainty: "Jose Juan Olivas thinks it is over by San Francisquito [Rancho San Francisco] but does not know and never did know just where" (NEA and King 2004:119). Based on diary entries from the Portolá Expedition (Perkins 1957), some have hypothesized that Estancia San Francisco de Xavier (often incorrectly referred to as an asistencia) was placed at the location of the village of tsawayang, but this is based on descriptive diary entries and has never been confirmed by archaeological or other historic evidence. In fact, no physical evidence of the village has ever been found. Other Tataviam villages mapped outside of the project area include tikatsing located on upper Castaic Creek, and pi'ing located where Castaic Creek meets Elizabeth Lake Canyon. The village of Tochonaga, was recorded on an 1843 land grant map. This site appears to be located to the southeast of Newhall, but its precise location has also never been confirmed: "Tochononga was located in the mountains northwest of San Fernando…over by Los Alamos somewhere here in the Tejon Ranch" (NEA and King 2004:117). Other villages and seasonal camp sites identified by Harrington include akure'eng, which was located at the original Newhall town site; apatsitsing, located on upper Castaic Creek; and naqava'atang, located east of Townsend Peak.

Piru Creek also contained several village and rancheria sites, located on the northern edge of Tataviam territory (Johnson and Earle 1990).

Pedro Fage's account of the 1769 Portola expedition indicates that the first Chumash settlement encountered upon leaving Tataviam territory was located west of the mouth of Piru Creek. The village of kamulus (Camulos), located east of Piru Canyon, bears a Chumash name (Johnson and Earle 1990), leading to speculation that this village consisted of a mixed Chumash-Tataviam population. There has been much discussion regarding Chumash ties to areas generally accepted as Tataviam territory (see Beeler and Klar 1977).

More recent studies have examined additional Tataviam investigations conducted by Harrington with neighboring groups (Johnson and Earle 1990). These studies support the original Kroeber and Harrington findings that the Tataviam were a distinct group:

The correspondence between (1) ancestral villages traced using genealogical evidence and (2) independently elicited information regarding Tataviam territoriality builds confidence in the reliability of the ethnographic record compiled by Kroeber and Harrington. The distinctiveness of the Tataviam as an ethnic entity, separate from the Kitanemuk and Fernandeño, is supported by our research (Johnson and Earle 1990:209).

In 1996, as the result of a Caltrans District 7 highway widening project for SR-126, archaeologists discovered and excavated 45 burials from CA-LAN-2233, a prehistoric village site dating from approximately 2000 to 1640 years before present (BP) and located within Tataviam territory. Examination of mitochondrial DNA (mtDNA) from five burials at CA-LAN-2233 found that these individuals were genetically linked to modern Uto-Aztecan speaking groups, such as the Tataviam (Miller et al. 2003).

3.2.3 Historic Period Overview

Post-contact history for the State of California is generally divided into three periods: the Spanish Period (1769-1821), Mexican Period (1821–1848), and American Period (1846–present). Although Spanish, Russian, and British explorers visited the area for brief periods between 1529 and 1769, the Spanish Period in California begins with the establishment in 1769 of a settlement at San Diego and the founding of Mission San Diego de Alcalá, the first of 21 missions constructed between 1769 and 1823. Independence from Spain in 1821 marks the beginning of the Mexican Period, and the signing of the Treaty of Guadalupe Hidalgo in 1848, ending the Mexican-American War, signals the beginning of the American Period when California became a territory of the United States.

Spanish Period (1769–1822)

Spanish explorers made sailing expeditions along the coast of Southern California between the mid-1500s and mid-1700s. In search of the legendary Northwest Passage, Juan Rodríquez Cabrílllo stopped in 1542 at present-day San Diego Bay. With his crew, Cabrílllo explored the shorelines of present Catalina Island, as well as San Pedro and Santa Monica Bays. Much of the present California and Oregon coastline was mapped and recorded in the next half-century by Spanish naval officer Sebastián Vizcaíno. Vizcaíno's crew also landed on Santa Catalina Island and at San Pedro and Santa Monica Bays, giving each location its long-standing name. The Spanish crown laid claim to California based on the surveys conducted by Cabrílllo and Vizcaíno (Bancroft 1885; Cleland 2005; Gumprecht 2001).

More than 200 years passed before Spain began the colonization and inland exploration of Alta California. The 1769 overland expedition by Captain Gaspar de Portolá marks the beginning of California's Historic Period, occurring just after the King of Spain installed the Franciscan Order to direct religious and colonization matters in assigned territories of the Americas. With a band of 64 soldiers, missionaries, Baja (lower) California Native Americans, and Mexican civilians, Portolá established the Presidio of San Diego, a fortified military outpost, as the first Spanish settlement in Alta California. In July of 1769, while Portolá was exploring Southern California, Franciscan Fr. Junípero Serra founded Mission San Diego de Alcalá at Presidio Hill, the first of the 21 missions that would be established in Alta California by the Spanish and the Franciscan Order between 1769 and 1823, including Mission San Fernando Rey de España (Cleland 2005; Gumprecht 2001; Jorgensen 1982; Kyle 2002; Roderick 2001).

The Portolá expedition first reached the present-day boundaries of Los Angeles in August 1769, thereby becoming the first Europeans to visit the area. Father Crespi named "the campsite by the river Nuestra Señora la Reina de los Angeles de la Porciúncula" or "Our Lady the Queen of the Angeles of the Porciúncula." Two years later, Friar Junípero Serra returned to the valley to establish a Catholic mission, the Mission San Gabriel Arcángel, on September 8, 1771 (Gumprecht 2001; Jorgensen 1982; Kyle 2002).

The expedition camped at a watering place at the base of the San Gabriel Mountains in 1769 and the location was noted in Crespi's diary. The mission was founded in September 1797 by Father Fermín Lasuén and Fray Francisco Dumetz. The mission consisted of a church, fountains, cloisters, and extensive agricultural grounds outside the area. The Spanish missionaries impressed the native Tongva, Tatavium, and Chumash tribes into Christianity through baptism and service as neophytes. The land taken by the Spanish was not repatriated to these tribes (Cleland 2005; Roderick 2001).

Mexican Period (1822–1848)

A major emphasis during the Spanish Period in California was the construction of missions and associated ranchos and presidios to integrate the Native American population into Christianity and communal enterprise. Incentives were also provided to bring settlers to pueblos or towns, but just three pueblos were established during the Spanish Period, only two of which were successful and remain as California cities (San José and Los Angeles). Several factors kept growth within Alta California to a minimum, including the threat of foreign invasion, political dissatisfaction, and unrest among the indigenous population. After more than a decade of intermittent rebellion and warfare, New Spain (Mexico and the California territory) won independence from Spain in 1821. In 1822, the Mexican legislative body in California ended isolationist policies designed to protect the Spanish monopoly on trade and decreed California ports open to foreign merchants (Cleland 2005; Dallas 1955).

Extensive land grants were established in the interior during the Mexican Period, in part to increase the population inland from the more settled coastal areas where the Spanish had first concentrated their colonization efforts. The secularization of the missions following Mexico's independence from Spain resulted in the subdivision of former mission lands and establishment of many additional ranchos.

During the supremacy of the ranchos (1834–1848), landowners largely focused on the cattle industry and devoted large tracts to grazing. Cattle hides became a primary Southern California export, providing a commodity to trade for goods from the east and other areas in the United States and Mexico. The number of non-native inhabitants increased during this period because of the influx of explorers, trappers, and ranchers associated with the land

grants. The rising California population contributed to the introduction and rise of diseases foreign to the Native American population, who had no associated immunities.

American Period (1848–Present)

War in 1846 between Mexico and the United States precipitated the Battle of Chino, a clash between resident Californios and Americans in the San Bernardino area. The Mexican–American War ended with the Treaty of Guadalupe Hidalgo in 1848, ushering California into its American Period.

California officially became a state with the Compromise of 1850, which also designated Utah and New Mexico (with present-day Arizona) as U.S. Territories (Waugh 2003). Horticulture and livestock, based primarily on cattle as the currency and staple of the rancho system, continued to dominate the Southern California economy through 1850s. The Gold Rush began in 1848, and with the influx of people seeking gold, cattle were no longer desired mainly for their hides but also as a source of meat and other goods. During the 1850s cattle boom, rancho vaqueros drove large herds from Southern to Northern California to feed that region's burgeoning mining and commercial boom. Cattle were at first driven along major trails or roads such as the Gila Trail or Southern Overland Trail, then were transported by trains when available. The cattle boom ended for Southern California as neighbor states and territories drove herds to Northern California at reduced prices. Operation of the huge ranchos became increasingly difficult, and droughts severely reduced their productivity (Cleland 2005).

3.3 Historic Context

Dudek provides the following historical overview to better understand the context of any of the identified previously recorded or newly documented historic era-built environment resources in the API. This context provides an overview of the historic themes and the property types that were documented as part of this study.

3.3.1 City of Los Angeles

In 1781, a group of 11 Mexican families traveled from Mission San Gabriel Arcángel to establish a new pueblo called El Pueblo de la Reyna de Los Angeles (the Pueblo of the Queen of the Angels). This settlement consisted of a small group of adobe-brick houses and streets and would eventually be known as the Ciudad de Los Angeles (City of Angels), which incorporated on April 4, 1850, only 2 years after the Mexican–American War and 5 months prior to California achieving statehood. Settlement of the Los Angeles region continued in the early American Period. The County of Los Angeles was established on February 18, 1850, one of 27 counties established in the months prior to California acquiring official statehood in the United States. Many of the ranchos in the area now known as Los Angeles County remained intact after the United States took possession of California; however, a severe drought in the 1860s resulted in many of the ranchos being sold or otherwise acquired by Americans. Most of these ranchos were subdivided into agricultural parcels or towns (Dumke 1944: 3–6). Nonetheless, ranching retained its importance, and by the late 1860s, Los Angeles was one of the top dairy production centers in the country (Dumke 1944: 14–15). By 1876, Los Angeles County reportedly had a population of 30,000 people (Dumke 1944: 7).

Los Angeles maintained its role as a regional business center and the development of citriculture in the late 1800s and early 1900s further strengthened this status. These factors, combined with the expansion of port facilities and railroads throughout the region, contributed to the impact of the real estate boom of the 1880s on Los Angeles (Pitt 2024; Dumke 1944: 41-43). Likewise, government leaders recognized the need for water to sustain the growing

population in the Los Angeles area. Irish immigrant William Mulholland personified the city's efforts for a stable water supply (Survey LA 2016: 2). By 1913, the City of Los Angeles had purchased large tracts of land in the Owens Valley, and Mulholland planned and completed the construction of the 240-mile aqueduct that brought the valley's water to the city. Access to water resulted in a population boom during the 1920s that saw an increase from 102,479 residents in 1900 to 576,673 by 1920. Much of the county transformed from ranches and farms into residential subdivisions surrounding commercial and industrial centers. Hollywood's development into the entertainment capital of the world and Southern California's booming aerospace and oil industries were key factors in the county's growth in the twentieth century (Pitt 2024; Los Angeles Almanac 2020).

Although the Great Depression in the 1930s initially led to a decline in employment rates in the city, the 1932 Summer Olympic Games held in Los Angeles helped to boost the economy with the influx of tourism. Additionally, the film and aerospace industries continued to thrive as Los Angeles became a hub for the production of airplanes for Britain and France during the onset of World War II. By the mid-1930s, Hollywood was host to a variety of celebrity-frequented nightclubs that epitomized the glamour and star power of the city. Despite federal prohibition laws (which were not repealed until 1933), drinking and gambling persisted in all the well-known clubs. The onset of World War II marked an end to the extravagant Hollywood lifestyle in the 1940s as rising production costs resulted in fewer films being produced (Pitt 2024; ARG 2008: 14–19). However, wartime employment in aircraft factories and shipyards increased, leading to a population rise that reached 1,504,277 residents in 1940. Likewise, thousands of service members passed through Los Angeles on their way to and from the war. In response to the rise in emigration to the city, developers built approximately 23,000 tract homes on previously agricultural properties surrounding the city throughout the 1940s and 1950s (Pitt 2024; Los Angeles Almanac 2020).

After World War II, a massive wave of migration and building boom occurred throughout California. Los Angeles continued to expand west. With the advent of the state and federal highway systems during the 1950s and 1960s, automobiles allowed travelers to take themselves to places that were only previously accessible by railroads. The highway system encouraged tourism which propelled the city's economy and spurred growth in the surrounding areas. This growth is reflected in the city's present-day built environment that includes sprawling postwar suburbs characterized by concentrations of single-family residences with distinctive planning features such as street alignments, setbacks, curbs, sidewalks, and landscaping (Caltrans 2011: 17-18; Survey LA 2021: 153). The population of Los Angeles reached 2,816,061 residents by 1960 and grew to 3,485,567 residents by 1990 as the city continued to expand during the last half of the twentieth century (Los Angeles Almanac 2020).

During the early 2000s, Los Angeles' downtown was revitalized. City Hall underwent historic restoration and earthquake retrofitting, the area along Grand Avenue was renovated, and new buildings such as the Walt Disney Concert Hall and the Los Angeles Cathedral were constructed (Pitt 2024). The economy continues to be supported by film and tourist industries, with the majority of jobs in the city related to management occupations (Data USA 2024).

3.3.1.1 Sun Valley

In 2015, the City of Los Angeles Department of City Planning, Office of Historic Preservation, hired Historic Resources Group to complete a Historic Resources Survey Report for the Sun Valley-La Tuna Canyon Community Plan Area (Exhibit 1). This report includes information on the historical development of the plan area where the API is located. Relevant sections of the Historic Resources Survey Report are reproduced below.

During the late 1800s, the Southern Pacific Railroad laid tracks to the north through the area, and a water tank was situated at what is now the corner of Sunland Boulevard and San Fernando Road. A small settlement grew up around this area, which was eventually dubbed "Roberts" after the Roberts General Store, the only business in town at the time. However, by the turn of the century the community of Roberts had become known instead as "Roscoe." At the time, the area was classified as one of the five healthiest places in the United States to live, and with the increased accessibility of the railroad, parcels of land in the area were being sold off to families coming to the area. By 1905, there were seven families residing in Roscoe. Extant resources from this period are rare, and only a few early residences remain today; examples include two Victorian vernacular cottages, located at 10149 Wealtha Street (1895), and at 8016 Fair Avenue (1905) (HRG 2015: 6).

Despite the area's relatively early settlement, development activity was limited throughout the 1910s. While the establishment of Roscoe School in 1917 signaled an expansion of the community, development efforts were focused on expanding industry in the area. During this period there were several factors that contributed to the development of Sun Valley, as the community would later be called. Perhaps the most critical was the opening of California State Route 99 around 1915, which was then the main highway between Los Angeles and Bakersfield. A Roscoe family boasted owning the first-ever gas pump along the highway. Increased access to the area also benefitted local industry; rock quarries in and around the nearby Tujunga Wash had recently been established in 1909. Over time, the presence of the quarries has had a marked effect on the landscape of Sun Valley and has led to the development of a number of industrial operations, many of which focus on waste management and landfill operations. One such example was the expansive Bradley Landfill, which had remained in operation for over fifty years before closing in 2007. At the time of its closure, it was noted that Sun Valley was home to over thirty landfills and quarries (HRG 2015: 6-7).

As industry in the area expanded, so did the accompanying infrastructure. Los Angeles city planner George Gordon Whitnall spearheaded a campaign to construct four "highways" that would radiate from the San Fernando Valley into arteries leading to the city. These parkway/highways were more modest in design than the modern freeway, and often featured a landscaped center strip separating opposing lanes of traffic. The most ambitious of these parkways was to be Whitnall Highway, which would stretch diagonally southeast by northwest from Newhall in the Santa Clarita Valley, through the San Fernando Valley, and meet up with the entrance of a two-mile tunnel originating off Riverside Drive that would run under Griffith Park into Hollywood. A key component of the project was the installation of power lines along the parkway, which were already installed by the time the first portion of the Whitnall Highway opened in June 1927. Although the project eventually stalled over issues of eminent domain and was abandoned entirely by the mid-1930s, the power lines – as well as the land already acquired by the City in preparation for the project – remained. Today, the area is known as the Whitnall Highway Power Corridor (HRG 2015: 7).

Residential development also flourished throughout the 1920s. Perhaps the most prominent example is the Stonehurst neighborhood, which is a designated Historic Preservation Overlay Zone. Stonehurst is composed of 92 homes built between 1923 and 1925 by Dan Montelongo, a local artisan and stonemason, using stone from the nearby washes and the foothills of the Tujunga

Valley. The neighborhood boasts the highest concentration of homes utilizing native river rock as a primary building material anywhere in the city. Many of these homes were designed in a "Stonemason Vernacular" style that is a derivative of Craftsman architecture. Arroyo river rock was a popular construction material in the Sun Valley area, and there are several extant examples of Arroyo stone residences constructed during this period, as well as some wood-frame houses which exhibit Arroyo stone features (HRG 2015: 7).

As the 1930s progressed through the Great Depression, development on the whole languished. Commercial and industrial activity in the area was limited, with the exception of the Dundee Egg Farms, which was opened in Sun Valley in 1931. The Dundee Egg Farms had been in operation for over a decade before moving to this location and establishing a storefront, complete with a cast stone egg over the door. A two-story warehouse building was added in 1964 (HRG 2015: 7-8).

The 1930s also saw the establishment of one of the San Fernando Valley's most iconic resources. The Hansen Ranch became a Los Angeles County park and recreation area in 1931. The lodge, which was originally built as the ranch house for the Hansen family, was turned into a public clubhouse for parties and meetings. New recreational facilities included two tennis courts, a swimming pool, playground, picnic tables, and camping areas. Construction subsequently commenced on the Hansen Dam in 1938, and was completed in 1940. The dam served as an important barrier which protected the eastern Valley from flooding from the nearby Tujunga Wash. Today, the park is known as the Hansen Dam Recreation Area, a portion of which lies within the boundaries of the Survey Area. Also during this period, improvements were made to area infrastructure, including the construction of the concrete Tujunga Wash Bridge in 1935, which carried San Fernando Road over the wash (HRG 2015: 8).

As building activity ground to a halt during World War II, the character of Sun Valley remained largely rural in nature, and residents continued to embrace the rustic lifestyle. Many residential properties were not only zoned for equestrian use, but were specifically designed for horses to be maintained on the property, and bridle trails were a prominent feature of the local landscape. Beginning in the 1940s, however, Sun Valley's identity began to evolve away from that of a primarily agricultural community as defense workers – and later, returning servicemen – began to flock to the San Fernando Valley. The airport in nearby Burbank had opened as the Union Airport in 1930, but was known as the Lockheed Air Terminal following the company's purchase of the facility in 1940. Not only did the airport continue serving commercial air traffic throughout World War II, but it also supported the Lockheed Corporation's wartime manufacturing efforts. The company's Vega factory was sited directly adjacent to the airport and became a critical proving ground for the development and testing of new fighter jets and military transport plants. Unlike other manufacturers who had found success producing materials for the war effort, Lockheed was also able to transition successfully to a critical role in the postwar economy through their development of passenger jets for civilian air travel, as well as their work developing transport and stealth technology aircraft during the Cold War era. Their flexibility ensured the continued success of the company, and Lockheed dominated the local economy throughout the middle part of the century (HRG 2015: 8).

With the influx of new residents in the 1940s, building activity in Sun Valley was concentrated not only on housing, but also on developing institutions to meet the demands of the growing

community. Examples include Fire Station No. 77, which was constructed in 1941. During the early years of the decade, some construction still reflected Sun Valley's agricultural past, such as the Our Lady of Zapopan Chapel, which was built in 1942 to serve Latino farm workers in Sun Valley. A number of schools were also constructed in Sun Valley to accommodate the growing young families who were relocating to the area. Perhaps the earliest examples of this trend are the Roscoe Elementary School building, constructed in 1939. Other intact examples include Sun Valley Middle School (1950), the Charles LeRoy Lowman Special Education Center (1950), Saticoy Elementary School (1955), and John H. Francis Polytechnic High School (1956). A Sun Valley branch of the U.S. Post Office was completed in 1960. And in 1964, Our Lady of the Holy Rosary parish dedicated a new Modern church designed by Thomas V. Merchant, exemplifying the area's increasing urbanization (HRG 2015: 8-9).

Neighborhood commercial centers also grew in importance as the "bedroom communities" of the San Fernando Valley expanded. Local establishments included the Pink Motel and Cadillac Jack's, developed between 1947 and 1959, the Lankershim Theater (1955), and the Googie-style Jimmy's Burgers (1965). Big Jim's Family Restaurant came along in the 1970s with themed décor that harkened back to the area's rural past. Its unique neon sign featuring a cowgirl atop a galloping horse still lights up nightly (HRG 2015: 9).

With the expansion of population, commerce, and industry in the postwar era, infrastructure became a major concern both during the 1940s and in the years following World War II. Communications services were improved and extended throughout the San Fernando Valley. Extant examples reflecting this growth include the Southern California Telephone Company Dial Office (1940), as well as a second building for the Southern California Telephone Company, which was constructed two years later, and the Pacific Telephone & Telegraph Company building (1950). Later improvements concentrated on the distribution of water and electrical power to the thousands of new residents in the area. Resources constructed during this period include the Valley Generating Station, constructed between 1951 and 1957; the Department of Water & Power East Valley District Headquarters (1956); and the Metropolitan Water District Treatment Plant (1963). As the automobile exploded in popularity during the midcentury years, many resources were also designed with motorists in mind. Local examples include PJ's Automotive service station (1948), The Dairy Store drive-through dairy (1951), and the El Michoacano food stand (1960) (HRG 2015: 9).

The physical landscape of Sun Valley evolved during the postwar period as well. As large-scale residential developments were constructed, the vernacular landscape was replaced by designed landscape elements to accompany site-built homes and residential subdivisions. One extant example of such landscaping efforts is the Cartwright Avenue street trees, a unique collection of mature Aleppo pine trees along two blocks of Cartwright Avenue. The trees appear to have been planted about the time of the residential development on these blocks in the early- to mid-1940s. Today, they are a prominent visual landmark in the area, and create a distinctive feel in the neighborhood. In 1966, the Theodore Payne Foundation for Wild Flowers and Native Plants was established on a 20-acres site donated by Eddie Merrill, a colleague and friend of Payne. Payne was an English horticulturalist, landscape designer, and botanist who is best known for his dedication to the preservation of California's native flora. The Foundation was established to carry on Payne's life's work (HRG 2015: 9-10).

Building activity in Sun Valley continued throughout the 1970s; while construction from this period reflects more recent architectural trends and styles, several distinctive examples of institutional and commercial development are worth noting. The Wat Thai Temple and Theravada Buddhist Center, constructed in 1976, stands as a rare and unique example of East Asian Eclectic religious architecture in Sun Valley. It is the only Buddhist temple in the United States designed in a Thai architectural style. The original plans were drawn up by the Thai Department of Religious Affairs and revised by a local architect to meet building codes. The center serves approximately 40,000 Thai Americans living in Los Angeles, and is the main gathering place for festivals, religious services, and cultural events within the city, drawing thousands of Thai people from throughout Southern California and beyond (HRG 2015: 10).

Exhibit 1. Sun Valley-La Tuna Canyon Community Plan Area boundaries.



Source: HRG 2015: 4

3.3.2 Development of Municipal Water Infrastructure

The following historic context provides an overview of the development of municipal water infrastructure in the United States and California in order to assess the potential significance of the Cantara Trunk Line within the larger LADWP Trunk Line System.

Water management infrastructure can be traced back more than 2,000 years to the Roman Empire in the form of aqueducts spanning Europe to connect water resources from rural areas to city centers. The first public drinking water-supply system in the United States was established in Boston, Massachusetts, in 1652. A "Water Works Company" was created to build a reservoir and canals to provide water for domestic use. The water was collected from local springs and stored in a 12-foot-square wooden reservoir. However, the city primarily depended on water supplied from underground wells. Further pioneering water systems involving reservoirs and canals were developed in Schaefferstown, Pennsylvania, in 1764; Providence, Rhode Island, in 1772; Salem, Massachusetts, in 1796;

Hartford, Connecticut, in 1797; Geneva, New York, in 1797; Worcester, Massachusetts, in 1798; Portsmouth, New Hampshire, in 1798; New York, New York, in 1799; Philadelphia, Pennsylvania, in 1799; Bethlehem, Pennsylvania, in 1799; and Lynchburg, Virginia, in 1799. Throughout the seventeenth to nineteenth centuries, drinking water was taken directly from creeks and rivers with no treatment before the water was distributed with pumps to local properties. Therefore, waterborne germs caused typhoid and cholera outbreaks until the danger of using untreated water was realized in the early 1900s (LaNier 1976: 174).

Early trunk line systems were developed during the late 1800s in an attempt to safely carry drinking water. In the 1860s, riveted pipes made of metal such as lead, tin, brass, and CI were common for early trunk line systems. However, studies showed that iron pipes had the least amount of chemical growth and were the best conduit for water conveyance. The first large, riveted pipe in California was developed in San Francisco in 1868. The line consisted of 30-inch-diameter CI pipes extending 15 miles. During the 1870s, early riveted-iron trunk lines in Rochester, New York, were 24 inches in diameter and constructed from wrought-iron or CI pipes. These lines had the capacity to transfer about 9,000,000 gallons of water per day. By 1890, hydraulic engineers developed the Newark Line in New York, consisting of 48-inch riveted-pipe lines designed to carry 50,000,000 gallons of water per day. The capacity of riveted pipes increased through the 1890s to meet the demands of growing urban areas (Scobey 1930:13-15).

The 1900s became known as the “New Era” for technological advancements in water system engineering that resulted in the expansion of systems throughout the country. The increasing demand for safe drinking water throughout the country resulted in the development of several early long-range water systems, including the Owens Valley River Project in Los Angeles and the Catskill-Delaware system in New York City, which doubled the city’s water supply when it was completed. Construction of the first stage of the Catskill system began in 1907 and included an extensive steel pipe system that was completed in 1917 and later expanded by 1927. These long-range water systems in Los Angeles and New York both included aqueducts and reservoirs to create a gravity system to carry water from long distances to city centers. Trunk line systems with steel pipes connected to reservoirs and aqueducts were constructed in surrounding areas to distribute drinking water to communities through main lines. (LaNier 1976: 178). The system in Los Angeles was developed with 16 storage reservoirs throughout the city, with a year-round water supply to support the growth of the city. The reservoirs ensured that there was always readily available water in case the aqueduct or other portions of the system failed. The system allowed Los Angeles to expand after World War II, with a reliable water system already in place (AECOM 2023: 21-22).

As technology for water conveyance systems improved, so did the quality of the water. After scientific research during the late 1800s discovered harmful algae and bacteria in public water supplies, chlorine was added to drinking water to disinfect water supplies. Chlorination was found to reduce waterborne diseases from 75 to 100 deaths per year per 100,000 people in 1880 to less than 0.1 deaths per 100,000 people annually in 1950. Likewise, in 1904, copper sulfate and algicide were added to water to improve taste and odor control, and by 1924, activated carbon was added as a filter to better clean drinking water. Activated carbon was so successful that by 1930, it was used in over 1,200 water treatment plants across the nation (LaNier 1976: 177). Additionally, pipelines were improved during the 1920s and 1930s to carry water farther. For example, in 1926, a full-welded steel pipe was laid from Alpine Dam in Marin County, California, consisting of 18,400 feet of 14-foot single-plate steel sections butt-welded on a straight seam that is 16 inches in diameter. J.S. Peters, Chief Engineer of the district, conducted flow tests showing that welded pipes generally provide stronger, leak-proof pipes compared to riveted pipes (Scobey 1930: 75).

Public water systems reached their maturity by 1950, with over 17,000 urban water systems equipped with treatment techniques, rapid filtration, and chlorination across the nation. Technological advancements over the years have almost eradicated waterborne diseases and expanded the availability of inexpensive potable water. As of 1976, there were over 582 million linear feet of pipelines that have been installed for water conveyance throughout the nation. More than 70% of the water supply systems in the country are publicly owned, with over 37 billion gallons of water consumed a day (LaNier 1976: 173-180).

3.3.2.1 Los Angeles Department of Water and Power and the Development of Municipal Water in Los Angeles

Municipal water was first supplied to Los Angeles by a system of ditches branching from the Los Angeles River. After the City was incorporated in 1850, a water tank was constructed by the Los Angeles Water Works to supply drinking water to the City. However, the tank failed in 1858, and it was not until 1868 that Los Angeles developed a water conveyance system similar to those previously developed on the East Coast during the late 1700s. The privately owned Los Angeles City Water Company was granted exclusive rights for the construction of a water system in the City. By 1878, the system included over 300 miles of water mains, six reservoirs, infiltration galleries, and pumping plants. The company was acquired by the City of Los Angeles in 1902 and formed the City's first municipal water system under the Los Angeles Water Department (a predecessor to LADWP). During this period, the department sought to expand the existing water storage system with the construction of new reservoirs that were supplied by the Los Angeles River (AECOM 2023: 18).

In 1902, the City contained about 120,000 residents with 23,180 customers served by 337 miles of underground water mains supplying drinking water from six reservoirs, and 676 fire hydrants. William Mulholland was the superintendent of the Los Angeles Water Department and sought to improve the storage capacity of the City's water supply. The department constructed the Ivanhoe Reservoir in 1906 and the Silver Lake Reservoir in 1907 to increase the intake of the Los Angeles River. Construction of the Silver Lake Reservoir attracted nationwide attention after it was constructed using methods from the Gatun Dam in the Panama Canal Zone. Water was stored in these reservoirs, and pumps were used to distribute water through trunk lines and distribution lines. However, Mulholland is best known for leading the construction of the Los Angeles Owens River Aqueduct (now known as the First Los Angeles Aqueduct) and is considered pioneering water management infrastructure.[4] It was innovative in its use of steel pipes and concrete conduits stretching over 233 miles from the Owens River to Los Angeles; this aqueduct brought water from a distant source to supply drinking water to a growing City and made it possible for the Los Angeles area to grow into California's largest city (Survey LA 2017: 3–8; LADWP 2024; Brookshear and Hickman 2016: 3).

On November 5, 1913, the First Los Angeles Aqueduct's opening day was held, and water from Owens Valley poured over the First Los Angeles Aqueduct Cascades north of Sylmar where water is conveyed from the aqueduct across the eastern Sierra Neveda Mountains. From the Cascades, several water mains were proposed to carry aqueduct water to Los Angeles via trunk lines that extended through the Santa Monica Mountains. In 1912, Mulholland published the annual water report discussing how water from the First Los Angeles Aqueduct might be distributed throughout the City, should all surrounding communities and districts buy into the Los Angeles water system. The City, in preparation for aqueduct water, built its own pipelines as far north as Beverly Hills. Between 1912 and 1913, the City purchased 11,690 tons of CI pipe to expand the municipal water system to connect to the aqueduct.

[4] LADWP constructed a second aqueduct between 1967 through 1972 (also known as the Second Los Angeles Aqueduct) and an extension of the original structure.

By July 1913, the City had constructed over 586 miles of 4-inch-diameter CI lateral water mains to deliver water from the aqueduct. Likewise, the City developed an underground trunk line system with over 46 miles of pipeline laid primarily in the City of Los Angeles and the San Fernando Valley area of Los Angeles between 1909 and 1914 to connect to the main lines supplying water from the First Los Angeles Aqueduct. The underground trunk line system included storage and distribution reservoirs, trunk lines, water mains, distribution lines, and pumping stations that deliver water between larger lines, tanks, and reservoirs to smaller water mains (AECOM 2023: 19-20).

Although the completion of the aqueduct and municipal water system provided water to the majority of the City, the surrounding areas continued to primarily rely on water from the Los Angeles River. To accommodate the growth of the City during the 1930s, additional trunk lines were constructed by 1932 to decentralize the trunk line system and reach newly developed communities, such as South Los Angeles. Trunk lines constructed in the subsequent decades continued to support the population boom of the mid-twentieth century as the City expanded (AECOM 2023: 21–22).

By 1940, almost half of the City's trunk lines had been installed, with about 300 miles of trunk lines. To accommodate further growth of the City, LADWP initiated a 6-year survey of 50,000 miles of desert for the development of the Colorado River Aqueduct, which was completed by 1941. A total of 13 cities in Southern California, including Los Angeles, formed the Metropolitan Water District (MWD) to distribute water from the Colorado River Aqueduct throughout Southern California to support the population increase of the area (LADWP 2024).

As the population of Los Angeles increased throughout the rest of the twentieth century, so did the demand for water. LADWP implemented projects with other agencies and stakeholders to augment water supplies throughout the City. Imported water supplies were incorporated into the local water supply. Recycled water from stormwater drains and rain barrels is captured and used for the irrigation of golf courses, parks, freeway medians, large landscaped areas, and industrial processes such as power plant cooling towers. Additionally, LADWP relies on water supplied by the MWD from the Colorado River. Presently, LADWP is the largest municipal utility in the nation, providing an average of 450 million gallons of water per day to over 4 million residents in Los Angeles (LADWP 2024). As of 2015, about 500 miles of trunk lines constructed between 1910 and the 1960s distributed water throughout the City. Trunk lines constructed between 1910 and 1919 consist of about 10% of the total system, with the majority constructed between 1930–1939 and 1950–1959 (AECOM 2023: 22).

Designated resources associated with LADWP in Los Angeles include:

- **1906:** Ivanhoe and Silver Lake Reservoirs (L.A. HCM No. 422)
- **1907:** Garvanza Pumping Station and Site of the Highland Reservoir (L.A. HCM No. 412)
- **1913:** First Los Angeles Aqueduct Cascade in Sylmar (L.A. HCM No. 742; California State Landmark No. 653)
- **1924:** Mulholland Dam and Hollywood Reservoir (L.A. HCM No. 421)
- **C. 1937:** Lincoln Heights Water and Power Building (L.A. HCM No. 384)
- **1940:** William Mulholland Memorial Fountain (L.A. HCM No. 162)
- **1964:** LADWP General Office Building (L.A. HCM No. 1022)

3.3.3 Development of the Cantara Trunk Line in the Area of Potential Impacts

After the completion of the First Los Angeles Aqueduct in 1913, the Los Angeles Water Department developed a trunk line system with over 46 miles of pipeline between 1909 and 1914 to expand water supply to the City. The Cantara Trunk Line was constructed in 1917 as an expansion of this original system during a time of increased development in the Sun Valley community. Originally called the Glendale Trunk Line, it consisted of approximately 17,500 feet of concrete, riveted-steel pipes that connected to the City Trunk Line (constructed c. 1914) at the intersection of Coldwater Canyon Avenue. The Cantara Trunk Line extended southeast to San Fernando Road, approximately 1,800 feet south of Strathern Street. The Los Angeles Reservoir supplied the City Trunk Line, which transmitted potable water from the San Fernando Valley to Sun Valley after the construction of the Glendale Trunk Line (LADWP 2025). Archival research was unable to determine when the name of the trunk line was changed to the Cantara Trunk Line. During the 1960s, various portions of the line were abandoned and replaced with welded-steel pipe segments including the replacement of approximately 2,210 feet of the original pipeline along San Fernando Road between Wheatland Avenue and Arvilla Avenue in 1960; the installation of approximately 3,120 feet of pipeline along Strathern Steet between Irvine Avenue and Fair Avenue in 1961; the installation of approximately 1,330 feet of pipeline along Fair Avenue between Cantara Street and Strathern Street in 1961; the abandonment of approximately 3,150 feet of pipeline along Cantara Street between Irvine Avenue and Fair Avenue c. 1965; the installation of approximately 1,330 feet of pipeline along Irvine Avenue between Cantara Street and Strathern Street c. 1965; and the installation of approximately 1,700 feet of pipeline along Cantara Street between Coldwater Avenue and Potter Avenue c. 1960s (LADWP 2025: VNNVGS 1966: 102).

In 2007, the Cantara Trunk Line was connected to the new City Trunk Line South at the intersection of Coldwater Canyon Avenue and Cantara Street. The City Trunk Line South (installed c. 2007) was connected to both the Los Angeles Reservoir and the Van Norman Bypass Reservoir and provides drinking water from both reservoirs to the Cantara Trunk Line (LADWP 2025). In January 2007, the trunk line ruptured along the 12000 block of Cantara Street in Sun Valley due to abnormally cold weather. The rupture caused a 40-foot-long and 8-foot-deep sinkhole that flooded homes in the area and led to 200 reported leaks in the system. The leaks were repaired with steel clamps (Uranga 2007).

The present Cantara Trunk Line consists of approximately 26,990 feet of riveted-steel and welded-steel pipe segments located within Cantara Street, extending from Coldwater Canyon Avenue to San Fernando Road in Sun Valley, Los Angeles. The remaining 51% of the original 1917 line is comprised of about 13,900 feet of riveted-steel pipe segments along Cantara Street between Coldwater Canyon Avenue and Irvine Avenue, and between Fair Avenue and San Fernando Road, where it continues southeast along San Fernando Road to Ferncola Avenue where the line terminates (LADWP 2025).

3.3.3.1 Typology: Water Supply Infrastructure

The *Los Angeles Citywide Historic Context Statement: Public and Private Institutional Development, 1850-1980: Municipal Infrastructure and Services, 1900-1980*, Municipal Water and Power, 1902-1980, published in 2017,

includes a historical overview of the development of reservoirs, dams, and water supply infrastructure. This overview is excerpted below to provide sufficient context through which to evaluate the Cantara Trunk Line:

> Reservoirs, Dams, and Water Supply Infrastructure can best be divided into three groups, based on chronology. The first includes those that date from before the completion of the First Los Angeles Aqueduct in 1913. The second is made up of those built between 1913 and the coming of the Second World War in 1941. The third consists of resources that date from after the end of the war in 1945 (Survey LA 2017: 25).
>
> There are two designated resources that date from the first period, between 1902 and 1913. The first is the storage complex known as the Ivanhoe and Silver Lake Reservoirs (L.A. Historic-Cultural Monument No. 422). The City had acquired a portion of the land for these projects in the 1880s and obtained the rest through condemnation in 1904. The Ivanhoe, placed in service in 1906, is the smaller portion at the north end of the complex and was originally covered by a timber roof when completed (Survey LA 2017: 25).
>
> The much larger Silver Lake Reservoir, directly to the south, was completed one year later, in 1907. From the beginning, unlike the covered Ivanhoe, Silver Lake was intended to be a scenic amenity for its neighborhood. It was left unfenced, surrounded by landscaping and stocked with black bass (Survey LA 2017: 25).
>
> The second designated resource is the Garvanza Pumping Station and Site of the Highland Reservoir (L.A. Historic-Cultural Monument No. 412). The reservoir, now replaced by a tank, appears to have dated from the 1880s and was inherited by the City in 1902. The Department of Water constructed a pump house in 1907, which is still intact. It is a spare classical form, with a strong continuous cornice and side pilasters. Notable are the stepped gable ends featuring circular openings (Survey LA 2017: 26).
>
> The Garvanza Station may well have been based on a standard design. There is an extant pump house at 1022 Eubank Avenue in Wilmington that appears to be identical. It dates from 1910. Its origins are obscure, but most likely it was constructed to house pumps that drew water from an existing well on the site. Wilmington had been an independent city with a privately owned water system up until its consolidation with Los Angeles in 1909 (Survey LA 2017: 26).
>
> Resources relating to the second period of construction, from the opening of the aqueduct in 1913 to the beginning of the Second World War in 1941, consist of the aqueduct itself and facilities that stored and distributed water delivered by the aqueduct. There are many significant structures associated with the aqueduct, but most are located outside the city limits. Of those within the limits the most impressive is the First Los Angeles Aqueduct Cascade in Sylmar (L.A. Historic-Cultural Monument No. 742). Built at the base of the aqueduct was the lower San Fernando Reservoir (also called the lower Van Norman Reservoir). Soon thereafter came a number of reservoirs designed to serve specific areas. The first was the Chatsworth Reservoir in 1919, followed between 1921 and 1929 by the upper San Fernando or Van Norman (now part of the Los Angeles Reservoir), Stone Canyon, Encino, and Hollywood Reservoirs (Survey LA 2017: 26-27).

Of these 1920s projects the most significant extant resource is the Mulholland Dam and Hollywood Reservoir (L.A. Historic-Cultural Monument No. 421). They are located in Weid Canyon, just to the east of Cahuenga Pass in the hills above Hollywood. The dam is a concrete-arched gravity design constructed between August of 1923 and December of 1924, under the direct supervision of William Mulholland. It was connected to both the aqueduct and to the wells in the San Fernando Valley (Survey LA 2017: 27).

The design of the Mulholland Dam was similar to that of the St. Francis Dam. After the failure of the St. Francis in 1928, the City placed tons of earth at the base of the Mulholland as reinforcement, and then landscaped the fill. The result was the disappearance of the dam as a visible entity from Hollywood below (Survey LA 2017: 28).

More common, if not as architecturally impressive, are the small pump stations and storage tanks located in high elevations. Typical is the Laurel Canyon Pumping Station, at 11300 Dona Dorotea Drive. The Laurel Canyon Station includes an original facility, designed in a Spanish Colonial Revival style, from 1930 and a later, more utilitarian structure from 1950. Behind these two structures is a large round storage tank, well hidden from view by landscaping (Survey LA 2017: 28).

The third period of construction, between 1945 and 1980, consists of facilities to handle increased supplies coming from the Second Los Angeles Aqueduct and from the Metropolitan Water District. A wave of construction in the 1950s included the Eagle Rock, Green Verdugo, and Upper Stone Canyon Reservoirs, and was concerned with distributing water delivered from the MWD's Colorado River Aqueduct (Survey LA 2017: 29).

Of particular significance among these 1950s-era reservoirs is the Eagle Rock. It received the city's initial portion of water from the Colorado River, delivered via pipeline from Lake Mathews in Riverside County. From there the water was distributed to the rest of the city's system. The reservoir is located just north of the 134 Freeway and west of the border with Pasadena. Construction on the Eagle Rock began in 1952 and it was completed in August of 1953. The Eagle Rock-Hollywood Conduit was finished in 1956. This 68-inch pipeline extended for ten miles and allowed water from the Eagle Rock reservoir to be distributed to the rest of the system (Survey LA 2017: 29).

Following the San Fernando Earthquake of 1971, the DWP focused on upgrading, expanding, and/or replacing existing dams and reservoirs. These improvements accommodated additional supplies that came with the completion of the Second Los Angeles Aqueduct in 1970 and with additional water supplied by the State Water Project to the Metropolitan Water District. The replacement of the Upper and Lower San Fernando/Van Norman Reservoirs with the Los Angeles Reservoir, at the point of delivery of both of the First [and Second] Los Angeles Aqueducts as well as MWD's supplies from Castaic Lake, was the most important of these improvements (Survey LA 2017: 30).

Character-defining features associated with water supply infrastructure include (Survey LA 2017: 32):

- Retains most of the essential character-defining features from the period of significance
- Of an engineering and/or architectural form/style typical of the 1902–1980 period

- May also be significant under themes within the architecture and engineering context
- Illustrates technological innovations in civil engineering relating to the history and development of the city's water storage and distribution system
- Reflects significant trends in community planning relating to the expansion of publicly owned utilities
- Associated with the physical growth of the city during the 1902–1980 period

3.3.4 Development of San Fernando Road

San Fernando Road was established in the 1870s as an unpaved rural road used for travel between Los Angeles to the south and San Fernando to the north. Jeanette A. McKenna previously evaluated the road in October 2006 for the *Results of a Phase I Cultural Resource Investigation for the Proposed Los Angeles Department of Water and Power Taylor Yard Park Water Recycling Project*, and in December 2012 by Candace Ehringer and Michael Vader of Environmental Science Associates in the *Santa Clarita Valley Sanitation District Chloride TMDL Facilities Plan Project: Phase I Cultural Resources Assessment* prepared for the Santa Clarita Valley Sanitation District. The report included a DPR form that provides contextual information for the evaluation of San Fernando Road as a potential historic resource (Ehringer 2012). The historic context statement is quoted verbatim below:

> San Fernando Road extends from Sierra Highway to its terminus at North Main Street in Los Angeles. The road was first recorded in 1871, although the name of the road is mentioned at least as early as 1863 in Los Angeles newspapers. Prior to that, the road was likely a route used by Native American groups and, later, Spanish explorers who passed through the area traveling between Mexico and Northern California. When the road was recorded during the "Great Partition of 1871," the court ordered San Fernando Road remain a public road indefinitely (Ehringer 2012: 2).
>
> The road, not more than a dirt trail at the time, was first cleared and packed by Remi Nadeau, to facilitate the transport of silver ore wagons from Owens Valley to Los Angeles) in the 1870s. (Ehringer 2012: 2). By 1890, the unpaved roadway was one of the most frequently used routes in Los Angeles County. Its upkeep was of concern to area residents, who relied on it for transporting agricultural products from the valley to city markets. The portion within the city limits of Los Angeles was perhaps the worst-kept part of the route. By July of 1892, several improvements had been made. The road was widened and holes filled. Also, an agreement was struck between the County of Los Angeles and residents to sprinkle the road – the County would sprinkle, if residents supplied the water (Ehringer 2012: 12).
>
> The state of the road continued to improve and by 1896 newspaper accounts were declaring San Fernando Road "one of the best in the district". The road was touted as one of the best for cycling from Los Angeles to Burbank, and at least part of it had been macadamized. Macadamization was named after John Loudon MacAdam, a Scotsman who invented the process circa 1820. The first macadam road in the United States was constructed in 1823 (curbstone, 2009). These roadbeds were built by laying down large, then medium, and then small crushed, angular rocks. Water was often used as a binder, though asphalt could be used as well. Macadimized roads drained well, meaning wagons were less likely to get stuck in the mud. Their smoother surface also required less horse power. Farming became more productive and profitable in areas with macadamized roads. Bicyclists preferred them as well (Ehringer 2012: 12).

However, as one of the most used roads in the county, San Fernando Road required constant maintenance and improvement to keep pace with increased traffic as Southern California's population grew. The segment of San Fernando Road within the city limits remained the worst-kept portion. In a 1905 letter to the Los Angeles Times, Mr. Eshelman noted "perhaps no other public road entering the city is so extensively used." Trade between the San Fernando Valley and Los Angeles relied on this route. The author reported, "One morning seventy-three wagon loads of melons came into the city over this road". A more permanent solution than gravel was needed to keep the traffic (and commodities) flowing (Ehringer 2012: 12).

In 1904, Jim Hanley was elected Street Superintendent for the City of Los Angeles, in part because during his previous tenure as Los Angeles County Supervisor (1892 to 1902), he had built San Fernando road into "one of the finest roadbeds in the State" transforming a dusty track into a fine road using decomposed granite for roadbed. Hanley, known as the "road builder," was needed to improve streets throughout the City of Los Angeles, as he had done for the county (Ehringer 2012: 12).

By 1908, plans were underway to improve roads throughout Los Angeles County with macadam or asphalt. The completion of San Fernando Road, over which "San Fernando Valley products are nearly all brought to Los Angeles by team…will interest more people directly than almost any other piece of work". Improvement of San Fernando Road would allow for increased travel and trade. By December 1910 almost all of San Fernando Road from Los Angeles to Burbank had been paved, using crushed rock from the Pacoima quarry. The macadam center was to be 16 feet wide, but that width was later found insufficient and modified to 20 feet wide. The entire project was completed by 1914, with San Fernando Road being the most costly roadway improved at $528,599 (Ehringer 2012: 12).

Despite these improvements, by November 1911 some portions of San Fernando Road were already undergoing repairs, specifically in Los Angeles and from the city limits to Burbank. These repairs must have been successful because by November of 1912, San Fernando Road was being advertised as "an excellent macadam driveway extending from Los Angeles through the entire valley" (Ehringer 2012: 12).

This road remained the choice of transport for valley farmers to get their product to Los Angeles, as shipment by rail was more costly. The recent creation of an auto trucking industry also cut costs and allowed farmers to remain in the fields while someone else transported their goods to market overnight. The city was thus provided with the freshest produce, and the farmer could command the highest prices. During the same timeframe, San Fernando Road was chosen by gas and oil companies to convey natural resources from the San Joaquin Valley to the City of Los Angeles. Pipelines had been laid within the street right-of way. These main pipelines would also serve growing communities north of Los Angeles, such as Burbank (Ehringer 2012: 12).

Prior to about 1910, most waterways along the road were not spanned by bridges. Intermittent watercourses, such as the Pacoima Wash, Tujunga Wash, and Verdugo Wash, were usually impassable during inclement weather, making travel along San Fernando Road difficult if not impossible during the wet season. The Los Angeles Times reported that "there are half a dozen channels through which a great deal of water runs just below the town of San Fernando and the

washing out of the roadbed here has often tied up traffic for several days". Bridges were the much-needed solution that would keep San Fernando Road open year-round (Ehringer 2012: 12).

By 1910, several wooden pile trestle bridges with concrete abutments had been completed on San Fernando Road. A concrete bridge had also been proposed for crossing the Verdugo Wash. This bridge would remove "one of the bad spots on the much-traveled thoroughfare to the north". These bridges would put an end to the "perilous fording of washes" on one of the busiest routes in Los Angeles County (Ehringer 2012: 13).

Of exception was the crossing of the Arroyo Seco at San Fernando Road (often referred to as Avenue 20 after crossing Arroyo Seco), where a bridge was in already in place by 1904. The bridge was the main route of trade from the San Fernando Valley to Los Angeles. In 1904, 566 San Fernando Valley ranching teams passed over the San Fernando Road (Avenue 20) Bridge in a 24-hour period, compared to 80 over Cahuenga Pass and 40 over Avenue 26. The bridge was damaged by floods in 1909 and eventually replace by a concrete two-span structure in 1913, which survived the floods of 1914 and is still standing (Ehringer 2012: 13).

About ten years later, the call to widen and improve San Fernando Road was again heard, as the road remained the major business route from Los Angeles to the San Fernando Valley, as well as other points north. The automobile had become the preferred mode of transport and the population of the region was increasing at a fast pace. "This highway, said to rival Harbor Truck Boulevard in tonnage carried, has been one of the most congested roads, and therefore one of the greatest obstacles, in the development of Northeastern Los Angeles". Petitions were circulated in December of 1923 urging agencies to widen the roadway to 60 feet, thereby relieving the congestion (Ehringer 2012: 13).

In 1924, the Los Angeles Times noted that the roadway was the original route from the north to Los Angeles and that it was too narrow to serve today's traffic. San Fernando Road's improvement was "essential to the intercommunity traffic of the valley as well as the flood of intercounty business northward from Los Angeles". Toward these improvements, the County appropriated $60,000 for widening and paving the road within the city limits of Glendale. Burbank also began taking steps to widen and pave the segment of the roadway within its city limits, including the removal of a dangerous bend known as "Turkey Neck Curve". However, work along the entire route would not be completed for several more years (Ehringer 2012: 13).

In August 1927, the Los Angeles City Council adopted the first of three ordinances required to proceed with widening and paving San Fernando Road from Dayton Avenue (present-day North Figueroa Street) to the Newhall Pass, a distance of 25 miles. Completion of the project would "result in a wide, well-paved highway for the entire length of the San Fernando Valley, helping to develop the valley through making it more accessible by automobile". The total cost was projected to be $1.2 million. E. L. Fleming was awarded one contract worth $578,331.01 and the George R. Curtis Paving Company another, valued at $432,479 (Ehringer 2012: 13).

The first section to be undertaken was between Burbank and the southern city limits of San Fernando, a distance of 6.8 miles. The existing pavement, which averaged about 22 feet in width, was widened to 55 feet. Both the street and shoulders were composed of an 8-inch-thick

layer of asphaltic concrete (a mixture of asphalt and aggregate), chosen for its ability to withstand heavy traffic (Ehringer 2012: 13).

The second section to be complete was the section from the northern city limits of San Fernando to the Newhall Pass. This portion of the road would be widened to 36 feet, with 5 foot gravel shoulders. Contract for work was awarded in August 1928, with work to begin immediately (Ehringer 2012: 13).

The final section, from Dayton Avenue to the Glendale city limits, had been held up by legal action by property owners. It was completed in 1929 by contractor P.J. Akman. This portion was the final link in U.S. Highway 99, which had been designated in 1926. U.S. Highway 99 extended from Mexico to Canada and was to become the "busiest truck route in the nation" (Ehringer 2012: 13).

Glendale widened and paved a 5-mile portion of San Fernando Road within the city limits in 1930 at a cost of $223,000. Width of the new pavement varied from 62.5 to 66 feet and allowed the route to become "the fast traffic speedway for all motorists from San Fernando Valley en route to Los Angeles". All of this work was successful and by 1949 the route continued as the main artery for traffic in Southern California, moving "more tonnage… by truck than over any other highway in the nation" (Ehringer 2012: 13).

Bridges carrying San Fernando Road over waterways were also in need of repair or replacement. The 1924 collapse of a wooden trestle bridge spanning the Arroyo Seco at Avenue 26 brought bridge rehabilitation to the fore. The wooden bridges were too narrow to accommodate widening efforts and unable to handle the weight of heavy, modern vehicular traffic. One of the bridges identified for replacement was the San Fernando Road Bridge over the Pacoima Wash, whose collapse had been prevented by the installation of temporary posts. The new bridge would be 100 feet long and 40 feet wide. It would be placed so that a dangerous curve in the road would be eliminated, resulting in one of the few modifications made to the original alignment of San Fernando Road in its history. The new concrete bridge was designed by John A. Griffin, City of Los Angeles, and constructed by Hogan Construction Company at a cost of $37,500 (Ehringer 2012: 14).

Heavy rains in February of 1926 damaged the wooden trestle bridge that carried San Fernando Road across Tujunga Wash. The bridge was repaired, but severely damaged again later that year by flooding in April. However, the wooden bridge would not be replaced with a concrete bridge until the 1930s. In1934, the San Fernando Road over Tujunga Wash was identified as one of 16 bridge projects to be funded by the Public Works Administration. In 1935, the State opened bidding for the construction of the new bridge spanning the wash. State and federal funds in the amount of $225,000 were granted for its construction. A contract from the State Department of Public Works was awarded to Griffith Company of Los Angeles in the amount of $91,119 for the construction of a bridge on San Fernando Road across Tujunga Wash. Replacement of the old bridge with a new, wider concrete bridge removed the last bottleneck impeding traffic along the widened San Fernando Road (Ehringer 2012: 14).

The existing San Fernando Road Bridge over Verdugo Wash was constructed part of a U.S. Army Corps of Engineers flood control project in the 1930s. After a disastrous flood on New Year's Day

in 1934 took the lives of 30 individuals and caused $5 million in damages, the Los Angeles County Flood Control District appealed to the Civil Works Administration for aid in controlling the Verdugo Wash run-off. The project was approved in 1935. Six miles of the existing Verdugo Wash conduit would be widened from 43 to 85 feet through Glendale to the washes' discharge into the Los Angeles River, just west of San Fernando Road. Fernando Road Bridge over Verdugo Wash was completed in 1939 (Ehringer 2012: 14).

Improvements were again needed to keep pace with the post-World War II boom. Seven miles of San Fernando Road from the city limits of San Fernando to Hollywood Way in Burbank needed to be widened to accommodate all the trucks. To alleviate the effects of truck traffic through the small San Fernando business district in 1952, the city completed Truman Street, parallel to San Fernando Road, and instituted one-way traffic through the area. But by 1958 the problem had gotten so bad that the City of San Fernando threatened to ban truck traffic entirely if the State did not help. Burbank had faced the same problem in 1943 and had re-routed truck traffic around the downtown business district. Glendale reported in 1956 that "truck traffic now on San Fernando has reached a virtual saturation point". As in 1905, a more permanent solution was needed to keep the traffic (and commodities) flowing (Ehringer 2012: 14).

The solution was on the way – the Golden State Freeway (I-5). The freeway was first proposed in 1953 and would extend from the Mexican border to the Canadian border, supplanting San Fernando Road (U.S. Highway 99) as the major inland thoroughfare in the region. The final San Fernando Valley section was completed in 1963 and the heyday of San Fernando Road came to an end. The City of San Fernando gladly welcomed two-way traffic through the City's business district again (Ehringer 2012: 14).

Most of the bridges within the San Fernando Road alignment required alterations to accommodate the widened roadway. The San Fernando Road Bridge over Pacoima Wash was improved in 1940, with assistance from the Works Progress Administration. The 1913 San Fernando Road Bridge over Arroyo Seco was modified in the late 1930s or early 1940s during the channelization of the Arroyo Seco when one of the two arch spans was backfilled. The San Fernando Road Bridge over Tujunga Wash was improved in 1951, possibly as part of the Tujunga Wash flood control project. Only the bridge over Verdugo Wash has not been altered since its original construction in 1939 (Ehringer 2012: 14).

In the late 1960s, 1970s, and 1980s, stretches of San Fernando Road were popular for cruising and drag racing. In 1991, the Burbank Media Center Mall opened, which cut San Fernando Road in half. It is no longer a straight shot from Los Angeles to the Newhall Pass. Today, the road is about 25 miles long and is lined with commercial and light industrial businesses. The Metrolink tracks (former Southern Pacific Railroad tracks) run parallel to the route for about 60 percent of its length. Motorists often use the road as an alternative route for I-5 during busy commuting hours. As San Fernando Road remains a major thoroughfare in Los Angeles County, it continues to undergo improvement and modifications (Ehringer 2012: 14).

3.3.4.1 Typology: Rural Roads

Roads throughout California can be traced back to Euroamerican settlers by the early nineteenth century. Early roads were unpaved with dirt and often followed Native American trails. They were used for travel between cities as well as the transportation of crops and goods. The California Trail offered several paths to the West Coast, including a route through South Pass, Wyoming, and then through southeast Idaho. By the 1860s, freight and mail companies, military expeditions, and settlement and trade stations had already been established and spread throughout the branches of the California Trail. With the discovery of gold in California, numerous emigrants took their chances of traveling west following rural dirt roads with wagons throughout the state. In 1895, the California Bureau of Highways was established along with the Lake Tahoe Wagon Road Commission and the Bureau of Highways Commission to study highway needs throughout the state, and California's Department of Highways began operation in 1897. Prior to the development of a statewide highway department, roads and streets were managed by local governments (BLM 2025; Caltrans 2025).

With the advent of the automobile, the state and federal highway systems were developed, forever changing America's relationship with roadways. The turn of the twentieth century saw the evolution of more durable materials and advances in engineering technology. In 1907, the State Department of Engineering was created to maintain all state highways, and on March 22, 1909, the "State Highways Act" was passed, authorizing $18 million in bonds for the Department of Engineering to develop a comprehensive state highway system to connect each county in the state. By 1911, the California Highway Commission was established with a three-member committee to manage the construction and maintenance of this system. As automobile technology improved in the late 1930s, cars allowed travelers to take themselves to places that were only previously accessible by wagons or trains. Throughout the twentieth century, roads and highways developed and were refined as the automobile grew in popularity (Caltrans 2025). Key character-defining features of roads often include the following:

- Original alignment, location, and setting
- Retains the system connectivity of its original construction
- The continued function as a roadway

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4 Results of Identification and Evaluation Efforts

4.1 Records Search Results

The records indicate that 36 previous cultural resources technical investigations have been conducted within 0.5 miles of the proposed project API, of which 7 have addressed portions of the proposed project API (Table 2).

4.1.1 Previously Conducted Studies

Table 2. Previous Cultural Resource Studies

Report ID	Year	Title	Author
Reports within the API			
LA-02950	1992	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate SV00908F (Public Storage), 7475 North San Fernando Road, Burbank, Los Angeles County, California	Anonymous
LA-04857	2001	Cultural Resource Assessment for AT&T Fixed Wireless Services Facility Number La_026_a, County of Los Angeles, California	Duke, Curt
LA-04858	2000	Nasr Cold Plane Existing Pavement on Various On/off-ramps on Route 170 and One on Ramp Route 5 With Rubberized Asphalt Concrete	Smith, Philomene C.
LA-08255	2006	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project State of California: Volumes I and II	Arrington, Cindy and Nancy Sikes
LA-10642	2010	Preliminary Historical/Archaeological Resources Study, Antelope Valley line Positive Train Control (PTC) Project Southern California Regional Rail Authority, Lancaster to Glendale, Los Angeles County, California	Bai “Tom” Tang
LA-10756	2010	A Cultural Resources Overview and Preliminary Assessment of the Pacoima/Panorama City Redevelopment Plan Amendment/Expansion Project Area, Los Angeles County, California	McKenna, Jeanette A.
LA-12526	2013	Santa Clarita Valley Sanitation District Chloride TMDL Facilities Plan Project, Phase I Cultural Resources Assessment	Ehringer, Candace, Katherine Ramirez, and Michael Vader,

Table 2. Previous Cultural Resource Studies

Report ID	Year	Title	Author
Previous Studies Within 0.5 Miles of the API			
LA-01379	1988	Archaeological Resource Survey and Impact Evaluation for the Tujunga Well Field Site, Located Between Hollywood Freeway and Arleta Avenue, San Fernando Valley	Lewis, Brandon S.
LA-01699	1988	Archaeological Resource Survey and Impact Evaluation for the Tujunga Well Field Site, Located Between the Hollywood Freeway and Canterbury Avenue, San Fernando Valley	Lewis, Brandon S.
LA-02591	1992	Archaeological Monitoring Report for the Tujunga Pumping Station Complex	Padon, Beth
LA-03486	1994	A Cultural Resources Inventory for the East Valley Water Reclamation Project	Stickel, Gary E.
LA-03722	1977	Historic Property Survey Strathern Street - Between Coldwater Canyon Avenue and Woodman Avenue W.O. 21267	Anonymous
LA-03724	1977	Historic Property Survey Roscoe Boulevard - Coldwater Canyon Avenue to Ventura Canyon Avenue	Anonymous
LA-03726	1977	Historic Property Survey Hollywood Way Between Golden State Freeway and Cohasset Street W.O. 21149	Anonymous
LA-05592	2000	Cultural Resource Assessment for Pacific Bell Mobile Services Facility La 959-09, in the County of Los Angeles, California	Gray, Deborah
LA-05749	2002	Cultural Resource Assessment Cingular Wireless Facility No. Vy 191-01 Los Angeles County, California	Duke, Curt
LA-06731	2002	Cultural Resource Assessment for AT&T Wireless Services Facility No. 14074 Los Angeles County, California	Duke, Curt
LA-06740	2000	Highway Project to Construct Soundwalls at Three Locations Along Interstate 5 in the San Fernando Valley Area of Los Angeles County	Sylvia, Barbara
LA-06753	1999	No Eligibility Determination for Inclusion in the National Register of Historic Places Regarding the Remains of Building 360 at the Former Lockheed-Martin B-6 Site, Burbank, California	Kessler, David B. and Edward L. Melisky
LA-06764	2001	Negative Archaeological Reconnaissance Report 8903 Balboa Boulevard, Northridge, City of Los Angeles, California	Romani, Gwendolyn R.

Table 2. Previous Cultural Resource Studies

Report ID	Year	Title	Author
LA-07793	2004	Records Search Results and Site Visit for Sprint Telecommunications Facility Candidate La60x526a (Diamond Auto Parts) 7600 Laurel Canyon Boulevard, North Hollywood, Los Angeles County, California	Bonner, Wayne H. and Christeen Taniguchi
LA-07807	2003	Polytechnic High School in the Sun Valley Area of Los Angeles	Unknown
LA-07817	2004	Phase 1 Historical Resources Investigation for East Valley High School No. 1a and Valley Region Middle School No. 3, Los Angeles County, California	Shaver, Noelle C.S.
LA-07833	2003	Archaeological Survey for Sun Valley Watershed Management Plan, County of Los Angeles, California	Foster, John M.
LA-08104	2002	Historic Properties Inventory and Evaluation for the Burbank-Glendale-Pasadena Airport, Burbank, California	Jordan, Stacey C.
LA-08105	2006	Cultural Resources Records Search Results and Site Visit for Cingular Wireless Candidate NI-0151-01 (amazonas Monopole), 10848 Cantara Street, Sun Valley, Los Angeles County, California	Bonner, Wayne H.
LA-08692	2006	Cultural Resource Records Search Results and Site Visit for T-Mobile USA Candidate Sv00908e (extra Storage), 7670 North Hollywood Way, Burbank, Los Angeles County, California	Bonner, Wayne H.
LA-09091	2005	Cultural Resources Records Search Results and Site Visit for Cingular Wireless NI-104-01 (sbc-lankershim), 7744 Lankershim Boulevard, North Hollywood, Los Angeles County, California	Bonner, Wayne H.
LA-09250	2007	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate SV00908F (Public Storage), 7475 North San Fernando Road, Burbank, Los Angeles County, California	Bonner, Wayne H.
LA-09252	2007	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate SV01584C (Our Lady of the Holy Rosary School), 7800-7808 Vineland Avenue, Sun Valley, Los Angeles County, California	Bonner, Wayne H.
LA-10214	2010	Cultural Resource Records Search and Site Visit Results for T-Mobile USA Candidate SV11987B (JW Golf), 8301	Bonner, Wayne H. and Arabesque Said

Table 2. Previous Cultural Resource Studies

Report ID	Year	Title	Author
		Tujunga Avenue, North Hollywood, Los Angeles County, California	
LA-11155	1997	U.S. Department of Transportation Federal Aviation, "No Eligibility Determination" regarding the Lockheed-Martin B-6 Site for inclusion in the National Register of Historic Places	Kessler, David and Melisky, Edward
LA-11576	2011	Cultural Resources Records Search and Site Visit Results for AT&T Mobility, LLC Candidate LA0285 (Chandler Canyon), CASPR No: 3551017973, 8333 Glenoaks Boulevard, Sun Valley, Los Angeles County, California	Bonner, Wayne H.
LA-12039	2012	Cultural Resources Collocation Records Search and Site Visit Results for T-Mobile West, LLC Candidate SV01584C (Our Lady of the Holy Rosa) 7800 Vineland Avenue, Sun Valley, Los Angeles County, California	Bonner, Wayne H., Sarah A. Williams, and Kathleen A. Crawford
LA-12538	2012	Cultural Resource Records Search and Site Survey AT&T Site LAC026 Sun Valley Overlay, 8125 Lankershim Boulevard North Hollywood, Los Angeles County, California 91605 CASPR #3551018127	Loftus, Shannon L.
LA-12607	2014	Woodman Avenue Multi-Beneficial Stormwater Capture Pilot Project, Cultural Resources Study Los Angeles, California	Maxon, Patrick

Notes: API = area of potential impacts.

4.1.2 Previously Identified Cultural Resources

The records indicate that five previous cultural resources have been previously recorded within 0.5 miles of the proposed project API. One resource, Old San Fernando Road (P-19-188007), was identified within the project API (Table 3).

Table 3. Previous Identified Cultural Resources

Primary Number	Type	Description	Address	CHR Status Code
Resource Within the API				
P-19-188007	Historic	Old San Fernando Road	San Fernando Road Glendale & Los Angeles	3S
Resources Within 0.5 Miles of the API				
P-19-173146	Historic	Old Trapper's Lodge	10340 Keswick Avenue, Sun Valley	Not listed

Table 3. Previous Identified Cultural Resources

Primary Number	Type	Description	Address	CHR Status Code
P-19-187105	Historic	United Airport District (Hollywood-Burbank Airport)	2627 Hollywood Way, Burbank	6
P-19-190061	Historic	Our Lady of the Holy Rosary Church	7800 Vineland Avenue, Los Angeles (AIN 2409-010-024)	Not listed
P-19-190749	Historic	8125 Lankershim Boulevard	8125 Lankershim Boulevard, North Hollywood	6Y

Notes: CRHR = California Register of Historical Resources; API = area of potential impacts; AIN = Assessor's Identification Number; NRHP = National Register of Historic Places.
California Historical Resource Status Codes
3S = Appears eligible for CRHR individually through survey evaluation
6 = Determined ineligible for listing for the NRHP, CRHR, or local listing.
6Y = Determined ineligible for NRHP by consensus through the Section 106 process – Not evaluated for CRHR or local listing.

4.2 Field Survey Results

4.2.1 Archaeology

The archaeological field survey was limited to the exposed soils located within the API. Surface visibility was poor (approximately 5%) throughout the API due to pavement, sidewalks, and landscaping. The exposed soils consisted of fine to medium grained, light brown to yellowish brown sandy silt with angular to subangular rocks and pebbles. The observed areas of soil also appeared to be artificial fill as the result of past construction activities due to their composition and proximity to the roadway. Only modern refuse was observed on the ground surface. No archaeological resources were present within the API during the field survey.

4.2.2 Built Environment

Two built environment resources over 45 years of age, the Cantara Trunk Line and San Fernando Road, were surveyed and recorded for historical significance. The resources are described and evaluated below. A detailed DPR 523 form set, which includes photographs from the survey of the resources, is included in Appendix D.

4.2.2.1 Map ID 1. Cantara Trunk Line

Description

The Cantara Trunk Line is an underground municipal water conveyance structure located in the Sun Valley community of the City of Los Angeles, California. The subject segment of trunk line begins at the intersection of Coldwater Canyon Avenue and Cantara Street and terminates at the intersection of San Fernando Road and Ferncola Avenue. It consists of approximately 26,990 feet of concrete, riveted steel, and welded steel pipes. Trunk line components include isolation valves, blowoffs, combination air/vacuum valves, vacuum breakers, and

distribution mainlines. The subject segments of the Cantara Trunk Line are located underneath Cantara Street between Potter Avenue and Irvine Avenue, from Fair Avenue to San Fernando Road, and along San Fernando Road from Cantara Street to Ferncola Avenue. They are not visible and are buried beneath the road at a depth ranging from approximately 7 feet to 10 feet.

The subject segments consist of about 13,900 feet of riveted steel pipe segments installed in 1917 and about 13,090 feet of welded steel pipe segments installed between 1961 and 1965, ranging in diameter from 27 inches to 36.75 inches. Connection pipes and regulator stations are situated along the trunk line alignment and are components of the system that ensure its effective operation. A 20-to-27-inch diameter CI mainline, installed in 1960, connects to the Cantara Trunk Line along approximately 5,100 feet of San Fernando Road between Cantara Street and Ferncola Avenue. The subject segment connects to the City Trunk Line South (installed circa 2007) at the intersection of Coldwater Canyon Avenue and Cantara Street.

Known alterations to the subject segment of the Cantara Trunk Line include the following:

- 1960: replacement of approximately 2,210 feet of the original pipeline along San Fernando Road between Wheatland Avenue and Ferncola Avenue (LADWP 2025)
- 1961: installation of approximately 3,120 feet of pipeline along Strathern Street between Irvine Avenue and Fair Avenue (LADWP 2025)
- 1961: installation of approximately 1,330 feet of pipeline along Fair Avenue between Cantara Street and Strathern Street (LADWP 2025)
- c. 1965: abandonment of approximately 3,150 feet of pipeline along Cantara Street between Irvine Avenue and Fair Avenue (LADWP 2025; VNNVGS 1966: 102)
- c. 1965: installation of approximately 1,330 feet of pipeline along Irvine Avenue between Cantara Street and Strathern Street (LADWP 2025; VNNVGS 1966: 102)
- 2007: Steel clamp repairs to leaks in the trunk line (Uranga 2007)

Statement of Significance

National Register of Historic Places/California Register of Historical Resources Criteria

The Cantara Trunk Line, which is part of the larger LADWP Trunk Line System, is not eligible for listing in the NRHP, CRHR, or City of Los Angeles HCM Criteria individually or as a contributing element of any previously evaluated LADWP structures that are considered historically significant.

In establishing an approach to evaluate water management systems it is important to consider questions of eligibility within the historic context of water infrastructure development, to identify pioneering infrastructure, and to assist in the identification of those water conveyance systems that merit recognition. Water conveyance systems are usually considered significant under NRHP Criterion A and CRHR Criterion 1 for their association with trends and events that have made a significant contribution to the broad patterns of our history, particularly in regional agricultural or local economic development. While these systems may have influenced the growth of local economies, agricultural ventures, or spurred expansion of settlement, this is too common an association to merit a conclusion of historical significance under NRHP Criterion A or CRHR Criterion 1 within the context of municipal water distribution. At some point in the past, all forms of historic-era infrastructure were associated locally or regionally with growth or economic development, actual or intended. It is often exceedingly difficult to prove whether

historic-era infrastructure associated with recognizable growth actually caused the growth or accommodated the growth.

Water conveyance systems that rise to a level of significance under NRHP Criterion A and CRHR Criterion 1 include pioneering elements such as those that are the first of its kind in the region, or are an essential or catalyst component of a water conveyance system that transformed local development in the area. Survey LA Los Angeles Citywide Historic Context Statement defines significant water resources as reservoirs, dams, and water supply infrastructure, such as pumping stations like the Garvanza Pumping Station (L.A. HCM No. 412), which were the primary catalysts for municipal water development in Los Angeles County. Likewise, the seminal LADWP water infrastructure including the First Los Angeles Aqueduct has been previously determined eligible for listing under NRHP Criterion A / CRHR Criterion 1 for the important role it played in the development of the City of Los Angeles during the early twentieth century, and for its associations with the economics and politics of California water issues at the state level of significance. It is also eligible under NRHP Criterion C / CRHR Criterion 3, for embodying distinctive characteristics of a type, period, and method of construction, as well as the work of a master -- William Mulholland, the chief engineer and visionary behind the project. The period of significance of the property is 1907, marking the beginning of construction, through 1931, the year of the passage of the County of Origins Law" (Brookshear and Hickman 2016: 3). The First Los Angeles Aqueduct, constructed between 1908 and 1913, represents LADWP landmark pioneering water management infrastructure, which allowed water conveyance from the Owens Valley to the San Fernando Valley to support the development and settlement in the Los Angeles area. It is also listed as L.A. HCM No. 742 and considered California State Landmark No. 653.

The Cantara Trunk Line, built in 1917, was constructed as part of the larger LADWP trunk line system, which is an underground municipal water system that receives and distributes water from the First Los Angeles Aqueduct and regional reservoirs. Although it is part of the LADWP water conveyance system, it does not represent pioneering or innovative water management infrastructure that merits historic significance level recognition. The Cantara Trunk Line is evaluated for potential significance under all applicable criteria with the above considerations in mind.

Municipal water can be traced back to the Roman Empire, and the first large, riveted pipe in California was developed in San Francisco in 1868. The line consisted of 30-inch-diameter CI pipes extending 15 miles. During the 1870s, early riveted-iron trunk lines in Rochester, New York, were 24 inches in diameter and constructed from wrought-iron or CI pipes. These lines had the capacity to transfer about 9,000,000 gallons of water per day. By 1890, hydraulic engineers developed the Newark Line in New York, consisting of 48-inch riveted pipelines designed to carry 50,000,000 gallons of water per day. The capacity of riveted pipes increased through the 1890s to meet the demands of growing urban areas. Essentially, the standards and technology utilized to create the LADWP Trunk Line system was well established by the time the system was implemented and connected to the larger LADWP system after the First Los Angeles Aqueduct was constructed.

Following the completion of the First Los Angeles Aqueduct, LADWP developed the first iteration of a trunk line system to support municipal water distribution. By 1914, the system included over 46 miles of underground pipeline to expand the water supply throughout the City. The Cantara Trunk Line was constructed in 1917 as an expansion of this original system to support development and settlement expansion in the Sun Valley community. Originally called the Glendale Trunk Line, the Cantara Trunk Line consisted of approximately 17,500 feet of concrete, riveted-steel pipes that connected to the City Trunk Line (constructed c. 1914) at the intersection of Coldwater Canyon Avenue. The Cantara Trunk Line extended southeast to San Fernando Road, approximately 1,800 feet south of

Strathern Street. The Los Angeles Reservoir supplied the City Trunk Line, which transmitted potable water from the San Fernando Valley to Sun Valley after the construction of the Glendale Trunk Line (LADWP 2025).

The Cantara Trunk Line is one of many trunk lines developed to convey drinking water from the First Los Angeles Aqueduct to communities throughout Los Angeles. It was merely an expansion of the existing water distribution system, and an extension to the City Trunk Line.. Furthermore, trunk lines do not distinctively "reflect significant trends in community planning relating to the expansion of publicly owned utilities to provide water and power services to a city growing in both area and population" (Survey LA 2017: 31). Construction of the City's trunk line system was a consequence of the development of the First Los Angeles Aqueduct which aided in bringing water to the region and was a monumental historic feat. Early reservoirs also represent historical significance associated with the LADWP water conveyance system including the Ivanhoe and Silver Lake Reservoirs from 1906 (L.A. HCM No. 422), Highland Reservoir from 1907 (L.A. HCM No. 412), Silverlake Dam and Reservoir from 1907 (L.A. HCM No. 422), and Mulholland Dam and Hollywood Reservoir from 1924 (L.A. HCM No. 421). These resources, specifically the First Los Angeles Aqueduct, best represent LADWP's historically significant efforts in regional water distribution and management.

While the connecting underground water conveyance structures, including trunk lines, provide an important service by distributing municipal water, these types of systems were well established by the time the LADWP trunk line system was first established in 1914, and they are secondary, auxiliary, supporting elements of the municipal water system. The trunk lines do not rise to the level of consideration as individually significant or contributing elements to the First Los Angeles Aqueduct or other significant LADWP infrastructure. As such, they do not represent a significant association with the development of the municipal water system in Los Angeles County. Therefore, the Cantara Trunk Line, which is part of the LADWP trunk line system, does not appear eligible under NRHP Criterion A or CRHR Criterion 1.

Under NRHP Criterion B and CRHR Criterion 2, the Cantara Trunk Line lacks a direct and significant association with the productive life of any person considered important in history. Because the municipal water system was essentially a city undertaking representing the collective decisions of LADWP's board of directors, managers, and engineers, the Cantara Trunk Line lacks an appropriate association with the distinctive contribution of any single individual. Research uncovered no individuals associated with the trunk line who made a demonstrably and singularly important contribution to history at the local, state, or national level. Therefore, the Cantara Trunk Line does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

Under NRHP and CRHR Criterion 3, the Cantara Trunk Line is not significant because it does not represent an important example of a type, period, or method of construction. Research did not identify the Cantara Trunk Line's engineer, architect, or builder, and it appears unlikely that it was the work of a master in engineering. The Cantara Trunk Line was constructed in 1917 using standard, wide-diameter riveted-steel pipe. The system was expanded upon in the 1960s with welded-steel pipe segments. Riveted-pipe technology existed in the United States as early as the 1860s, followed by the development of welded pipes during the early 1900s. Thus, the Cantara Trunk Line represents common standardized water distribution designs for underground municipal water distribution and construction methods characteristic of trunk lines built during the early twentieth century, likely throughout the United States. It does not "illustrate technological innovations in civil engineering relating to the development of the city's water storage and distribution system" (Survey LA 2017: 31–32). Additionally, as the Cantara Trunk Line is not visible and located underground, it does not possess high artistic value. It is an undistinguished and undifferentiated example of ubiquitous underground municipal water infrastructure and does not meet the

requirements for individual listing, nor would it qualify as a contributing element to the significance of previously documented Los Angeles' water management infrastructure. Therefore, Cantara Trunk Line does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

Under NRHP Criterion D and CRHR Criterion 4, the Cantara Trunk Line is not significant as a source, or likely source, of important historical information, nor does it appear likely to yield important information about historic construction methods, materials, or technologies. This technology is well understood through contemporary trade journals and scientific monographs. As such, the Cantara Trunk Line lacks significance under NRHP Criterion D and CRHR Criterion 4.

City of Los Angeles Historic Cultural Monument Criteria

Because the City of Los Angeles HCM criteria closely follow that of the NRHP and CRHR, the national and state significance evaluation previously presented is also relevant here. The Cantara Trunk Line does not have a distinguishable role in the history of Los Angeles, as it does not reflect a specific significant trend in planning related to the development of a municipal water system and is merely a secondary element of the system constructed to expand existing infrastructure. Additionally, as part of a municipal water system, the trunk line was a city undertaking and does not appear to be associated with the productive life of any individual. The Cantara Trunk Line is not an example of outstanding craftsmanship and did not influence the design of other architecture in the City of Los Angeles. Archival research did not find the engineer or designer of the trunk line. As a utilitarian example of standardized water distribution infrastructure, the Cantara Trunk Line lacks distinctive characteristics of a type, period, or method of construction. Finally, as a trunk line constructed in 1917 as part of the expansion of the municipal water system, the Cantara Trunk Line is not likely to yield information important in prehistory or history. Therefore, the Cantara Trunk Line is recommended not eligible for listing as a City of Los Angeles HCM under any designation criteria.

Integrity Assessment

Integrity is the ability of a property to convey its significance. Because the concept of integrity is based on significance, the assessment of a property's integrity can only proceed after its significance has been fully established. The assessment of integrity requires consideration under the seven aspects or qualities. To retain integrity, a property will always possess several, and generally most, aspects of integrity. Determining which aspects are most important requires an understanding of why, where, and when the property is significant. Because the Cantara Trunk Line lacks sufficient associative significance to meet any of the criteria for listing in the NRHP, CRHR, or City of Los Angeles HCM list, an integrity analysis is unnecessary.

4.2.2.2 Map ID 2. San Fernando Road (P-19-188007)

Description

San Fernando Road is approximately 25 miles long, extending south from Sierra Highway to its terminus at North Main Street in Los Angeles (Photograph 1). The road was initially developed in the 1870s and has been improved over the years to ensure its continuous use. The surrounding area is developed with residential, commercial, and industrial properties. The Hollywood Burbank Airport is along the southwest side of the road between North Clybourn Avenue and North Hollywood Way. The road is currently composed of concrete with a width of approximately 50 feet and a height of about 6.5 inches. Several highway overpasses span across San Fernando Road including I-5,

SR-126, SR-14, I-210, SR-118, SR-134, SR-2, and SR-110. According to historic topographic maps and aerial photography, the road appears to have been paved and straightened during the 1920s and has retained the present alignment since (NETR 2025a, 2025b). The present road has been altered over the years to maintain its operation for over 100 years.

Known alterations to San Fernando Road include the following:

- **1896:** portions of the road were macadamized (Ehringer 2012: 2)
- **1910:** portions of the road between Los Angeles and Burbank were macadamized (Ehringer 2012: 2)
- **1924-1926:** portions of the road within Glendale and Burbank were widened and improved (Ehringer 2012: 2)
- **1927-1929:** Road was widened and paved with asphalt concrete from Dayton Avenue (present-day North Figueroa Street) to Newhall Pass (Ehringer 2012: 2)

Photograph 1. View looking northeast from the intersection of Cantara Street and San Fernando Road.



Source: Dudek, IMG_8692. Photograph taken February 21, 2025.

Statement of Significance

National Register of Historic Places/California Register of Historical Resources Criteria

San Fernando Road was previously evaluated in 2012 and found eligible under NRHP/CRHR Criteria A/1 for its significant association with the development of California, Los Angeles, and the San Fernando Valley. Dudek concurs with this finding. The 2012 evaluation of the property is as follows:

> Resource P-19-188007 (San Fernando Road) is a historic-period road. As part of U.S. Highway 99, the roadway has been recognized historically significant and important to the development of the state (Assembly Concurrent Resolution No. 19, 1993). Research conducted as part of this assessment indicates that resource P-19-188007 (San Fernando Road) appears to be eligible for listing in the National Register and California Register at the state level. San Fernando Road was a major thoroughfare in southern California from at least the 1870s to 1963. Prior to the completion of I-5, the road was instrumental in the development of the City of Los Angeles and the San Fernando Valley, serving as a major transportation and trade route. Based on the 1993 resolution and the results of the archival research, San Fernando Road appears to be eligible for listing in the National Register and California Register under Criterion A/1 (associated with events that have made a significant contribution to the broad patterns of history) for its contribution to the development of the state of California, the City of Los Angeles, and the San Fernando Valley (Ehringer 2012: 15).
>
> The resource does not appear to be eligible for listing in the National Register or California Register under Criteria B/2, C/3, or D/4. Research did not reveal that San Fernando Road is associated with any significant individuals. Therefore, this resource does not appear eligible for listing under Criterion B/2 as it is not associated with the lives of persons important in our past. The materials and construction style of this resource is consistent with typical construction of roadways, which consisted of asphaltic concrete. Therefore, this resource does not appear eligible for listing in the National Register or California Register under Criterion C/3 as it does not embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values. Nor does it appear to be eligible for listing in the National Register or California Register under Criterion D/4 as it is unlikely to yield information important in prehistory or history. For a resource to be considered eligible, it must maintain its integrity. The alignment of San Fernando Road has changed little in the past 90 years and, as such, the road maintains its integrity of location. In addition, the surrounding area has remained largely industrial/commercial, and the road maintains its integrity of setting. Therefore, San Fernando Road appears to be eligible for the National Register and California Register under Criterion A/1 for its contribution to the development of California, the City of Los Angeles, and the San Fernando Valley. The period of significance for San Fernando Road has been defined as ca. 1924 to 1963, the date when initial steps were taken to widen and improve the road to its current condition to the date when I-5 was completed in the San Fernando Valley supplanting San Fernando Road as the major north-south thoroughfare (Ehringer 2012: 15).

City of Los Angeles Historic Cultural Monument Criteria

Because the City of Los Angeles HCM criteria closely follow that of the NRHP and CRHR, the national and state significance evaluation previously presented is also relevant here. San Fernando Road appears to have made a significant contribution to the development of Los Angeles. It was initially developed in the 1800s as a rural paved road between Los Angeles and San Fernando, and it has been improved over the years to become a heavily traversed route. The period of significance for the road from c. 1924 to 1963 coincides with when the road was paved and became a major street in Los Angeles. Therefore, the San Fernando Road is recommended to be eligible for listing as a City of Los Angeles HCM under Criterion 1.

Character-Defining Features

Character-defining features, when defined, should be the link between significant associations and historic integrity. As stated in National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation, "All properties change over time. It is not necessary for a property to retain all its historic physical features or characteristics. The property must, however, retain the essential physical features that enable it to convey its historic identity. The essential physical features are those features that define both why a property is significant (Applicable Criteria and Areas of Significance) and when it was significant (Periods of Significance)" (NPS 1995, p. 46).

Under NRHP Criterion A and CRHR Criterion 1, the San Fernando Road is significant for its contribution to the development of the state of California, the City of Los Angeles, and the San Fernando Valley. The period of significance for San Fernando Road has been defined as c. 1924 to 1963, the date when initial steps were taken to widen and improve the road to its current condition to the date when I-5 was completed in the San Fernando Valley supplanting San Fernando Road as the major north-south thoroughfare. It must retain the following character-defining features as they relate to its historical association and the integrity of location, setting, and feeling:

- Original alignment, location, and setting.
- The continued function as a north-south transportation thoroughfare.
- The historical association with the development of the State of California, the City of Los Angeles, and the San Fernando Valley.

5 California Environmental Quality Act Impacts Assessment

This section analyzes the impacts of project activities specific to built environment historical cultural resources. This analysis was prepared by Dudek Senior Architectural Historian Kathryn Haley, MA, who meets the SOI's Professional Qualifications Standards for architectural history and history.

5.1 Method for Determining Significance under the California Environmental Quality Act

Under CEQA, significant environmental effects of a proposed project must be identified in the environmental impact report (14 CCR 15126). Significant effects are based on whether the impacts from the project would exceed the significance threshold established for the resource.[5] According to the CEQA Guidelines, for cultural resources, a project would result in a significant impact on built environment historical resources if it would result in the following:

> A substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.

The CEQA Guidelines apply the following definitions to analyze impacts on historical or archaeological resources:

> "Substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (14 CCR 15064.5[b][1]).

> "The significance of a historical resource would be materially impaired when a project… demolishes or materially alters in an adverse manner those physical characteristics that convey… its historic significance or justify its inclusion in, or eligibility for," the NRHP, CRHR, or local registers (14 CCR 15064.5[b][2][A-C]).

5.2 Physical Effects and Proposed Project Plans Related to the Historic Property

The following proposed project activities could result in physical effects on the segment of the San Fernando Road in the API. For structural and locational reference, see the figures noted below, and Figure 3:

Construction taking place within the San Fernando Road alignment in the API is related to the repairs and modifications to the Cantara Trunk Line system, which is located under portions of the historic property. The proposed work is summarized below from the project description.

[5] As used in the CEQA Guidelines and 14 CCR 15358, the terms "effects" and "impacts" are synonymous, and, therefore, they are also used interchangeably in this section.

Construction of the proposed project would primarily occur along the existing public ROW of Cantara Street, Strathern Street, and San Fernando Road using open-trench and pipe-jacking construction methods. Construction of an approximately 400-foot distribution mainline spur would occur within the surface parking area of private industrial parcels using open-trench construction methods. Due to high traffic volume and utility congestion at two intersections along Strathern Street, LADWP would utilize pipe jacking methods at these locations to minimize disruptions. For similar reasons, LADWP is also considering the use of pipe jacking methods at two intersections along San Fernando Road. Figure 2-4 shows the outer limits of where construction disturbance may occur. The precise locations for work areas would be established closer to the time of construction, and the actual work area width would be less than what is shown in Figure 2-4.

Open-trench construction activities would last for approximately 58 months, assuming one construction crew (15-16 persons). Pipe jacking activities would last approximately 20 months, assuming one construction crew. Slurry-filling activities for pipelines to be abandoned would generally coincide with pipeline installation. The general processes for open-trench construction, pipe jacking, and slurry filling are described below.

Open-trench excavation is a construction method typically used to install pipelines and their appurtenances. In general, the process consists of site preparation, excavation, shoring, pipe installation, backfilling, and worksite restoration. The majority of construction would occur within the public ROW, with work areas divided into lengths of approximately 1,000 feet. The maximum length of open trench at any one time would be approximately 1,000 feet. Construction work areas would occur on the streets adjacent to the proposed pipelines and would move iteratively as construction progresses. A work area of approximately 1,000 feet in length can be used for both pipe installation activities and staging equipment. Work areas would be approximately 28 feet wide for pipeline installation on Strathern Street and San Fernando Road and 20 feet wide for pipeline installation on Cantara Street.

Work areas would be barricaded with chain-link fences and K-rails (i.e., modular traffic barriers) to prevent vehicles and pedestrians from entering work areas throughout the construction duration of a given work area. During the open-trench construction processes, approximately 27 cubic yards of excavated material are expected to be removed and hauled off per day. Each work area would be occupied for approximately 4 months.

Full road closures are not anticipated during construction. Within the vicinity of construction work areas on Strathern Street and San Fernando Road, one lane of travel is anticipated to be maintained in each direction. Any portion of the roadway damaged as a result of construction activities will be repaved and restored in accordance with all applicable City of Los Angeles Department of Public Works standards. Once the pavement has been restored, traffic delineation (striping) would also be restored.

5.3 San Fernando Road (P-19-188007) (Map ID 2) Summary of Significance

Under NRHP Criterion A and CRHR Criterion 1, the San Fernando Road is significant for its contribution to the development of the state of California, the City of Los Angeles, and the San Fernando Valley, The period of significance for San Fernando Road has been defined as ca. 1924 to 1963, the date when initial steps were taken to widen and improve the road to its current condition to the date when I-5 was completed in the San Fernando

Valley supplanting San Fernando Road as the major north-south thoroughfare. It must retain the following character-defining features as they relate to its historical association and the integrity of location, setting, and feeling:

- Original alignment, location, and setting.
- The continued function as a north-south transportation thoroughfare.
- The historical association with the development of the State of California, the City of Los Angeles, and the San Fernando Valley.

5.4 Analysis of Potential Impact to a California Environmental Quality Act Historical Resource

The proposed project activities previously described are analyzed below in consideration of potential impacts under CEQA.

The proposed project would result in open-trench excavation and pipe-jacking to install pipelines and their appurtenances underneath San Fernando Road. In general, the process consists of site preparation, excavation, shoring, pipe installation, backfilling, and worksite restoration. Portions of the roadway would be temporarily deconstructed to conduct this work. However. the roadway damaged as a result of construction activities would be repaved and restored in accordance with all applicable City of Los Angeles Department of Public Works standards. Once the pavement has been restored, traffic delineation (striping) would also be restored. There are no original materials of the roadway being damaged or destroyed.

The proposed project involves the destruction of portions of the San Fernando Road in the project API and reconstruction in kind. Reconstruction in kind is in conformance with the SOI's guidelines. The San Fernando Road would retain its historic location, alignment, and setting. The historic roadway would not be neglected as part of the proposed project; rather, it would be repaved and improved, so it continues to serve as a major community thoroughfare, which is one of its character-defining features. The project would therefore not result in a change of use for the historic-era roadway. Additionally, project construction and implementation would not introduce new visual, atmospheric, or audible elements that are not considered common sounds in its current setting. Following project completion, including reconstruction of the road in kind, the roadway would continue to retain all its character-defining features and would remain eligible for listing under Criteria A/1; therefore, the potential impact would be considered less than significant.

5.5 Summary

Dudek recommends that the project would not result in an adverse effect for the segment of the San Fernando Road in the API. The CEQA finding is considered less than significant.

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6 Summary of Findings and Management Considerations

As a result of Dudek's research, field survey, and property significance evaluations, the following section presents a summary of eligibility for the subject properties in the API and management recommendations. A summary of CEQA findings for Cultural Resources is summarized below.

6.1 Archaeological Resources Findings

Dudek's cultural resources inventory of the project API suggests that there is a low potential for inadvertent impacts to previously unidentified archaeological cultural resources or deposits. The CHRIS records search did not identify any discrete archaeological resources within the API or the 0.5-mile record search radius. According to historic aerial photographs and topographic maps, the amount of previous disturbance from the structures constructed between the 1940s and the 2020s and the installation of previous infrastructure and utilities indicates a low potential for the presence of intact subsurface soils that could support archaeological deposits.

A cultural resources survey was completed of all undeveloped areas within the API. No cultural resources were identified during this survey. Visibility of the ground surface was restricted due to the presence of paved roadways, sidewalks, and associated landscaping (Photograph 2 and Photograph 3). Upon observation, the exposed soils appeared to be imported fill associated with previous construction activities, and no native alluvial soils were observed. In conclusion, because there are no known archaeological resources within the surrounding 0.5 miles, and due to the previous disturbance, addition of pavement, and landscaping, the project has a low potential of encountering unanticipated archaeological resources within the API. The recommended CEQA finding for archaeological resources is less than significant with mitigation incorporated.

Photograph 2. Overview of Strathern Street toward Whitsett Avenue; view to east.



Source: Dudek 2025 (IMG_8670.JPG)

Photograph 3. Overview of Cantara Street toward Gentry Avenue; view to east.



Source: Dudek 2025 (IMG_8677.JPG)

6.2 Archaeological Resources Management Recommendations

6.2.1 Unanticipated Discovery of Archaeological Resources

Below are the recommended measures (MM-CUL-1 and MM-CUL-2) for implementation prior to and during project construction.

MM-CUL-1 Cultural Resources Awareness Training and Management Plan. All field supervisors and all construction workers shall participate in cultural resources awareness training prior to the initiation of project construction on project sites that involve ground-disturbing activities. The training shall include a description of the types of cultural resources (including tribal cultural resources and human remains) that could inadvertently be encountered during ground-disturbing activities, the sensitivity of the resources, the legal basis for protection of the resources, and the penalties for unauthorized collection of or knowingly damaging the resources. The training shall address the proper procedures in the event of an inadvertent discovery of a cultural resource, including the immediate halting of work in the area of the discovery, notification of appropriate individuals of the discovery, the establishment of appropriate protective buffer zones around the discovery, and the continued avoidance of the protected area until the resource has been evaluated by qualified individuals and an appropriate treatment plan has been developed and implemented. These procedures shall be documented in a cultural resources management plan (CRMP) that shall establish, in the event of an inadvertent discovery of cultural resources, monitoring procedures (including applicable archaeological and/or tribal monitors), notification procedures, key staff, and preliminary treatment measures for potential discoveries. The CRMP shall be written to ensure compliance with appropriate state and federal laws. The training presentation and CRMP shall be available to additional supervisory or construction personnel who may join after project construction has begun.

MM-CUL-2 Inadvertent Discovery. In the event that cultural resources are inadvertently discovered during project activities, all construction work occurring within 100 feet of the find shall cease and a qualified archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for archaeology shall assess the find. Construction activities may continue in other areas, or use existing paths of travel, but should be redirected a safe distance from the find. Consulting tribes shall be contacted about any pre-contact and/or post-contact finds and be provided information after the archaeologist makes their initial assessment of the nature of the find, to provide Tribal input with regards to significance and treatment.

6.2.2 Unanticipated Discovery of Human Remains

Below is the recommended measure (MM-CUL-3) for implementation during project construction.

MM-CUL-3 Inadvertent Discovery of Human Remains. In accordance with Section 7050.5 of the California Health and Safety Code, if human remains are found, the County Coroner shall be immediately notified of the discovery. No further excavation or disturbance of the site or any nearby area

reasonably suspected to overlie adjacent remains shall occur until the County Coroner has determined the appropriate treatment and disposition of the human remains. If the County Coroner determines that the remains are, or are believed to be, Native American, he or she shall notify the Native American Heritage Commission (NAHC) in Sacramento within 24 hours. In accordance with California Public Resources Code Section 5097.98, the NAHC must immediately notify the person or persons it believes to be the Most Likely Descendant (MLD) from the deceased Native American. The MLD shall complete inspection and make recommendations for the treatment and disposition, in consultation with LADWP, of the human remains within 48 hours of being granted access to the site.

6.3 Built Environment Findings

Dudek's archival research and field survey identified two historic-age resources within the API that required consideration as a historical resource under CEQA. San Fernando Road was previously evaluated in 2012 and assigned a California Historical Resource Status (CHRS) Code of 3S, indicating that it was found eligible for the NRHP individually through a survey evaluation. Dudek agrees with the previous evaluation of San Fernando Road that the road is eligible under NRHP Criterion A and CRHR Criterion 1 for its contribution to the development of the state of California, the City of Los Angeles, and the San Fernando Valley area. The Cantara Trunk Line was evaluated under NRHP, CRHR, and Los Angeles HCM criteria and was found not to meet any of the applicable criteria thresholds and associated integrity considerations. The recommended CHRS Code for the property is 6Z, meaning it was found ineligible for the NRHP and CRHR through survey evaluation (Table 4).

Preparation of a detailed impacts assessment in Section 5 of this report recommends that the project would have no adverse effect on the segment of the San Fernando Road which qualifies as a historical resource under CEQA. The recommended CEQA finding for built environment historical resources is less than significant; no mitigation is required. Table 4 summarizes these suggested findings. LADWP would fund the proposed project and is the lead agency under CEQA. LADWP may use the documentation and recommendations in this report as substantial evidence as part of the CEQA process.

Table 4. CEQA Findings for Built Environment Historical Resources

Figure 3. API Map ID	Name of Property if Applicable	Year Built	Property Type	Prior CHRS Status Code, if applicable	Current CHRS Status Code	Eligibility and Status	Applicable Criteria	CEQA Finding
1	Cantara Trunk Line	1917	Water Conveyance (Trunk Line)	N/A	6Z	Ineligible, not a CEQA Historical Resource	N/A	No Impact
2	San Fernando Road	c. 1924	Road	3S	3S	Eligible, qualifies as a CEQA Historical Resource	A/1	Less Than Significant, No Mitigation Required

Notes: CEQA = California Environmental Quality Act; CRHR = California Register of Historical Resources.
California Historical Resource Status Codes
6Z = Found ineligible for NR, CR or local designation through survey evaluation.
3S = Appears eligible for CRHR individually through survey evaluation

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Appendix A (Confidential)

Records Search Maps and Information

Appendix B

Native American Heritage Commission Sacred Lands File Results

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Reginald Pagaling
Chumash

VICE-CHAIRPERSON
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

SECRETARY
Sara Dutschke
Miwok

PARLIAMENTARIAN
Wayne Nelson
Luiseño

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Stanley Rodriguez
Kumeyaay

COMMISSIONER
Laurena Bolden
Serrano

COMMISSIONER
Reid Milanovich
Cahuilla

COMMISSIONER
Vacant

EXECUTIVE SECRETARY
Raymond C. Hitchcock
Miwok, Nisenan

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

December 21, 2023

Alexandria Fortaleza
Los Angeles Department of Water and Power

Via Email to: Alexandria.Fortaleza@ladwp.com

Re: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Cantara Trunk Line Replacement Project, Los Angeles County

Dear Ms. Fortaleza:

Pursuant to Public Resources Code section 21080.3.1 (c), attached is a consultation list of tribes that are traditionally and culturally affiliated with the geographic area of the above-listed project. Please note that the intent of the AB 52 amendments to CEQA is to avoid and/or mitigate impacts to tribal cultural resources, (Pub. Resources Code §21084.3 (a)) ("Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.")

Public Resources Code sections 21080.3.1 and 21084.3(c) require CEQA lead agencies to consult with California Native American tribes that have requested notice from such agencies of proposed projects in the geographic area that are traditionally and culturally affiliated with the tribes on projects for which a Notice of Preparation or Notice of Negative Declaration or Mitigated Negative Declaration has been filed on or after July 1, 2015. Specifically, Public Resources Code section 21080.3.1 (d) provides:

Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The AB 52 amendments to CEQA law does not preclude initiating consultation with the tribes that are culturally and traditionally affiliated within your jurisdiction prior to receiving requests for notification of projects in the tribe's areas of traditional and cultural affiliation. The Native American Heritage Commission (NAHC) recommends, but does not require, early consultation as a best practice to ensure that lead agencies receive sufficient information about cultural resources in a project area to avoid damaging effects to tribal cultural resources.

The NAHC also recommends, but does not require that agencies should also include with their notification letters, information regarding any cultural resources assessment that has been completed on the area of potential effect (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

- A listing of any and all known cultural resources that have already been recorded on or adjacent to the APE, such as known archaeological sites;
- Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
- Whether the records search indicates a low, moderate, or high probability that unrecorded cultural resources are located in the APE; and
- If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

    - Any report that may contain site forms, site significance, and suggested mitigation measures.

      All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code section 6254.10.

3. The result of any Sacred Lands File (SLF) check conducted through the Native American Heritage Commission was negative.

4. Any ethnographic studies conducted for any area including all or part of the APE; and

5. Any geotechnical reports regarding all or part of the APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS are not exhaustive and a negative response to these searches does not preclude the existence of a tribal cultural resource. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the event that they do, having the information beforehand will help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our consultation list remains current.

If you have any questions, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Los Angeles County
12/21/2023

Tribe Name	Fed (F) Non-Fed (N)	Contact Person	Contact Address	Phone #	Fax #	Email Address	Cultural Affiliation	Counties	Last Updated
Barbareño/Ventureño Band of Mission Indians	N	Cultural Resource Committee,	P.O. Box 364 Ojai, CA, 93024	(805) 746-6685		CR@bvbmi.com	Chumash	Los Angeles,San Luis Obispo,Santa Barbara,Ventura	6/19/2023
Chumash Council of Bakersfield	N	Julio Quair, Chairperson	729 Texas Street Bakersfield, CA, 93307	(661) 322-0121		chumashtribe@sbcglobal.net	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	
Coastal Band of the Chumash Nation	N	Gabe Frausto, Chairman	P.O. Box 40653 Santa Barbara, CA, 93140	(805) 568-8063		fraustogabriel28@gmail.com	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	8/28/2023
Fernandeno Tataviam Band of Mission Indians	N	Sarah Brunzell, CRM Manager	1019 Second Street San Fernando, CA, 91340	(818) 837-0794		CRM@tataviam-nsn.us	Tataviam	Kern,Los Angeles,Ventura	5/25/2023
Gabrieleno Band of Mission Indians - Kizh Nation	N	Christina Swindall Martinez, Secretary	P.O. Box 393 Covina, CA, 91723	(844) 390-0787		admin@gabrielenoindians.org	Gabrieleno	Los Angeles,Orange,Riverside,San Bernardino,Santa Barbara,Ventura	8/18/2023
Gabrieleno Band of Mission Indians - Kizh Nation	N	Andrew Salas, Chairperson	P.O. Box 393 Covina, CA, 91723	(844) 390-0787		admin@gabrielenoindians.org	Gabrieleno	Los Angeles,Orange,Riverside,San Bernardino,Santa Barbara,Ventura	8/18/2023
Gabrieleno/Tongva San Gabriel Band of Mission Indians	N	Anthony Morales, Chairperson	P.O. Box 693 San Gabriel, CA, 91778	(626) 483-3564	(626) 286-1262	GTTribalcouncil@aol.com	Gabrieleno	Los Angeles,Orange,Riverside,San Bernardino,Ventura	12/4/2023
Gabrielino /Tongva Nation	N	Sandonne Goad, Chairperson	106 1/2 Judge John Aiso St., #231 Los Angeles, CA, 90012	(951) 807-0479		sgoad@gabrielino-tongva.com	Gabrielino	Los Angeles,Orange,Riverside,San Bernardino,Ventura	3/28/2023
Gabrielino Tongva Indians of California Tribal Council	N	Robert Dorame, Chairperson	P.O. Box 490 Bellflower, CA, 90707	(562) 761-6417	(562) 761-6417	gtongva@gmail.com	Gabrielino	Los Angeles,Orange,Riverside,San Bernardino,Santa Barbara,Ventura	3/16/2023
Gabrielino Tongva Indians of California Tribal Council	N	Christina Conley, Cultural Resource Administrator	P.O. Box 941078 Simi Valley, CA, 93094	(626) 407-8761		christina.marsden@alumni.usc.edu	Gabrielino	Los Angeles,Orange,Riverside,San Bernardino,Santa Barbara,Ventura	3/16/2023
Gabrielino-Tongva Tribe	N	Sam Dunlap, Cultural Resource Director	P.O. Box 3919 Seal Beach, CA, 90740	(909) 262-9351		tongvatcr@gmail.com	Gabrielino	Los Angeles,Orange,Riverside,San Bernardino,Ventura	5/30/2023
Gabrielino-Tongva Tribe	N	Charles Alvarez, Chairperson	23454 Vanowen Street West Hills, CA, 91307	(310) 403-6048		Chavez1956metro@gmail.com	Gabrielino	Los Angeles,Orange,Riverside,San Bernardino,Ventura	5/30/2023
Northern Chumash Tribal Council	N	Violet Walker, Chairperson	P.O. Box 6533 Los Osos, CA, 93412	(760) 549-3532		violetsagewalker@gmail.com	Chumash	Los Angeles,San Luis Obispo,Santa Barbara,Ventura	6/5/2023
San Fernando Band of Mission Indians	N	Donna Yocum, Chairperson	P.O. Box 221838 Newhall, CA, 91322	(503) 539-0933	(503) 574-3308	dyocum@sfbmi.org	Kitanemuk Vanyume Tataviam	Kern,Los Angeles,San Bernardino,Ventura	5/8/2023
Santa Rosa Band of Cahuilla Indians	F	Lovina Redner, Tribal Chair	P.O. Box 391820 Anza, CA, 92539	(951) 659-2700	(951) 659-2228	lsaul@santarosa-nsn.gov	Cahuilla	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	
Santa Ynez Band of Chumash Indians	F	Sam Cohen, Government & Legal Affairs Director	100 Via Juana Road Santa Ynez, CA, 93460			scohen@chumash.gov	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	7/6/2023
Santa Ynez Band of Chumash Indians	F	Kelsie Shroll, Elders' Council Administrative Assistant	100 Via Juana Road Santa Ynez, CA, 93460	(805) 245-5403		kshroll@chumash.gov	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	7/6/2023
Santa Ynez Band of Chumash Indians	F	Nakia Zavalla, Tribal Historic Preservation Officer	100 Via Juana Road Santa Ynez, CA, 93460			nzavalla@chumash.gov	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	7/6/2023
Santa Ynez Band of Chumash Indians	F	Wendy Teeter, Cultural Resources Archaeologist	100 Via Juana Road Santa Ynez, CA, 93460	(805) 325-8630		wteeter@chumash.gov	Chumash	Kern,Los Angeles,San Luis Obispo,Santa Barbara,Ventura	7/6/2023
Soboba Band of Luiseno Indians	F	Joseph Ontiveros, Tribal Historic Preservation Officer	P.O. Box 487 San Jacinto, CA, 92581	(951) 663-5279	(951) 654-4198	jontiveros@soboba-nsn.gov	Cahuilla Luiseno	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	7/14/2023
Soboba Band of Luiseno Indians	F	Jessica Valdez, Cultural Resource Specialist	P.O. Box 487 San Jacinto, CA, 92581	(951) 663-6261	(951) 654-4198	jvaldez@soboba-nsn.gov	Cahuilla Luiseno	Imperial,Los Angeles,Orange,Riverside,San Bernardino,San Diego	7/14/2023

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and section 5097.98 of the Public Resources Code.

This list is only applicable for consultation with Native American tribes under Public Resources Code Sections 21080.3.1 for the proposed Cantara Trunk Line Replacement Project, Los Angeles County.

Record: PROJ-2023-006266
Report Type: AB52 GIS
Counties: Los Angeles
NAHC Group: All

Appendix C

Interested Party Correspondence

Los Angeles Department of Water & Power
BUILDING A STRONGER L.A.

Karen Bass, Mayor

Board of Commissioners
Richard Katz, President
George S. McGraw, Vice President
Nurit D. Katz
Mia Lehrer
Wilma J. Pinder
Chante L. Mitchell, Secretary

Janisse Quiñones, Chief Executive Officer and Chief Engineer

April 29, 2025

Los Angeles City Historical Society
PO Box 862311
Los Angeles, CA 90086-2311

To Whom it May Concern:

Subject: Cantara Trunk Line Replacement Project

Dudek has been retained by the Los Angeles Department of Water and Power (LADWP) to complete a cultural resources inventory and evaluation report for the Cantara Trunk Line Project (Proposed Project). The Proposed Project is located in the northern portion of the City of Los Angeles in the Sun Valley community (see Project Location Map enclosed).

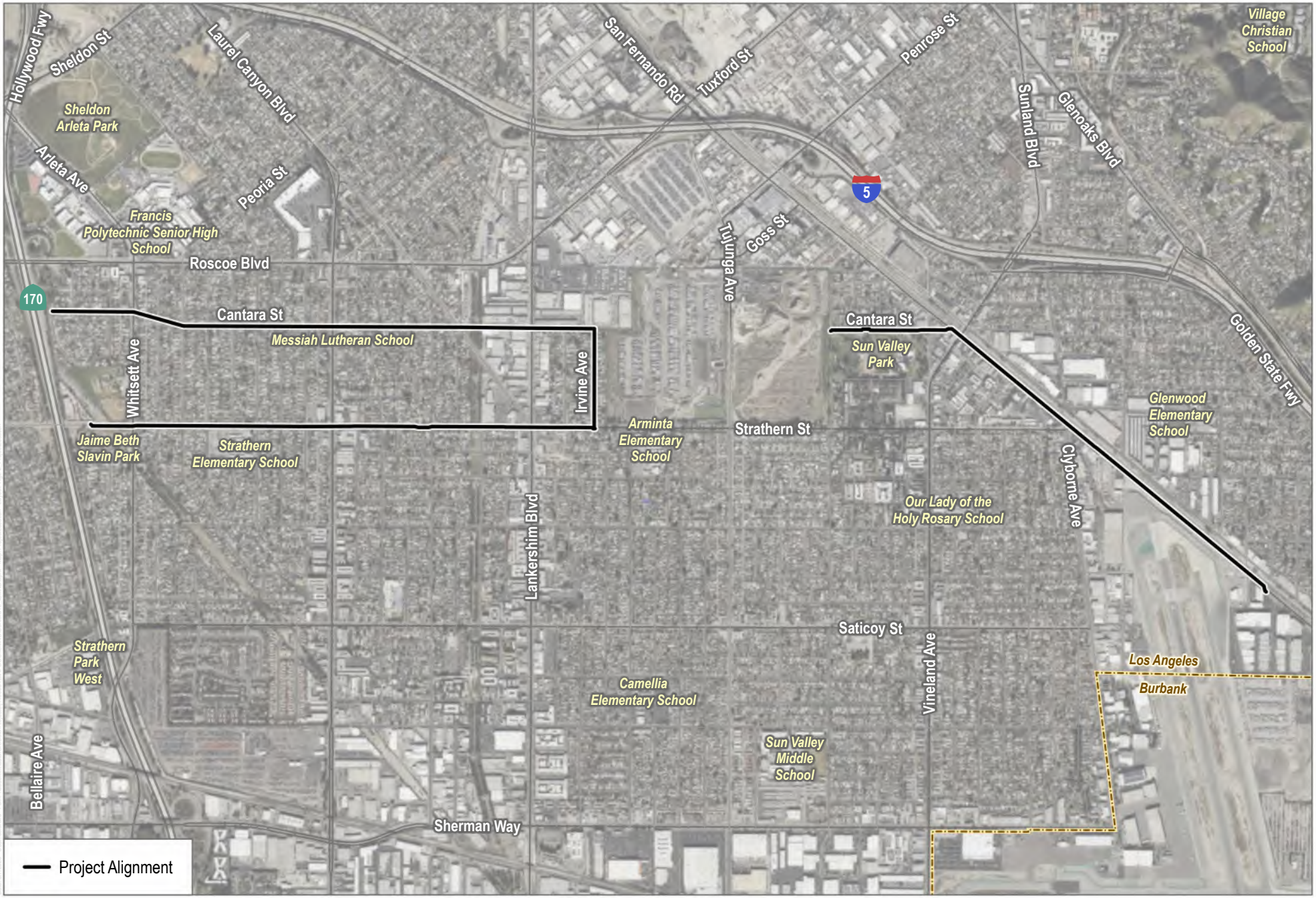
LADWP is proposing to install approximately 8,200 feet of 30-inch diameter underground pipe along Strathern Street and Cantara Street, and to replace the aging and deteriorated existing Cantara Trunk Line along San Fernando Road with approximately 5,100 feet of 20-inch diameter underground pipe. The Proposed Project will also include improvements to the 7,010 feet of eight-inch distribution mainline along Cantara Street.

As part of our study, we are consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be affected by the Proposed Project. Your efforts in this process will provide invaluable information for the proper identification and treatment of such resources. If you have any information regarding known cultural resources in the Proposed Project area, please feel free to contact Ms. Alexandria Fortaleza, of my staff, at (213) 367-0871 or Alexandria.Fortaleza@ladwp.com. All comments, emails or letters received will be included in the reports generated by this study. Thank you for your time regarding our request.

Sincerely,

Jane Hauptman
Manager of Environmental Planning and Assessment

AF:ar
Enclosure
c/enc: Ms. Alexandria Fortaleza



SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

N

0 850 1,700 Feet

FIGURE 1

Project Location

Cantara Trunk Line Replacement Project

Los Angeles Department of Water & Power
BUILDING A STRONGER L.A.

Karen Bass, Mayor

Board of Commissioners
Richard Katz, President
George S. McGraw, Vice President
Nurit D. Katz
Mia Lehrer
Wilma J. Pinder
Chante L. Mitchell, Secretary

Janisse Quiñones, Chief Executive Officer and Chief Engineer

April 29, 2025

San Fernando Valley Historical Society
10940 Sepulveda Boulevard
Mission Hills, CA 91345

To Whom it May Concern:

Subject: Cantara Trunk Line Replacement Project

Dudek has been retained by the Los Angeles Department of Water and Power (LADWP) to complete a cultural resources inventory and evaluation report for the Cantara Trunk Line Project (Proposed Project). The Proposed Project is located in the northern portion of the City of Los Angeles in the Sun Valley community (see Project Location Map enclosed).

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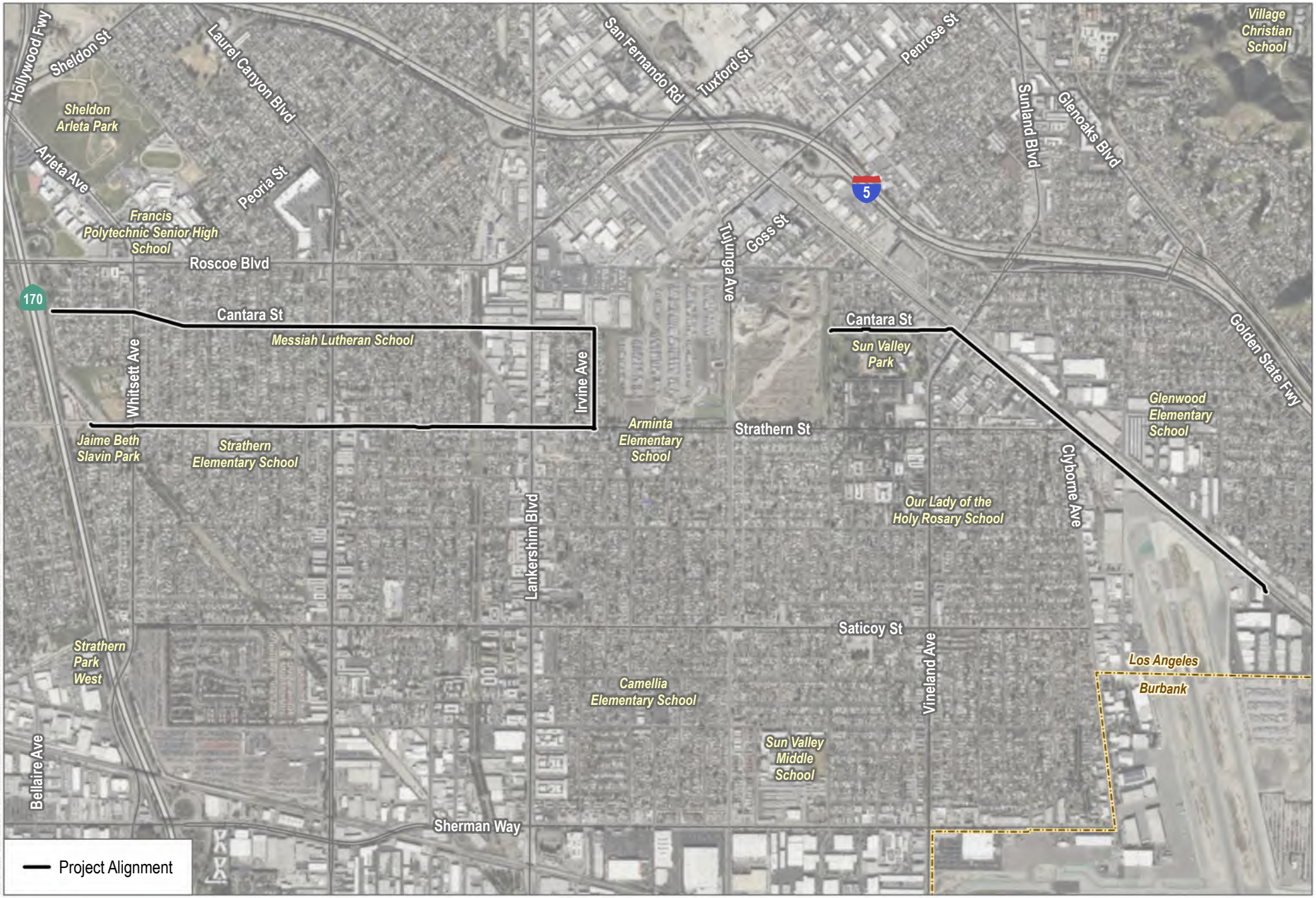
Sincerely,

Jane Hauptman
Manager of Environmental Planning and Assessment

AF:ar
Enclosure
c/enc: Ms. Alexandria Fortaleza



SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

N

0 850 1,700 Feet

FIGURE 1

Project Location

Cantara Trunk Line Replacement Project

Los Angeles Department of Water & Power
BUILDING A STRONGER L.A.

Karen Bass, Mayor

Board of Commissioners
Richard Katz, President
George S. McGraw, Vice President
Nurit D. Katz
Mia Lehrer
Wilma J. Pinder
Chante L. Mitchell, Secretary

Janisse Quiñones, Chief Executive Officer and Chief Engineer

April 29, 2025

Burbank Historical Society
1100 West Clark Avenue
Burbank, CA 91506

To Whom it May Concern:

Subject: Cantara Trunk Line Replacement Project

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Jane Hauptman
Manager of Environmental Planning and Assessment

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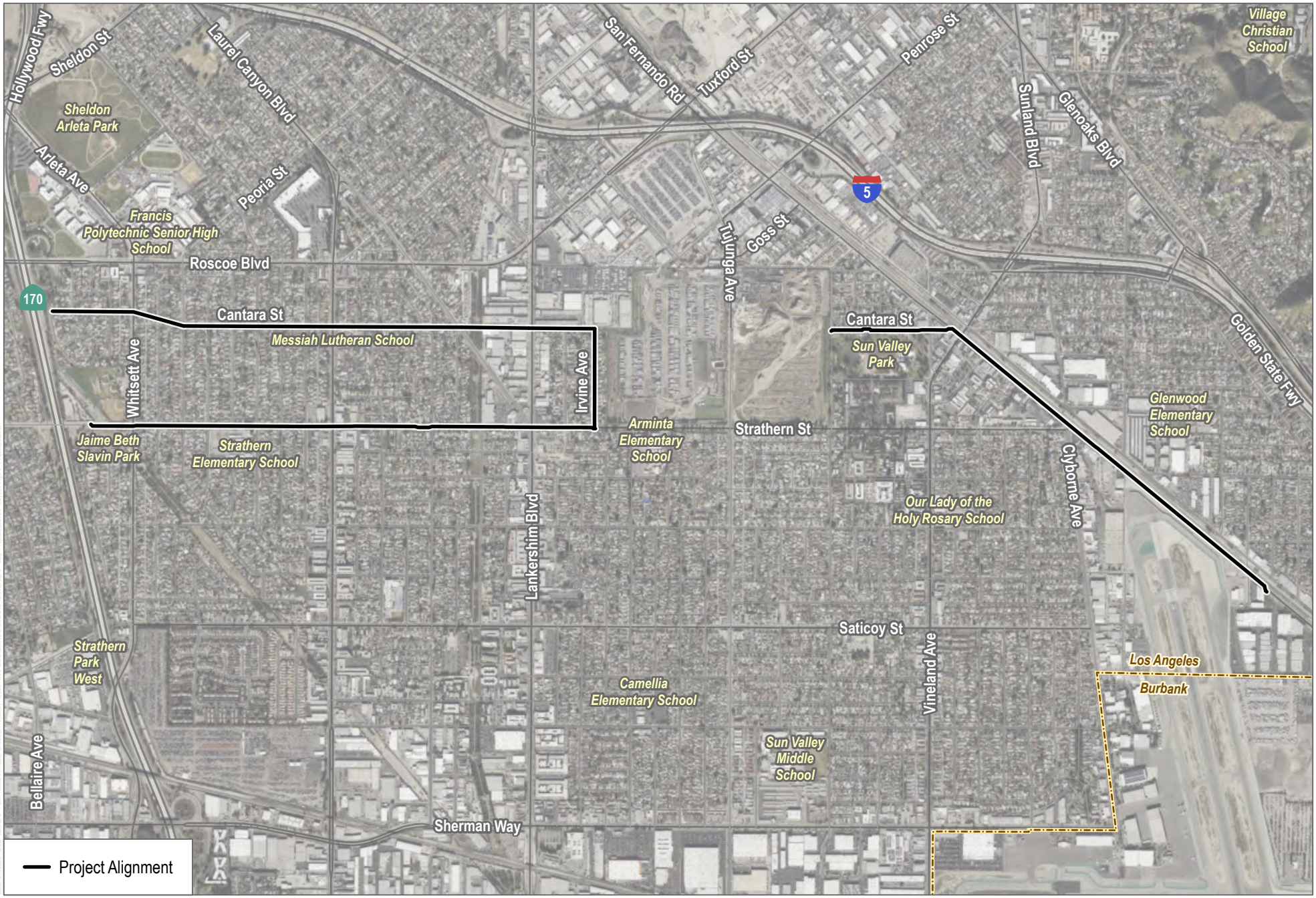
Enclosure
c/enc: Ms. Alexandria Fortaleza



SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 850 1,700 Feet

FIGURE 1

Project Location

Cantara Trunk Line Replacement Project

From: Lindsay Mulcahy
To: Fortaleza, Alexandria
Cc: Andrew Salimian
Subject: [EXTERNAL] RE: Cantara Trunk Line Replacement Project - Historical Outreach
Date: Thursday, May 8, 2025 1:25:58 PM
Attachments: image001.png

EXTERNAL EMAIL! This email was generated from a non-LADWP address. If any links exist, do not click/open on them unless you are 100% certain of the associated site or source. ALWAYS hover over the link to preview the actual URL/site and confirm its legitimacy.

Hi Alexandria,

Thank you for consulting the L.A. Conservancy about historic resources within the project area. HistoricPlacesLA identifies three eligible resources that are along the project route: 1123 W Cantara Street, Roscoe Elementary Schoolhouse at 10765 W Strathern Street, and the Metropolitan Water District Water Treatment Plant at 7550 N Greg Avenue.

Please include us as interested parties should the project impact any of these historic resources.

Best,

Lindsay

Lindsay Mulcahy
Neighborhood Outreach Manager
Los Angeles Conservancy
523 West Sixth Street, Suite 826
Los Angeles, CA 90014
(520) 307-6265 | lmulcahy@laconservancy.org

Pronouns: She / Her / Hers

laconservancy.org
E-News – Facebook – Twitter – Instagram

Membership starts at just $40
Join the Conservancy today

From: Fortaleza, Alexandria <Alexandria.Fortaleza@ladwp.com>

Sent: Tuesday, May 6, 2025 1:43 PM
To: Reception <info@laconservancy.org>
Subject: Cantara Trunk Line Replacement Project - Historical Outreach

To whom it may concern:

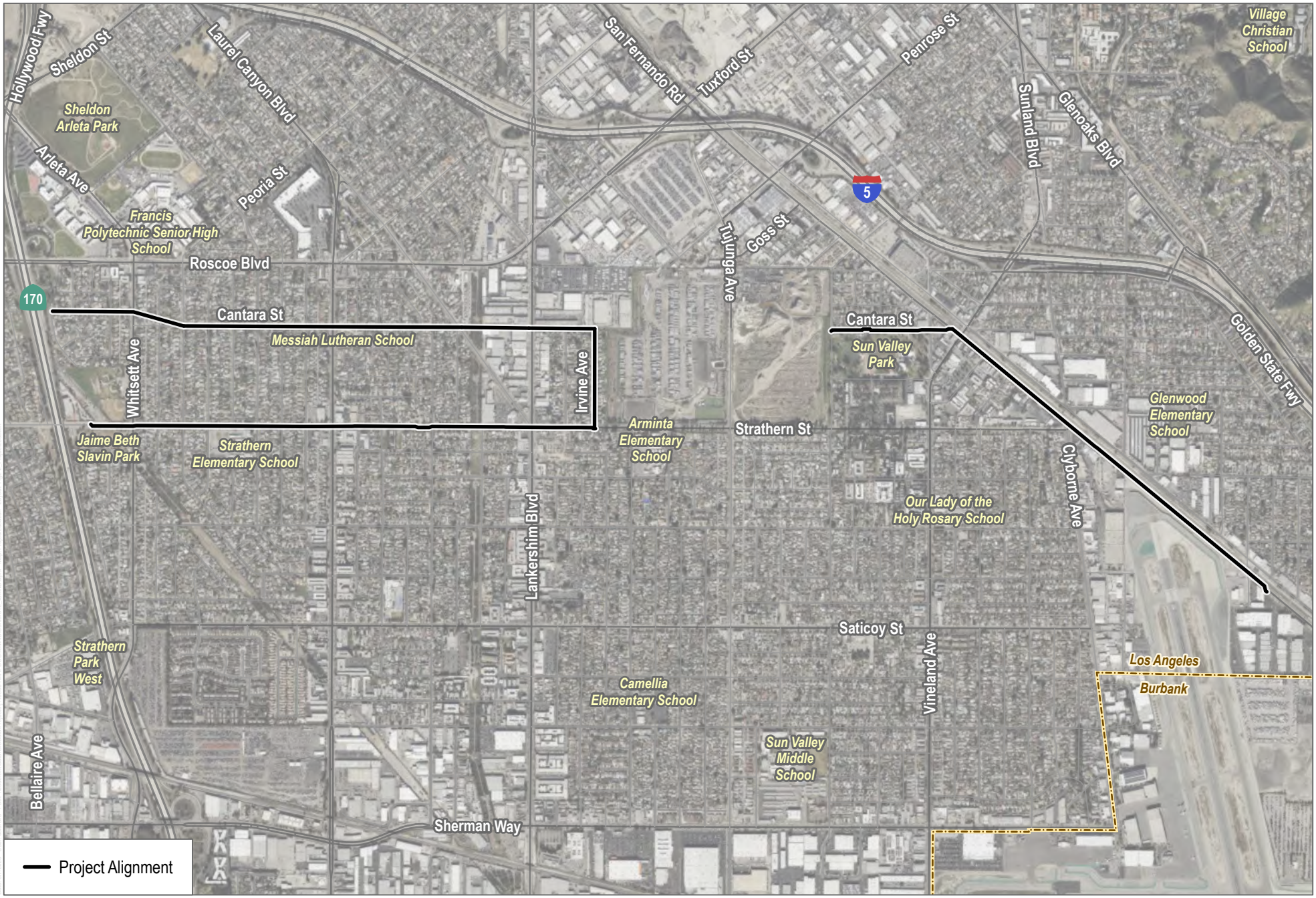
I am reaching out today on behalf of Los Angeles Department of Water and Power and our consulting firm, Dudek, to provide you with some information about the Cantara Trunk Line Replacement Project. As part of the cultural resources study for the proposed project, Dudek is consulting all regional historical organizations to determine if there are any known historic or cultural resources that may be within the proposed project area. Please see the attached letter and map for more information about the nature and location of the project, and please feel free to contact me should you have questions or information regarding cultural or historical resources in this area.

Thank you,

LA DWP Los Angeles Department of Water & Power

Alexandria Fortaleza
Environmental Specialist
Environmental Planning and Assessment
111 N. Hope Street, Room 1044
Los Angeles, CA 90012
Office: (213) 367-0871
Cell: (213) 661-8259

----------Confidentiality Notice---------- This electronic message transmission contains information from the Los Angeles Department of Water and Power (LADWP), which may be confidential. If you are not the intended recipient, be aware that any disclosure, copying, distribution or use of the content of this information is prohibited. If you have received this communication in error, please notify us immediately by e-mail and delete the original message and any attachment without reading or saving in any manner.



SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 850 1,700 Feet

FIGURE 1

Project Location

Cantara Trunk Line Replacement Project

Appendix D
DPR Forms

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) Cantara Trunk Line

P1. Other Identifier: N/A

*P2. **Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Los Angeles

and (P2c, P2e, and P2b or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Burbank, Calif. Van Nuys, Calif. **Date** 1994 **T** 2N; **R** 14-15W; ¼ **of** ¼ **of Sec** 31-33 and 36, ; San Bernardino **B.M.**

c. Address Cantara Street between Potter Avenue and San Fernando Road, and San Fernando Road between Cantara Street and City Los Angeles Zip 91352

d. UTM: (Give more than one for large and/or linear resources) Zone 11, 379008 mE/ 3754396 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, decimal degrees, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Cantara Trunk Line is an underground municipal water conveyance structure located in the Sun Valley community of the City of Los Angeles, California. The subject segment of trunk line begins at the intersection of Coldwater Canyon Avenue and Cantara Street and terminates at the intersection of San Fernando Road and Arvilla Avenue. It consists of approximately 26,990 feet of concrete, riveted steel, and welded steel pipes. See Continuation Sheet.

***P3b. Resource Attributes:** (List attributes and codes) AH6. Water Conveyance System

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) Photo 1, Cantara Street and Potter Avenue, looking east, 2/21/2025 (Dudek, IMG_8681)

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1917 (LADWP 2025)

***P7. Owner and Address:**
Los Angeles Department of Water and Power
111 North Hope Street, Room 1044
Los Angeles, CA 90012

***P8. Recorded by:** (Name, affiliation, address)
Katie Ahmanson, MHC, Dudek
225 S. Lake Ave, Ste. M210
Pasadena, CA 91101

***P9. Date Recorded:** 2/21/2025

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Dudek. 2025. *Cultural Resources Inventory, Evaluation, and Impact Assessment Report for the Cantara Trunk Line Replacement Project*. Prepared for Los Angeles Department of Water and Power. July 2025.

***Attachments:** ☐ NONE ☒Location Map ☒Continuation Sheet ☒Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☒Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐Sketch Map ☐Other (List):

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) Cantara Trunk Line

B1. Historic Name: Glendale Trunk Line
B2. Common Name: Cantara Trunk Line
B3. Original Use: Water Conveyance System
B4. Present Use: Water Conveyance System
***B5. Architectural Style:** N/A
***B6. Construction History:** (Construction date, alterations, and date of alterations) See Continuation Sheet.

***B7. Moved?** ☒**No** ☐**Yes** ☐**Unknown** **Date:** **Original Location:**
***B8. Related Features:** N/A

B9a. Architect: N/A b. Builder: N/A
***B10. Significance: Theme** N/A **Area:** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The Cantara Trunk Line does not meet the criteria for the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR) or City of Los Angeles HCM Criteria. The property was evaluated in accordance with Section 106 of the National Historic Preservation Act (Section 106) and Section 15064.5 (a)(2)-(3) of the CEQA Guidelines using the criteria outlined in Section 5024.1 of the California Public Resources Code. The property is not considered a historic property for the purposes of Section 106 or a historical resource under CEQA. As such, this evaluation assigns a 6Z California Historical Resources Status Code to the Cantara Trunk Line. See Continuation Sheet.

B11. Additional Resource Attributes: (List attributes and codes)

***B12. References:** See Continuation Sheet.

B13. Remarks:

***B14. Evaluator:** Katie Ahmanson, MHC, Dudek

***Date of Evaluation:** May 2025

(This space reserved for official comments.)

(Sketch Map with north arrow required.)



L1. Historic and/or Common Name: Cantara Trunk Line

L2a. Portion Described: ☐ Entire Resource ☒ Segment ☐ Point Observation **Designation:**

b. Location of point or segment: (Provide UTM coordinates, decimal degrees, legal description, and any other useful locational data. Show the area that has been field inspected on a Location Map.)

The Cantara Trunk Line extends from the intersection of Cantara Street and Coldwater Canyon to the intersection of Cantara Street and San Fernando Road where it terminates at San Fernando Road from Cantara Street to Ferncola Avenue in Sun Valley, Los Angeles, Los Angeles County.

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)

It is located underground at depths ranging from approximately 8 to 15 feet. The trunk line consists of about 13,900 feet of riveted steel pipe segments and about 13,090 feet of welded steel pipe, ranging in diameter from 27 inches to 36.75 inches.

L4. Dimensions: (In feet for historic features and meters for prehistoric features)

- **a. Top Width:** Uknown
- **b. Bottom Width:** Uknown
- **c. Height or Depth:** Uknown
- **d. Length of Segment:** 26,990 feet

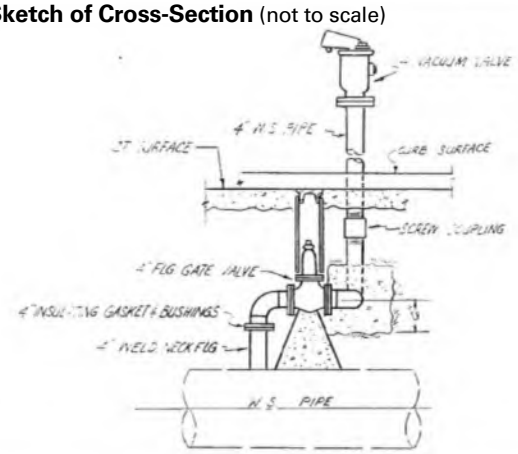
L5. Associated Resources: N/A

L6. Setting: (Describe natural features, landscape characteristics, slope, etc., as appropriate.):

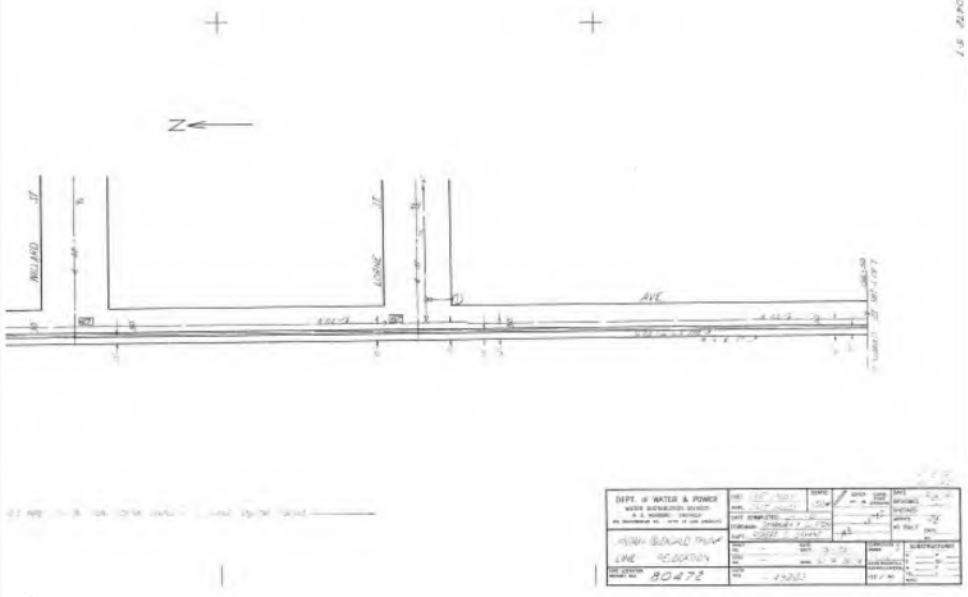
Commercial and residential properties.

L7. Integrity Considerations: Approximately 2,210 feet of the pipeline was replaced in 1960 and about 4,460 feet of additional pipeline was installed in 1961. Portions totaling about 4,480 of the trunk line were abandoned c. 1965.

L4e. Sketch of Cross-Section (not to scale) **Facing:** N/A



L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing (View, scale, etc.) Plan for the 1960 replacement of the line along Fair Avenue (LADWP 2025)

L9. Remarks: N/A

L10. Form Prepared by: (Name, affiliation, and address)

Katie Ahmanson
Dudek
225 S. Lake Avenue
Pasadena, CA 91101

L11. Date: 2/21/2025

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

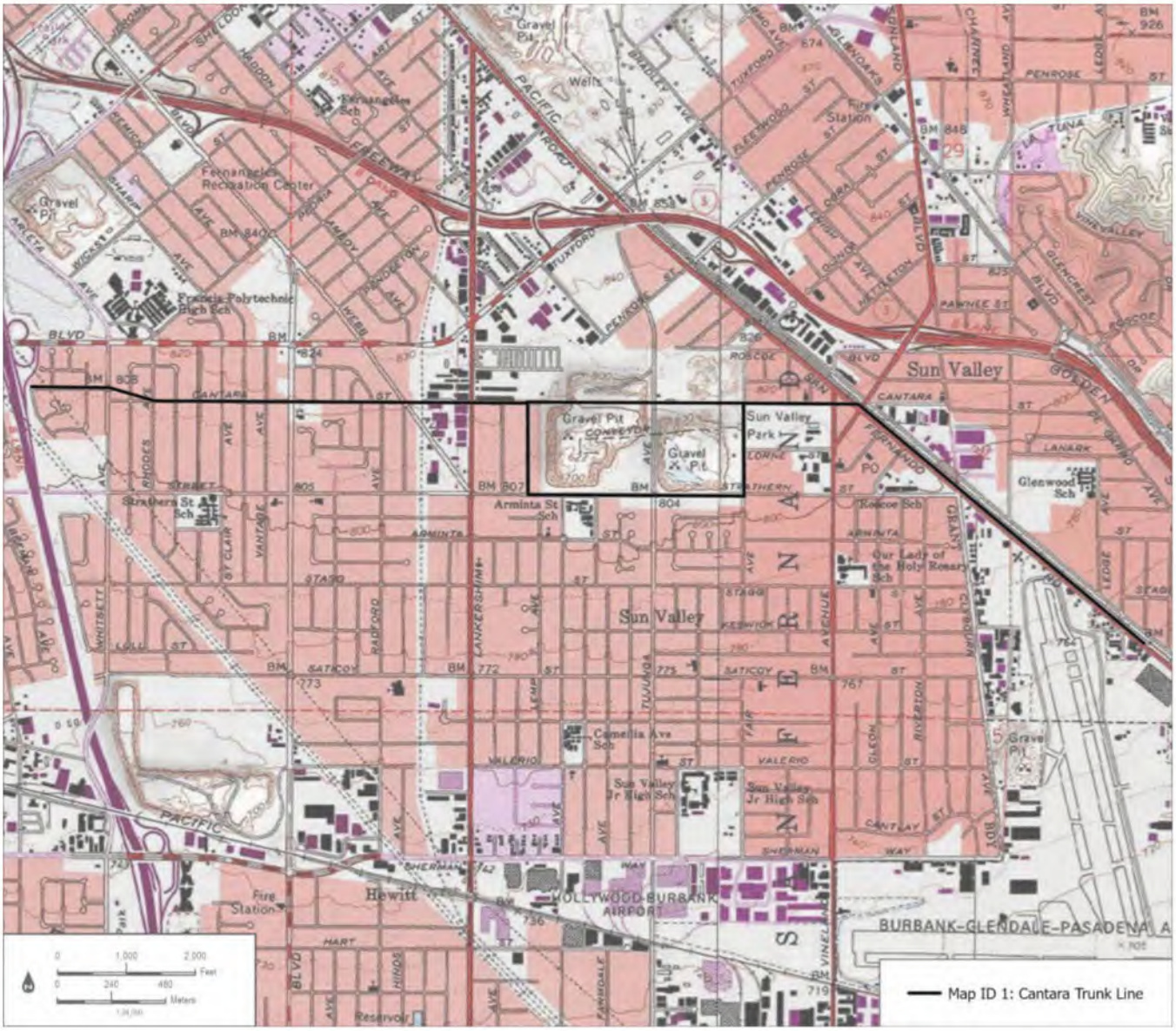
Primary #
HRI#
Trinomial

***Resource Name or #** (Assigned by recorder) Cantara Trunk Line

***Map Name:** Burbank, Calif. Van Nuys, Calif.

***Scale:** 1:24,000

***Date of map:** 1994



*** Required information**

***P3a. Description**

Trunk line components include isolation valves, blowoffs, combination air/vacuum valves, and distribution mainlines that reduce water pressure for delivery to properties. The subject segments of the Harbor Trunk Line are located underneath Cantara Street between Potter Avenue and Irvine Avenue, from Fair Avenue to San Fernando Road, and along San Fernando Road from Cantara Street to Arvilla Avenue. They are not visible and are buried beneath the road at a depth ranging from approximately 7 to 10 feet.

The subject segments consist of about 13,900 feet of riveted steel pipe segments installed in 1917 and about 13,090 feet of welded steel pipe segments installed between 1961 and 1965, ranging in diameter from 27 inches to 36.75 inches. Connection pipes and regulator stations are situated along the trunk line alignment and are components of the system that ensure its effective operation. A 20-to-27-inch diameter cast iron mainline, installed in 1960, connects to the Cantara Trunk Line along approximately 5,100 feet of San Fernando Road between Cantara Street and Arvilla Avenue. The subject segment connects to the City Trunk Line South (installed circa 2007) at the intersection of Coldwater Canyon Avenue and Cantara Street.

***B06. Construction History**

Known alterations to the segment of the Cantara Trunk Line include the following:

- 1960: replacement of approximately 2,210 feet of the original pipeline along San Fernando Road between Wheatland Avenue and Ferncola Avenue (LADWP 2025)
- 1961: installation of approximately 3,120 feet of pipeline along Strathern Street between Irvine Avenue and Fair Avenue (LADWP 2025)
- 1961: installation of approximately 1,330 feet of pipeline along Fair Avenue between Cantara Street and Strathern Street (LADWP 2025)
- c. 1965: abandonment of approximately 3,150 feet of pipeline along Cantara Street between Irvine Avenue and Fair Avenue (LADWP 2025; VNNVGS 1966: 102)
- c. 1965: installation of approximately 1,330 feet of pipeline along Irvine Avenue between Cantara Street and Strathern Street (LADWP 2025; VNNVGS 1966: 102)
- 2007: Steel clamp repairs to leaks in the trunk line (Uranga 2007)

***B10. Significance:**

The following historic context is adapted from the *Cultural Resources Inventory, Evaluation, and Impact Assessment Report for the Cantara Trunk Line Replacement Project* prepared in July 2025 by Dudek.

Historical Overview of the City of Los Angeles

In 1781, a group of 11 Mexican families traveled from Mission San Gabriel Arcángel to establish a new pueblo called El Pueblo de la Reyna de Los Angeles (The Pueblo of the Queen of the Angels). This settlement consisted of a small group of adobe-brick houses and streets and would eventually be known as the Ciudad de Los Angeles (City of Angels), which incorporated on April 4, 1850, only two years after the Mexican-American War and five months prior to California achieving statehood. Settlement of the Los Angeles region continued in the early American Period. The County of Los Angeles was established on February 18, 1850, one of 27 counties established in the months prior to California acquiring official statehood in the United States. Many of the ranchos in the area now known as Los Angeles County remained intact after the United States took possession of California. Most of these ranchos were subdivided into agricultural parcels or towns (Dumke 1944: 3-6).

Government leaders recognized the need for water to sustain the growing population in the Los Angeles area. Irish immigrant William Mulholland personified the city's efforts for a stable water supply (Survey LA 2016: 2). By 1913, the City of Los Angeles had purchased large tracts of land in the Owens Valley, and Mulholland planned and completed the

construction of the 240-mile aqueduct that brought the valley's water to the city. Much of the county transformed from ranches and farms into residential subdivisions surrounding commercial and industrial centers. Hollywood's development into the entertainment capital of the world and southern California's booming aerospace and oil industries were key factors in the county's growth in the twentieth century (Pitt 2024; Los Angeles Almanac 2020).

The wartime employment in aircraft factories and shipyards increased, leading to a population rise that reached 1,504,277 residents in 1940. Likewise, thousands of servicemen passed through Los Angeles on their way to and from the war. In response to the rise in emigration to the city, developers built approximately 23,000 tract homes on previously agricultural properties surrounding the city throughout the 1940s and 1950s (Pitt 2024; Los Angeles Almanac 2020). With the advent of the state and federal highway systems during the 1950s and 1960s, automobiles allowed travelers to take themselves to places that were only previously accessible by railroads. The highway system encouraged tourism that propelled the city's economy and spurred growth in the surrounding areas. This growth is reflected in the City's present-day built environment that includes sprawling post-war suburbs characterized by concentrations of single-family residences with distinctive planning features such as street alignments, setbacks, curbs, sidewalks, and landscaping (CDT 2011:17-18; Survey LA 2021: 153).

During the early 2000s Los Angeles' downtown was revitalized. City Hall underwent historic restoration and earthquake retrofitting, the area along Grand Avenue was renovated, and new buildings such as the Walt Disney Concert Hall and the Los Angeles Cathedral were constructed (Pitt 2024). The economy continues to be supported by film and tourist industries with the majority of jobs in the city related to management occupations (Data USA 2024).

Development of Sun Valley

During the late 1800s, the Southern Pacific Railroad laid tracks to the north through the area, and a water tank was situated at what is now the corner of Sunland Boulevard and San Fernando Road. A small settlement grew up around this area. Despite the area's relatively early settlement, development activity was limited throughout the 1910s. During this period there were several factors that contributed to the development of Sun Valley, as the community would later be called. Perhaps the most critical was the opening of California State Route 99 around 1915, which was then the main highway between Los Angeles and Bakersfield. Increased access to the area also benefitted local industry; rock quarries in and around the nearby Tujunga Wash had recently been established in 1909. Over time, the presence of the quarries has had a marked effect on the landscape of Sun Valley and has led to the development of a number of industrial operations, many of which focus on waste management and landfill operations (HRG 2015: 6-7).

As industry in the area expanded, so did the accompanying infrastructure. Los Angeles city planner George Gordon Whitnall spearheaded a campaign to construct four "highways" that would radiate from the San Fernando Valley into arteries leading to the city. Residential development also flourished throughout the 1920s. Many of these homes were designed in a "Stonemason Vernacular" style that is a derivative of Craftsman architecture. Arroyo river rock was a popular construction material in the Sun Valley area, and there are several extant examples of Arroyo stone residences constructed during this period, as well as some wood-frame houses which exhibit Arroyo stone features (HRG 2015: 7).

As the 1930s progressed through the Great Depression, development on the whole languished. Commercial and industrial activity in the area was limited, with the exception of the Dundee Egg Farms, which was opened in Sun Valley in 1931. The 1930s also saw the establishment of one of the San Fernando Valley's most iconic resources. The Hansen Ranch became a Los Angeles County park and recreation area in 1931. New recreational facilities included two tennis courts, a swimming pool, playground, picnic tables, and camping areas. Construction subsequently commenced on the Hansen Dam in 1938, and was completed in 1940. The dam served as an important barrier which protected the eastern Valley from flooding from the nearby Tujunga Wash. Also during this period, improvements were made to area infrastructure, including the construction of the concrete Tujunga Wash Bridge in 1935, which carried San Fernando Road over the wash (HRG 2015: 7-8).

As building activity ground to a halt during World War II, the character of Sun Valley remained largely rural in nature, and residents continued to embrace the rustic lifestyle. With the influx of new residents in the 1940s, building activity in Sun Valley was concentrated not only on housing, but also on developing institutions to meet the demands of the growing community. Many residential properties were not only zoned for equestrian use, but were specifically designed for horses to be maintained on the property, and bridle trails were a prominent feature of the local landscape. Beginning

in the 1940s, however, Sun Valley's identity began to evolve away from that of a primarily agricultural community as defense workers – and later, returning servicemen – began to flock to the San Fernando Valley. The airport in nearby Burbank had opened as the Union Airport in 1930. Not only did the airport continue serving commercial air traffic throughout World War II, but it also supported wartime manufacturing efforts. The Vega factory was sited directly adjacent to the airport and became a critical proving ground for the development and testing of new fighter jets and military transport plants (HRG 2015: 8).

With the expansion of population, commerce, and industry in the postwar era, infrastructure became a major concern both during the 1940s and in the years following World War II. Communications services were improved and extended throughout the San Fernando Valley. Later improvements concentrated on the distribution of water and electrical power to the thousands of new residents in the area. As the automobile exploded in popularity during the midcentury years, many resources were also designed with motorists in mind. The physical landscape of Sun Valley evolved during the postwar period as well. As large-scale residential developments were constructed, the vernacular landscape was replaced by designed landscape elements to accompany site-built homes and residential subdivisions. Building activity in Sun Valley continued throughout the 1970s; while construction from this period reflects more recent architectural trends and styles, several distinctive examples of institutional and commercial development are worth noting (HRG 2015: 9-10).

Development of Water Infrastructure in the United States

Water infrastructure can be traced back more than 2,000 years to the Roman Empire in the form of aqueducts spanning Europe to connect water resources from rural areas to city centers. The first public water-supply system in the United Starts was established in Boston, Massachusetts in 1652. Further pioneering water systems involving reservoirs and canals were developed in Schaefferstown, Pennsylvania in 1764; Providence, Rhode Island in 1772; Salem, Massachusetts in 1796; Hartford, Connecticut in 1797; Geneva, New York in 1797; Worcester, Massachusetts in 1798; Portsmouth, New Hampshire in 1798; New York, New York in 1799; Philadelphia, Pennsylvania in 1799; Bethlehem, Pennsylvania in 1799; and Lynchburg, Virginia in 1799. Throughout the seventeenth to nineteenth centuries, water was taken directly from creeks and rivers with no treatment before the water was distributed with pumps to local properties (LaNier 1976: 174).

Early trunk line systems were developed during the late 1800s in an attempt to safely carry drinking water. In the 1860s, riveted pipes made of metal such as lead, tin, brass, and cast iron were common for early trunk line systems. The first large, riveted pipe in California was developed in San Francisco in 1868. The line consisted of 30-inch-diameter cast-iron pipes extending 15 miles. During the 1870s, early riveted-iron trunk lines in Rochester, New York, were 24-inch in diameter and constructed from wrought-iron or cast-iron pipes. These lines had the capacity to transfer about 9,00,000 gallons of water per day. By 1890, hydraulic engineers developed the Newark Line in New York, consisting of 48-inch rivetted-pipe lines designed to carry 50,000,000 gallons of water per day. The capacity of riveted pipes increased through the 1890s to meet the demands of growing urban areas (Scobey 1930:13- 15).

The 1900s became known as the "New Era" for technological advancements in water system engineering that resulted in the expansion of systems throughout the country. The increasing demand for safe drinking water throughout the country resulted in the development of several early long-range water systems, including the Owens Valley River Project in Los Angeles and the Catskill-Delaware system in New York City. Both systems included aqueducts and reservoirs to create a gravity system to carry water from long distances to city centers. Trunk line systems with steel pipes connected to reservoirs and aqueducts constructed in surrounding areas to distribute drinking water to communities through main lines. (LaNier 1976: 178). As technology for water conveyance systems improved, pipelines were improved to carry water further. In 1926, a full-welded steel pipe was laid from Alpine Dam in Marin County, California, consisting of 18,400 feet of 14-foot single-plate steel sections butt-welded on a straight seam that is 16 inches in diameter. J.S. Peters, Chief Engineer of the district, conducted flow tests showing that welded pipes generally provide stronger, leak-proof pipes compared to riveted pipes (Scobey 1930: 75).

Public water systems reached their maturity by 1950 with over 17,000 urban water systems with treatment techniques, rapid filtration, and chlorination across the nation. Technological advancements over the years have almost eradicated waterborne diseases, expanded the availability of inexpensive potable water (LaNier 1976: 180).

Los Angeles Department of Water and Power and the Development of Municipal Water in Los Angeles

Water was first supplied to Los Angeles by a system of ditches branching from the Los Angeles River. After the city incorporated in 1850, a water tank was constructed by Los Angeles Water Works to supply drinking water to the city. However, the tank failed in 1858, and it was not until 1868 that Los Angeles developed a water conveyance system similar to those previously developed on the east coast during the late 1700s. The privately owned Los Angeles City Water Company was granted exclusive righter for the construction of a water system in the city. The system included over three-hundred miles of water mains, six reservoirs, infiltration galleries, and pumping plantes by 1878. The company was acquired by the City of Los Angeles in 1902 and formed the city's first municipal water system under the Los Angeles Water Department (a predecessor to the LADWP) like the prior municipal water systems developed in other regions of the country. During this period, the department sought to expand the existing water storage system with the construction of new reservoirs that were supplied by the Los Angeles River (Aecom 2023: 18).

In 1902, the city contained about 120,000 residents with 23,180 customers served by 337 miles of pipes and 676 fire hydrants. William Mulholland was superintendent of the company and south the improve the storage capacity of the city's water supply. However, Mulholland is best known for leading the construction of the Los Angeles Owens River Aqueduct (now known as the Los Angeles Aqueduct), that was innovative in its use of steel pipes and concrete conduits stretching over 233 miles from the Owens River to Los Angeles that significantly contributed to the growth and development of the city (Survey LA 2017: 3-8; LADWP 2024).

Construction of the 233-mile Los Angeles Aqueduct began in 1908 and was completed in 1913. In anticipation of the aqueduct, the department developed a trunk system with over forty-six miles of pipeline laid between 1909 and 1914 to expand the municipal water supply from the Los Angeles Aquaduct. The trunk system included storage and distribution reservoirs, trunk lines, water mains, distribution lines, and pumping stations. This system delivers water between larger lines, tanks, and reservoirs to smaller water mains (Aecom 2023: 19).

By the early 1930s, the municipal water distribution system continued to primarily rely on water from the Los Angeles River as well as four reservoirs supplied by trunk systems. To accommodate the growth of the city during the 1930s, additional trunk lines were constructed by 1932 to decentralize the trunk line system and reach newly developed communities such as South Los Angeles. Trunk lines constructed in the subsequent decades continued to support to population boom of the mid-twentieth century as the city expanded (Aecom 2023: 21-22).

By 1940, almost half of the city's trunk lines had been installed with about three-hundred miles of trunk lines. To accommodate the further growth of the city, LADWP initiated a six-year survey of 50,000 miles of desert for the development of the Colorado River Aqueduct by 1941. Thirteen cities in Southern California, including Los Angeles, formed the Metropolitan Water District (MWD) to distribute water from the Colorado River Aqueduct throughout Southern California to support the population increase of the area (LADWP 2024b).

As the population of Los Angeles increased throughout the rest of twentieth century, so did the demand for water. Recycled water from stormwater drains and rain barrels is captured and used for the irrigation of golf courses, parks, freeway medians, large, landscaped areas, and industrial processes such as power plant cooling towers. Additionally, LADWP relies on water supplied by the MWD from the Colorado River. Presently, LADWP is the largest municipal utility in the nation providing an average of 450 million gallons of water per day to over four-million residents in Los Angeles (LADWP 2024b). As of 2015, about five-hundred miles of trunk lines constructed between 1910 and the 1960s distributed water throughout the city. Trunk lines constructed between 1910 and 1919 consist of about ten percent of the total system with the majority constructed between 1930 to 1939 and 1950 to 1959 (Aecom 2023: 22).

Development of the Cantara Trunk Line

After the completion of the First Los Angeles Aqueduct in 1913, the Los Angeles Water Department developed a trunk line system with over 46 miles of pipeline between 1909 and 1914 to expand water supply to the City. The Cantara Trunk Line was constructed in 1917 as an expansion of this original system during a time of increased development in the Sun Valley community. Originally called the Glendale Trunk Line, it consisted of approximately 17,500 feet of concrete, riveted-steel pipes that connected to the City Trunk Line (constructed c. 1914) at the intersection of Coldwater Canyon Avenue. The Cantara Trunk Line extended southeast to San Fernando Road, approximately 1,800 feet south of

Strathern Street. The Los Angeles Reservoir supplied the City Trunk Line, which transmitted potable water from the San Fernando Valley to Sun Valley after the construction of the Glendale Trunk Line (LADWP 2025). Archival research was unable to determine when the name of the trunk line was changed to the Cantara Trunk Line. During the 1960s, various portions of the line were abandoned and replaced with welded-steel pipe segments including the replacement of approximately 2,210 feet of the original pipeline along San Fernando Road between Wheatland Avenue and Arvilla Avenue in 1960; the installation of approximately 3,120 feet of pipeline along Strathern Steet between Irvine Avenue and Fair Avenue in 1961; the installation of approximately 1,330 feet of pipeline along Fair Avenue between Cantara Street and Strathern Street in 1961; the abandonment of approximately 3,150 feet of pipeline along Cantara Street between Irvine Avenue and Fair Avenue c. 1965; the installation of approximately 1,330 feet of pipeline along Irvine Avenue between Cantara Street and Strathern Street c. 1965; and the installation of approximately 1,700 feet of pipeline along Cantara Street between Coldwater Avenue and Potter Avenue c. 1960s (LADWP 2025: VNNVGS 1966: 102).

In 2007, the Cantara Trunk Line was connected to the new City Trunk Line South at the intersection of Coldwater Canyon Avenue and Cantara Street. The City Trunk Line South (installed c. 2007) was connected to both the Los Angeles Reservoir and the Van Norman Bypass Reservoir and provides drinking water from both reservoirs to the Cantara Trunk Line (LADWP 2025). In January 2007, the trunk line ruptured along the 12000 block of Cantara Street in Sun Valley due to abnormally cold weather. The rupture caused a 40-foot-long and 8-foot-deep sinkhole that flooded homes in the area and led to 200 reported leaks in the system. The leaks were repaired with steel clamps (Uranga 2007).

The present Cantara Trunk Line consists of approximately 26,990 feet of riveted-steel and welded-steel pipe segments located within Cantara Street, extending from Coldwater Canyon Avenue to San Fernando Road in Sun Valley, Los Angeles. The remaining 51% of the original 1917 line is comprised of about 13,900 feet of riveted-steel pipe segments along Cantara Street between Coldwater Canyon Avenue and Irvine Avenue, and between Fair Avenue and San Fernando Road, where it continues southeast along San Fernando Road to Ferncola Avenue where the line terminates (LADWP 2025).

Typology: Water Supply Infrastructure

Reservoirs, Dams, and Water Supply Infrastructure can best be divided into three groups, based on chronology. The first includes those that date from before the completion of the Los Angeles Aqueduct in 1913. The second is made up of those built between 1913 and the coming of the Second World War in 1941. The third consists of resources that date from after the end of the war in 1945 (Survey LA 2017: 25).

There are two designated resources that date from the first period, between 1902 and 1913, the Ivanhoe and Silver Lake Reservoirs (L.A. Historic-Cultural Monument No. 422) and the Garvanza Pumping Station and Site of the Highland Reservoir (L.A. Historic-Cultural Monument No. 412) (Survey LA 2017: 25).

Resources relating to the second period of construction, from the opening of the aqueduct in 1913 to the beginning of the Second World War in 1941, consist of the aqueduct itself and facilities that stored and distributed water delivered by the aqueduct. There are many significant structures associated with the aqueduct, but most are located outside the city limits. Of those within the limits the most impressive is the First Los Angeles Aqueduct Cascade in Sylmar (L.A. Historic-Cultural Monument No. 742). Soon thereafter came a number of reservoirs designed to serve specific areas. Of these 1920s projects the most significant extant resource is the Mulholland Dam and Hollywood Reservoir (L.A. Historic-Cultural Monument No. 421). More common, if not as architecturally impressive, are the small pump stations and storage tanks located in high elevations (Survey LA 2017: 26-28).

The third period of construction, between 1945 and 1980, consists of facilities to handle increased supplies coming from the Second Los Angeles Aqueduct and from the Metropolitan Water District. A wave of construction in the 1950s included the Eagle Rock, Green Verdugo, and Upper Stone Canyon Reservoirs, and was concerned with distributing water delivered from the MWD's Colorado River Aqueduct (Survey LA 2017: 29).

Following the San Fernando Earthquake of 1971, the DWP focused on upgrading, expanding, and/or replacing existing dams and reservoirs. These improvements accommodated additional supplies that came with the completion of the Second Los Angeles Aqueduct in 1970 and with additional water supplied by the State Water Project to the Metropolitan

Water District. The replacement of the Upper and Lower San Fernando/Van Norman Reservoirs with the Los Angeles Reservoir, at the point of delivery of both of the Los Angeles Aqueducts as well as MWD's supplies from Castaic Lake, was the most important of these improvements (Survey LA 2017: 30).

Character defining features associated with water supply infrastructure include (Survey LA 2017: 32):

- Retains most of the essential character defining features from the period of significance
- Of an engineering and/or architectural form/style typical of the 1902-1980 period o May also be significant under themes within the Architecture and Engineering context
- Illustrates technological innovations in civil engineering relating to the history and development of the city's water storage and distribution system
- Reflects significant trends in community planning relating to the expansion of publicly-owned utilities
- Associated with the physical growth of the city during the 1902-1980 period

NRHP/CRHR Evaluation

The Cantara Trunk Line, which is part of the larger LADWP Trunk Line System, is not eligible for listing in the NRHP, CRHR, or City of Los Angeles HCM Criteria individually or as a contributing element of any previously evaluated LADWP structures that are considered historically significant.

In establishing an approach to evaluate water management systems it is important to consider questions of eligibility within the historic context of water infrastructure development, to identify pioneering infrastructure, and to assist in the identification of those water conveyance systems that merit recognition. Water conveyance systems are usually considered significant under NRHP Criterion A and CRHR Criterion 1 for their association with trends and events that have made a significant contribution to the broad patterns of our history, particularly in regional agricultural or local economic development. While these systems may have influenced the growth of local economies, agricultural ventures, or spurred expansion of settlement, this is too common an association to merit a conclusion of historical significance under NRHP Criterion A or CRHR Criterion 1 within the context of municipal water distribution. At some point in the past, all forms of historic-era infrastructure were associated locally or regionally with growth or economic development, actual or intended. It is often exceedingly difficult to prove whether historic-era infrastructure associated with recognizable growth actually caused the growth or accommodated the growth.

Water conveyance systems that rise to a level of significance under NRHP Criterion A and CRHR Criterion 1 include pioneering elements such as those that are the first of its kind in the region, or are an essential or catalyst component of a water conveyance system that transformed local development in the area. Survey LA Los Angeles Citywide Historic Context Statement defines significant water resources as reservoirs, dams, and water supply infrastructure, such as pumping stations like the Garvanza Pumping Station (L.A. HCM No. 412), which were the primary catalysts for municipal water development in Los Angeles County. Likewise, the seminal LADWP water infrastructure including the First Los Angeles Aqueduct has been previously determined eligible for listing under NRHP Criterion A / CRHR Criterion 1 for the important role it played in the development of the City of Los Angeles during the early twentieth century, and for its associations with the economics and politics of California water issues at the state level of significance. It is also eligible under NRHP Criterion C / CRHR Criterion 3, for embodying distinctive characteristics of a type, period, and method of construction, as well as the work of a master -- William Mulholland, the chief engineer and visionary behind the project. The period of significance of the property is 1907, marking the beginning of construction, through 1931, the year of the passage of the County of Origins Law" (Brookshear and Hickman 2016: 3). The First Los Angeles Aqueduct, constructed between 1908 and 1913, represents LADWP landmark pioneering water management infrastructure, which allowed water conveyance from the Owens Valley to the San Fernando Valley to support the development and settlement in the Los Angeles area. It is also listed as L.A. HCM No. 742 and considered California State Landmark No. 653.

The Cantara Trunk Line, built in 1917, was constructed as part of the larger LADWP trunk line system, which is an underground municipal water system that receives and distributes water from the First Los Angeles Aqueduct and regional reservoirs. Although it is part of the LADWP water conveyance system, it does not represent pioneering or innovative water management infrastructure that merits historic significance level recognition. The Cantara Trunk Line is evaluated for potential significance under all applicable criteria with the above considerations in mind.

Municipal water can be traced back to the Roman Empire, and the first large, riveted pipe in California was developed in San Francisco in 1868. The line consisted of 30-inch-diameter CI pipes extending 15 miles. During the 1870s, early riveted-iron trunk lines in Rochester, New York, were 24 inches in diameter and constructed from wrought-iron or CI pipes. These lines had the capacity to transfer about 9,000,000 gallons of water per day. By 1890, hydraulic engineers developed the Newark Line in New York, consisting of 48-inch riveted pipelines designed to carry 50,000,000 gallons of water per day. The capacity of riveted pipes increased through the 1890s to meet the demands of growing urban areas. Essentially, the standards and technology utilized to create the LADWP Trunk Line system was well established by the time the system was implemented and connected to the larger LADWP system after the First Los Angeles Aqueduct was constructed.

Following the completion of the First Los Angeles Aqueduct, LADWP developed the first iteration of a trunk line system to support municipal water distribution. By 1914, the system included over 46 miles of underground pipeline to expand the water supply throughout the City. The Cantara Trunk Line was constructed in 1917 as an expansion of this original system to support development and settlement expansion in the Sun Valley community. Originally called the Glendale Trunk Line, the Cantara Trunk Line consisted of approximately 17,500 feet of concrete, riveted-steel pipes that connected to the City Trunk Line (constructed c. 1914) at the intersection of Coldwater Canyon Avenue. The Cantara Trunk Line extended southeast to San Fernando Road, approximately 1,800 feet south of Strathern Street. The Los Angeles Reservoir supplied the City Trunk Line, which transmitted potable water from the San Fernando Valley to Sun Valley after the construction of the Glendale Trunk Line (LADWP 2025).

The Cantara Trunk Line is one of many trunk lines developed to convey drinking water from the First Los Angeles Aqueduct to communities throughout Los Angeles. It was merely an expansion of the existing water distribution system, and an extension to the City Trunk Line.. Furthermore, trunk lines do not distinctively "reflect significant trends in community planning relating to the expansion of publicly owned utilities to provide water and power services to a city growing in both area and population" (Survey LA 2017: 31). Construction of the City's trunk line system was a consequence of the development of the First Los Angeles Aqueduct which aided in bringing water to the region and was a monumental historic feat. Early reservoirs also represent historical significance associated with the LADWP water conveyance system including the Ivanhoe and Silver Lake Reservoirs from 1906 (L.A. HCM No. 422), Highland Reservoir from 1907 (L.A. HCM No. 412), Silverlake Dam and Reservoir from 1907 (L.A. HCM No. 422), and Mulholland Dam and Hollywood Reservoir from 1924 (L.A. HCM No. 421). These resources, specifically the First Los Angeles Aqueduct, best represent LADWP's historically significant efforts in regional water distribution and management.

While the connecting underground water conveyance structures, including trunk lines, provide an important service by distributing municipal water, these types of systems were well established by the time the LADWP trunk line system was first established in 1914, and they are secondary, auxiliary, supporting elements of the municipal water system. The trunk lines do not rise to the level of consideration as individually significant or contributing elements to the First Los Angeles Aqueduct or other significant LADWP infrastructure. As such, they do not represent a significant association with the development of the municipal water system in Los Angeles County. Therefore, the Cantara Trunk Line, which is part of the LADWP trunk line system, does not appear eligible under NRHP Criterion A or CRHR Criterion 1.

Under NRHP Criterion B and CRHR Criterion 2, the Cantara Trunk Line lacks a direct and significant association with the productive life of any person considered important in history. Because the municipal water system was essentially a city undertaking representing the collective decisions of LADWP's board of directors, managers, and engineers, the Cantara Trunk Line lacks an appropriate association with the distinctive contribution of any

single individual. Research uncovered no individuals associated with the trunk line who made a demonstrably and singularly important contribution to history at the local, state, or national level. Therefore, the Cantara Trunk Line does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

Under NRHP and CRHR Criterion 3, the Cantara Trunk Line is not significant because it does not represent an important example of a type, period, or method of construction. Research did not identify the Cantara Trunk Line's engineer, architect, or builder, and it appears unlikely that it was the work of a master in engineering. The Cantara Trunk Line was constructed in 1917 using standard, wide-diameter riveted-steel pipe. The system was expanded upon in the 1960s with welded-steel pipe segments. Riveted-pipe technology existed in the United States as early as the 1860s, followed by the development of welded pipes during the early 1900s. Thus, the Cantara Trunk Line represents common standardized water distribution designs for underground municipal water distribution and construction methods characteristic of trunk lines built during the early twentieth century, likely throughout the United States. It does not "illustrate technological innovations in civil engineering relating to the development of the city's water storage and distribution system" (Survey LA 2017: 31–32). Additionally, as the Cantara Trunk Line is not visible and located underground, it does not possess high artistic value. It is an undistinguished and undifferentiated example of ubiquitous underground municipal water infrastructure and does not meet the requirements for individual listing, nor would it qualify as a contributing element to the significance of previously documented Los Angeles' water management infrastructure. Therefore, Cantara Trunk Line does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

Under NRHP Criterion D and CRHR Criterion 4, the Cantara Trunk Line is not significant as a source, or likely source, of important historical information, nor does it appear likely to yield important information about historic construction methods, materials, or technologies. This technology is well understood through contemporary trade journals and scientific monographs. As such, the Cantara Trunk Line lacks significance under NRHP Criterion D and CRHR Criterion 4.

City of Los Angeles HCM Evaluation

Because the City of Los Angeles HCM criteria closely follow that of the NRHP and CRHR, the national and state significance evaluation previously presented is also relevant here. The Cantara Trunk Line does not have a distinguishable role in the history of Los Angeles, as it does not reflect a specific significant trend in planning related to the development of a municipal water system and is merely a secondary element of the system constructed to expand existing infrastructure. Additionally, as part of a municipal water system, the trunk line was a city undertaking and does not appear to be associated with the productive life of any individual. The Cantara Trunk Line is not an example of outstanding craftsmanship and did not influence the design of other architecture in the City of Los Angeles. Archival research did not find the engineer or designer of the trunk line. As a utilitarian example of standardized water distribution infrastructure, the Cantara Trunk Line lacks distinctive characteristics of a type, period, or method of construction. Finally, as a trunk line constructed in 1917 as part of the expansion of the municipal water system, the Cantara Trunk Line is not likely to yield information important in prehistory or history. Therefore, the Cantara Trunk Line is recommended not eligible for listing as a City of Los Angeles HCM under any designation criteria.

Integrity Considerations

Integrity is the ability of a property to convey its significance. Because the concept of integrity is based on significance, the assessment of a property's integrity can only proceed after its significance has been fully established. The assessment of integrity requires consideration under the seven aspects or qualities. To retain integrity, a property will always possess several, and generally most, aspects of integrity. Determining which aspects are most important requires an understanding of why, where, and when the property is significant. Because the Cantara Trunk Line lacks sufficient associative significance to meet any of the criteria for listing in the NRHP, CRHR, or City of Los Angeles HCM list, an integrity analysis is unnecessary.

Summary of Evaluation Findings

The Cantara Trunk Line was evaluated under NRHP, CRHR, and Los Angeles HCM criteria and was found not to meet any of the applicable criteria thresholds and associated integrity considerations. The recommended California Historical

Resource Status Code for the property is 6Z, meaning it was found ineligible for the NRHP and CRHR through survey evaluation.

***B12. References:**

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***Pfa. Photographs:**

Photograph 2. View of Cantara Street and Irvine Avenue, looking west.



Source: Dudek 2025, IMG_8471. Photograph taken on February 21, 2025

Photograph 3. View of Cantara Street and San Fernando Road, looking southeast.



Source: Dudek 2025, IMG_8697. Photograph taken on February 21, 2025

Photograph 4. View of San Fernando Road and Arvilla Avenue, looking northeast.



Source: Dudek 2025, IMG_8712. Photograph taken on February 21, 2025.

*__NRHP Status Code__ 3S

P1. Other Identifier: Map ID 2

***P3a. Description:**

This Update addresses San Fernando Road, which was previously recorded (P-19-188007). This Update supplements the recordation and evaluation of the property prepared in 2012. San Fernando Road is an approximately 25-mile-long road extending south from Sierra Highway to its terminus at North Main Street in Los Angeles (Photograph 1). The road was initially developed in the 1870s and has been improved over the years to ensure its continuous use. The surrounding area is developed with residential, commercial, and industrial properties, as well as the Burbank Airport along the southwest side of the road between North Clybourn Avenue and North Hollywood Way. The road is made of concrete with a width of approximately 50 feet and a height of about 6.5 inches. Several highway overpasses span across San Fernando Road including Interstate(I)-5, State Route (SR)-126, SR-14, I-210, SR-118, SR-134, SR-2, and SR-110. According to historic topographic maps and aerial photography, the road appears to have been paved and straightened during the 1920s and has retained the present alignment since (NETR 2025a; NETR 2024b). The present road has been altered over the years to maintain its operation for over 100 years.

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) Photo 1, looking northeast, 2/21/2025, (Dudek, IMG_8692).

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
c. 1924/(Ehringer 2012)

***P8. Recorded by:** (Name, affiliation, address)
Katie Ahmanson, MHC, Dudek
225 S. Lake Ave, Ste. M210
Pasadena, CA 91101

***P9. Date Recorded:**
2/21/2025

***P11.Report Citation**: (Cite survey report and other sources, or enter "none.") Dudek. 2025. *Cultural Resources Inventory, Evaluation, and Impact Assessment Report for the Cantara Trunk Line Replacement Project*. Prepared for Los Angeles Department of Water and Power. July 2025.

***Attachments:** ☒Location Map ☒Continuation Sheet ☒Sketch Map

***B5. Architectural Style:** N/A

***B6. Construction History:** (Construction date, alterations, and date of alterations) 1896: portions of the road were macadamized; 1910: portions of the road between Los Angeles and Burbank were macadamized; 1924-1926: portions of the road within Glendale and Burbank were widened and improved; 1927-1929: 25-miles were widened and paved with asphalt concrete from Dayton Avenue (present-day North Figueroa Street) to Newhall Pass (Ehringer 2012: 2)

***B10. Significance:** **Theme** Transportation **Area:** Los Angeles County
Period of Significance c. 1924-1963 **Property Type** Road/Highway **Applicable Criteria** A/1

San Fernando Road was previously evaluated in 2012 and found eligible under NRHP/CRHR Criteria A/1 for its significant association with the development of California, Los Angeles, and the San Fernando Valley. Dudek concurs with this finding. San Fernando Road retains a sufficient amount of its integrity of location, design, materials, setting, feeling, association, and workmanship to convey its historical significance under NRHP Criterion A and CRHR Criterion 1. Therefore, San Fernando Road maintains the requisite integrity to warrant designation as a historic resource in the NRHP, CRHR, and City of Los Angeles HCM list.

***B12. References:**

Ehringer, Candace. 2012. *State of California Department of Parks and Recreation form for San Fernando Road*. December 7, 2012.

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***B14. Evaluator:** Katie Ahmanson, MHC, Dudek

***Date of Evaluation:** May 27, 2025

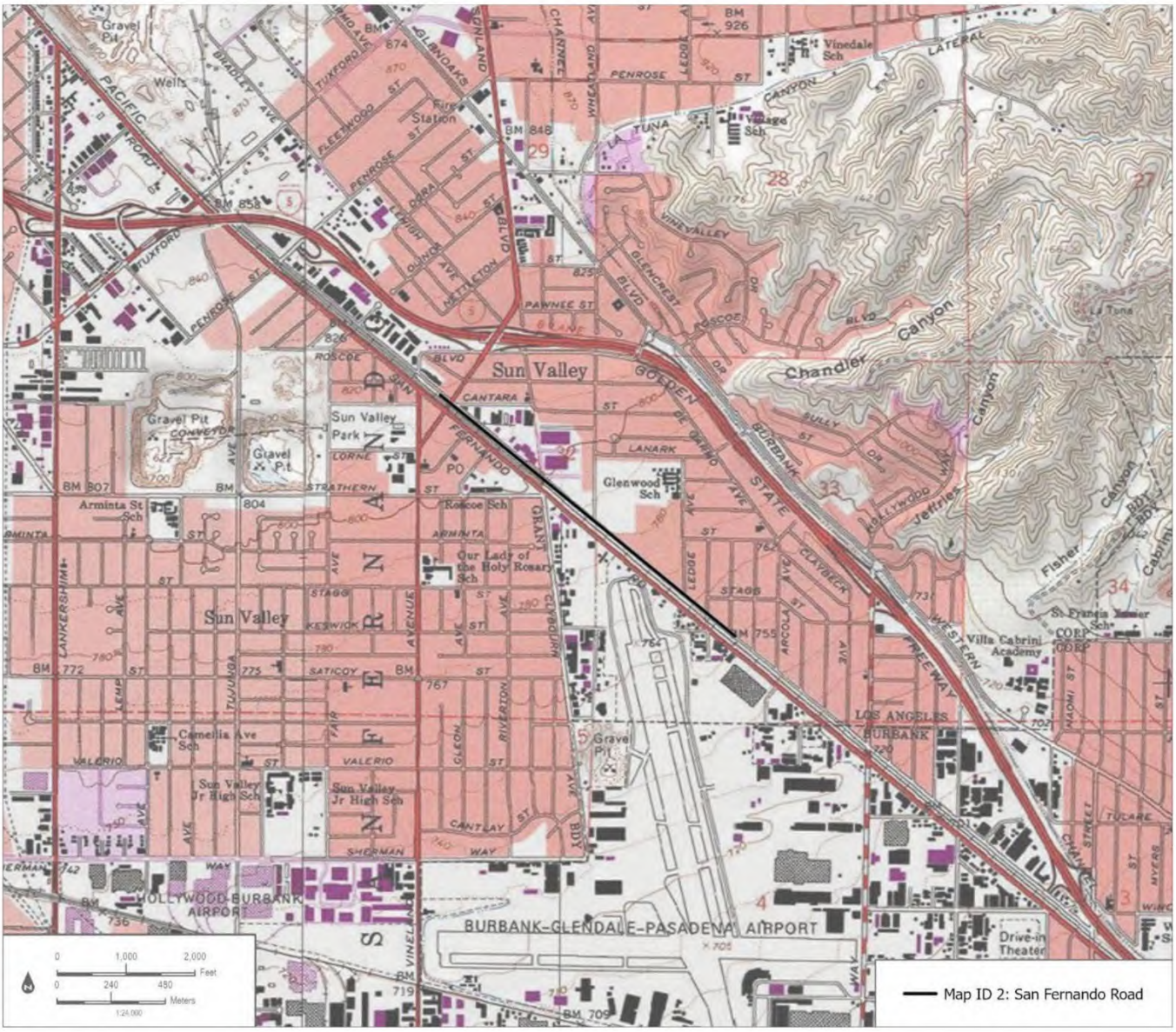
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P-19-188007 – UPDATE
HRI#
Trinomial

***Resource Name or #** (Assigned by recorder) San Fernando Road – UPDATE

***Map Name:** Burbank, Calif. ***Scale:** 1:24,000 ***Date of map:** 1994




La Tuna Canyon Rd
Tuxford St
Penrose St
Sunland Blvd
Glenoaks Blvd
Goss St
Tujunga Ave
San Fernando Rd
Roscoe Blvd
Cantara St
Golden State Fwy
Strathern St
Lankershim Blvd
Clybourne Ave
Hollywood Way
Saticoy St
Vineland Ave
Cohasset St
San Fernando Blvd
Buena Vista St
Sherman Way
Map ID 2: San Fernando Road

Appendix D

Preliminary Geological and Geotechnical Assessment of the Proposed Cantara Trunk Line Replacement Project

CITY OF LOS ANGELES
DEPARTMENT OF WATER AND POWER
INTRADEPARTMENTAL CORRESPONDENCE

Date: July 24, 2019

To: Vlad D. Scutelnicu, Interim Trunk Line Design Manager

From: Clifford C. Plumb, Geology & Reservoir Surveillance Manager
Jianping Hu, Geotechnical Engineering Manager

Subject: Preliminary Geological and Geotechnical Assessment of the Proposed Cantara Trunk Line Replacement Project (23556)

Introduction

The Trunk Line Design Group (TLDG) has requested a Preliminary Geological/Geotechnical assessment for the proposed Cantara Trunk Line Replacement (CTLR) Project (LADWP, 2019). This memorandum has been prepared by the Geology and Reservoir Surveillance Group and the Geotechnical Engineering Group, and details the results of the combined assessment. The primary purpose of this memorandum is to provide information regarding potential geologic and geotechnical hazards within the Project area to assist TLDG with future planning of the Project.

The CTLR Project (Project) area is located in the easterly portion of the San Fernando Valley and is generally bounded by Roscoe Boulevard and Tuxford Street to the north, Saticoy Street to the south, CA-170 Hollywood Freeway to the west, and San Fernando Road to the east as generally depicted on Figure 1. The currently proposed trunk line replacement route is depicted as a solid blue line on Figures 1 through 7. A portion of the existing Cantara Trunk Line is anticipated to remain and be reused which is depicted as a solid green line on Figures 1 through 7.

Methodology

This preliminary assessment consisted of a review of existing literature. The purpose of the literature review was to review the geologic setting within the Project area and to help identify areas with known or potential geologic hazards. The primary information reviewed for this memorandum included published and unpublished geological and geotechnical reports and maps gathered from in-house, state, regional, and local levels. Sources of data included the California Geological Survey (CGS) (formerly the California Division of Mines and Geology [CDMG]) and the United States Geological Survey (USGS), as well as internal reports and unpublished resources. A list of the available references used to prepare this memorandum is provided in the References section following the main text. No subsurface investigation was performed specifically for this assessment.

Potential geologic hazards that could impact the Project area were evaluated. These hazards included surface fault rupture, ground shaking, liquefaction, seismically induced landslides, subsidence, and methane intrusion. Note that certain potential geologic hazards (such as liquefaction) cannot be verified without performing a subsurface field investigation and engineering analysis.

Geologic Setting

The proposed Project is located within the northern portion of the San Fernando Valley in the geologically complex Transverse Ranges physiographic province of Southern California (Yerkes, et al., 1965). Physiographic provinces are large geographic regions that are similar in topography and geologic structure. The Transverse Ranges province is one of California's most seismically active regions and is characterized by east-west trending mountains, valleys, and geologic structures. The San Fernando Valley is a broad, relatively flat, synclinal valley that has filled slowly through time with young, unconsolidated alluvial sediments from the surrounding highlands. The majority of the Project area consists of residential and commercial properties with supporting roads and other infrastructure.

Site Geology

The proposed Project area is located on a relatively flat, gently sloping, alluvial plain. The main surficial and subsurface materials underlying the Project area are young Holocene (~last 11,700 years) alluvial materials (Qa) shed from the San Gabriel and Verdugo mountains to the north and east, respectively. Dibblee and Ehrenspeck (1992) describe these materials as "gravel, sand, and clay of valley areas." Hitchcock and Willis (2000) have further subdivided the alluvial materials within the Project area as "active wash deposits" (Qw) and "alluvial and alluvial fan deposits" (Qyf2). They also delineate some zones of artificial fill (af) associated with freeways and waste landfills. Artificial fill materials associated with other man-made disturbances such as grading and development should be locally anticipated throughout the Project area. Location, depth, and composition of such materials may be widely variable. The areal distribution of the geologic materials within and surrounding the Project area is provided in Figures 2 and 3.

No bedrock materials are anticipated to be encountered during construction in the Project area. However, difficult excavation may be anticipated if cobbles and boulders are encountered during construction. Areas designated as Qw on Figure 3 may have higher percentages of cobbles and boulders than surrounding materials.

Groundwater

The Project area is located within the San Fernando Groundwater Basin. Depths to groundwater in this basin were shallowest in 1944 before excessive pumping caused drawdown throughout the valley (CDMG, 1997). Historical highest groundwater depths

range from approximately 80 feet near the southwest portion of the Project area to greater than 160 feet near the intersection of San Fernando Road and Tuxford Street (Figure 4).

Recent groundwater depths in the Project area are typically deeper than the historical groundwater depths summarized in CDMG (2001a). Numerous monitoring wells operated by the Los Angeles County Department of Public Works (LACDPW, 2019) are located within the boundaries of the Project area and are approximately located on Figure 5 with the most recent reported groundwater level measurement. A search of monitoring well data from the California Department of Water Resources (CDWR, 2019) did not locate any CDWR water wells within the Project boundaries.

Localized shallow groundwater could be encountered at various unknown locations within the proposed Project area. Near-surface groundwater may not be considered a continuous “regional” groundwater table but could be a perched or a localized condition at the contact between more permeable soils overlying a less permeable soil. Groundwater depths should be anticipated to fluctuate based on weather conditions, local landscape practices, and local infiltration or pumping (with-drawl) programs.

Potential Geologic Hazards

Based on the literature review, potential geologic hazards were identified that could impact the proposed Trunk Line within the Project area. An earthquake occurring in the San Fernando Valley is likely the most threatening geologic hazard to the proposed Project. Seismic hazards resulting from earthquakes include ground shaking, liquefaction, and earthquake induced landslides. Additional geologic hazards that were evaluated include surface fault rupture, shallow groundwater (discussed above), and methane intrusion. A brief discussion of the potential geologic hazards is provided below.

Faults and Surface Rupture Hazard

The proposed Project is located within a seismically active region that is well known for its many faults and historic seismicity. It will be subjected to future seismic shaking from fault rupture that will occur along local or regional faults. Surface fault rupture is the displacement that occurs along the ground surface trace of a fault, primarily as the result of an earthquake. Ground surface fault rupture also may accompany fault creep or natural or man-induced subsidence.

The “Alquist-Priolo Earthquake Fault Zoning (AP) Act” is a state law that regulates development projects near active faults to mitigate the hazard of surface fault rupture. Based on our review of the available referenced literature, the proposed Project area is not located within an AP fault zone. The closest AP fault zone to the Project is located approximately 3.5 miles to the north (CGS, 1979).

The Verdugo Fault, located east and northeast of the Project area, is the closest known active fault. The Fault has been mapped by at various locations by different authors due to its lack of surface expression. Published maps reviewed for this study suggest that the Fault is likely located between approximately 1,000 and 2,500 feet east-northeast of the eastern boundary of the Project (Dibblee, 1991b and Hitchcock and Willis, 2000). The State of California does not include the Verdugo Fault as an AP fault (CGS, 1979). The potential for surface fault rupture to affect the Project area is considered low.

Seismicity

As discussed above, the proposed Project is located in a seismically active region. Numerous active faults are located within and near the San Fernando Valley. Strong ground shaking in the proposed Project vicinity occurred during the ~M6.5-6.7 1971 San Fernando Earthquake and during the M6.7 1994 Northridge Earthquake. The epicenter of the Northridge Earthquake was located about 7.3 miles west of the proposed Project route (Tsutsumi and Yeats, 1999) (CGS, 2000). The epicenter of the San Fernando Earthquake was located about 13 miles northeast of the proposed Project route (CGS, 2000).

Ground motions in the vicinity of the proposed Project area were estimated using an online seismic design application provided by the California Office of Statewide Health Planning and Development (OSHPD) at the USGS (2019b) website. For preliminary planning purposes, the approximate center (34.215715°N, -118.379087°W) of the proposed Project area was used as the site location. Parameters chosen included Site Class “D” and “Essential Facilities.” Spectral values for the seismic design were determined by inputting longitude, latitude, site soil classification, and risk category into an internet application program provided by OSHPD at the USGSociety (USGS, 2019) website. The preliminary seismic design values are provided in the attached Appendix A.

Liquefaction

The CGS has designated certain areas within California as potential liquefaction hazard zones. These are areas considered at greater risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of a relatively shallow groundwater table. These liquefaction hazard zone maps are intended to prompt more detailed, site-specific geotechnical investigations. They do not predict the amount or direction of liquefaction-related ground displacements, or the amount of damage to facilities that may result from liquefaction.

Liquefaction most often occurs in loose, saturated, and granular soils when strong ground motions cause the soil to lose strength and fail. Typically, younger alluvial soils with historically high groundwater levels shallower than 40 feet in depth are considered to be potentially susceptible to liquefaction by the CDMG (1998).

Potential liquefaction zones are detailed in Seismic Hazard Zone maps provided by the CDMG (1997 and 1998) and are depicted as green shading on Figure 6. The Project area is not located within a liquefaction hazard zone.

Earthquake-Induced Landslides

Earthquake-induced landslide zones are areas with previous occurrence of landslide movement, or areas where local topographic, geologic, geotechnical, and subsurface water conditions indicate the potential for permanent ground displacement during a seismic event. Potential landslide zones are detailed on Seismic Hazard Zone maps provided by the CDMG (1997 and 1998) and are depicted as light blue shading (Figure 6).

The majority of the Project area is a relatively flat-lying area where landslides are not expected to occur. However, earthquake-induced landslide zones are depicted north of Strathern Street and west of Fair Avenue. These zones appear to be associated with the edges of a large gravel pit. Based on recent aerial photographs on Google Earth (2019), the majority of this gravel pit has been filled in and the remaining slope may be less than approximately 15 feet. Based on these recent aerial photos, the risk of seismically induced landslides is considered low; however, if the proposed route is to be located near the top of any slopes or excavations not identified during this desktop study, slope stability should be considered during future geologic and geotechnical investigations.

Subsidence

Ground subsidence, or settlement, is a phenomenon where the ground surface drops due to removal or densification of soil materials in the subsurface. Depending on the cause of the subsidence, surface expression can include cracks, depressions, or damage to man-made structures.

The potential for subsidence should be evaluated during a site specific geologic and geotechnical investigation, particularly if the proposed route is to be located in areas with known soft, weak soils.

Methane

Methane and methane buffer zones are defined as areas with the potential for methane gas seepage to occur. The Los Angeles Department of Public Works (LADPW), (2004) has compiled a map of methane and methane buffer zones for the City of Los Angeles. Based on the methane map, most of the proposed Project area is not located within a methane or methane buffer zone. However, the extreme southwest corner of the Project is located in a methane and methane buffer zone as well as a rectangular area in the north central portion of the Project area. A portion of the existing Cantara Trunk Line to be replaced and a portion of the trunk line to be reused near the intersection of Cantara Street and Irvine Avenue cross methane and methane buffer zones as illustrated on Figure 7.

Geotechnical Considerations

Based on the review of existing literature, the following geotechnical considerations are identified:

- Regional groundwater is not anticipated to be encountered during construction; however, local shallow perched groundwater may require mitigation.
- The alluvium in the Project area may contain isolated pockets of cobbles and occasional boulders that may affect pipe jacking, tunneling, or excavation procedures.
- Tunneling may require face control method if the alluvium is below the groundwater table.
- Prefabricated shoring using the Occupational Safety and Health Administration surcharge load of 72 psf is generally not adequate for construction in the street and may require a shoring designer. Furthermore, if the soil is not stable, prefabricated shoring may not be feasible.

Conclusions and Recommendations

Based on the limited brief review of available literature and maps for this preliminary geologic/geotechnical assessment, siting and construction of the CTLR Project is feasible provided the geologic hazards and conditions discussed herein are considered and evaluated in future geologic and geotechnical investigations. These hazards should be considered during route selection and, where possible, routes should be located where lesser hazards may exist. A complete geologic and geotechnical investigation is recommended prior to construction.

A brief summary of our conclusions is provided below:

- A site-specific field investigation should be performed in order to provide preliminary design and construction recommendations.
- The site is primarily underlain by alluvial (Qa) sediments (soil) comprised primarily of sand, clay, and gravel. Consistency of these materials may range from soft/loose to dense. Refer to Figures 2 and 3 for the distribution of geologic units.
- Artificial fill materials (Af) may be present throughout the Project area. Where the proposed trunk line crosses such materials, the fill should be evaluated for suitability to support the trunk line or associated improvements.
- The Project area has been subjected to strong historic seismic ground shaking and; therefore, strong ground shaking should be anticipated in the future due to earthquakes on nearby regional faults. Design ground motions should be provided as part of a full investigation report.

- Historical high groundwater depths are generally greater than 80 to 160 feet deep within the Project area. However, localized perched conditions may be a constraint for construction of the proposed new trunk line. Current groundwater depths for the selected route(s) should be investigated and evaluated for potential impacts to design and construction.
- The site is not located in an Alquist-Priolo Earthquake Fault Zone.
- According to the State of California, the Project area is not located in a Liquefaction Hazard Zone.
- Areas susceptible to Earthquake Induced Landslides are mapped by the State of California near the north of Strathern Street and west of Fair Avenue. The zones appear to be associated with an old mining pit that has since been filled in to within approximately 10 to 15 feet of surrounding grades. As such, Earthquake-Induced Landslides are not anticipated to impact the proposed Project area.
- Localized portions of the Project area are located within areas designated as methane or methane buffer zones by the City of Los Angeles.
- Soil corrosivity should be evaluated to determine the corrosive potential of on-site soils to any proposed concrete and underground metal conduits or infrastructure.

If you have any questions, please contact Jeffrey Tyson, Engineering Geologist Associate, at Extension 70031 or Devin J. Gordon, Civil Engineering Associate, at Extension 73462.

JT/DJG/JSC:cc
Attachments

e-bc: Andrew L. Linard
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Sabrina Y. Tsui
Marce-Adrian Perez
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Steven R. Cole
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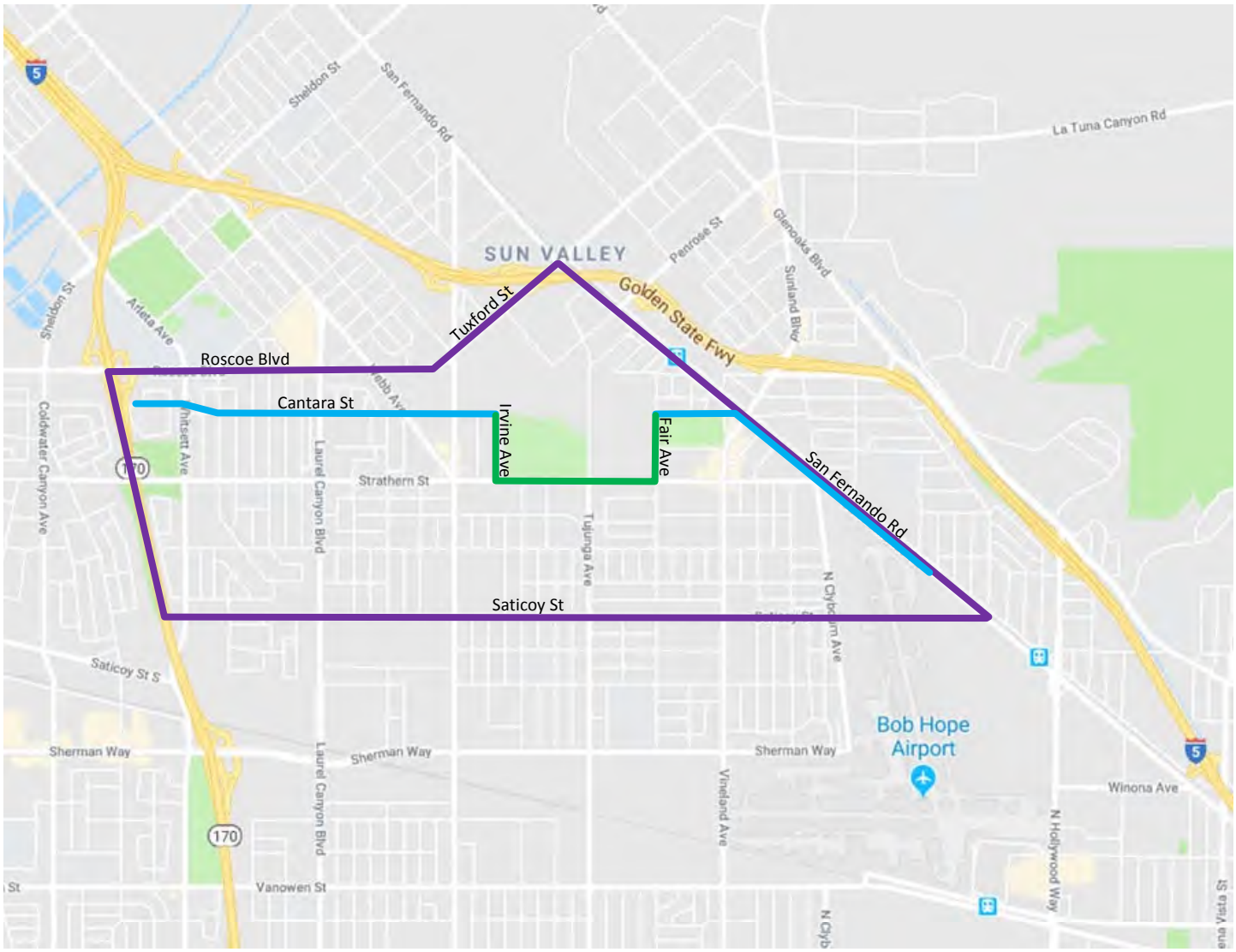
FIGURES



N

Scale:

0 0.5 1 Mile

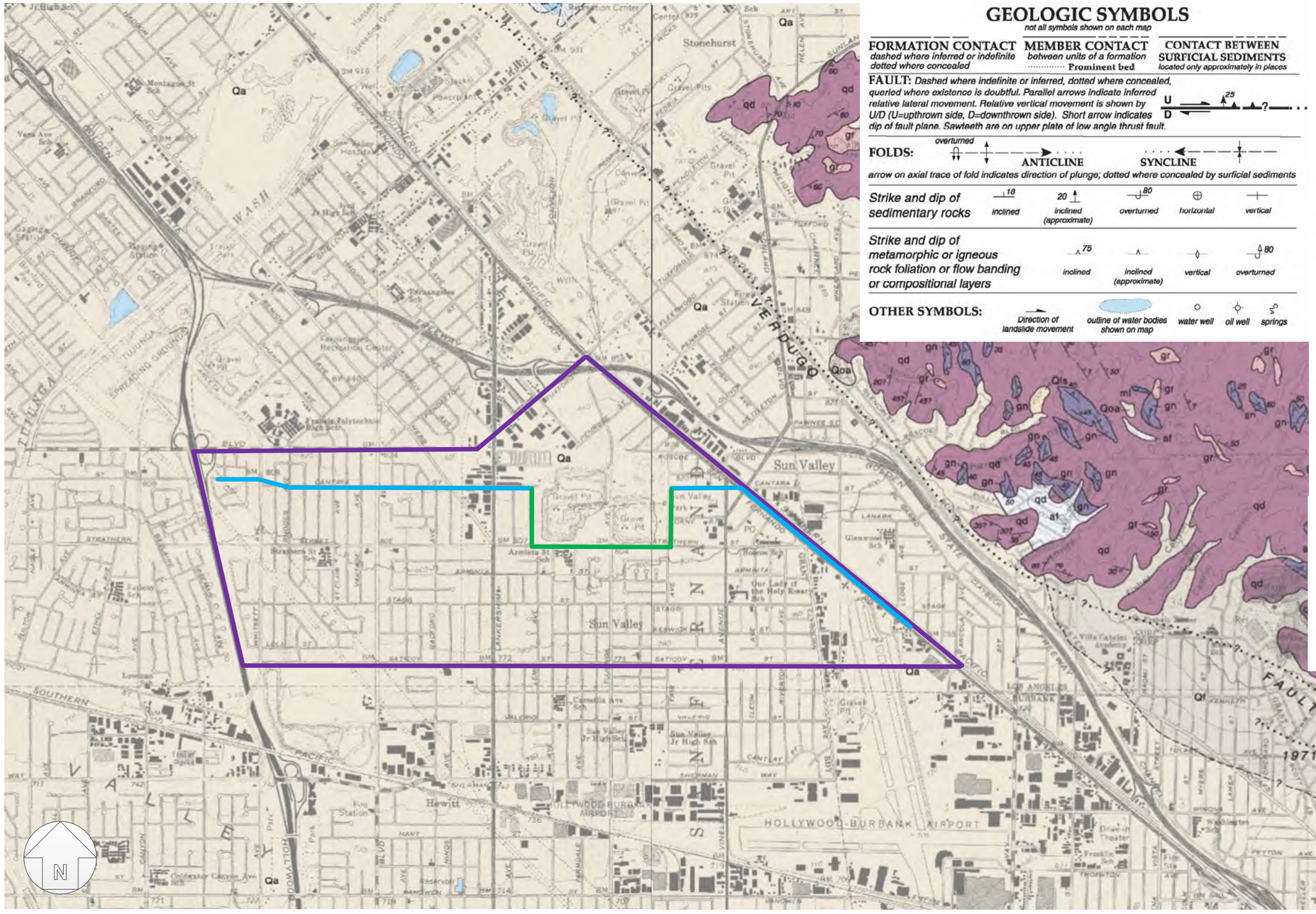
Existing Cantara Trunk Line to be replaced

Existing Cantara Trunkline that can be reused

Boundary Limits of Study Area

Base Map: Google Maps, accessed June 10, 2019

LA DWP Los Angeles Department of Water & Power	**Site Location Map** Cantara Trunk Line Replacement Project Los Angeles, California	Figure: 1 Date: July 2019



GEOLOGIC SYMBOLS

not all symbols shown on each map

FORMATION CONTACT — *dashed where inferred or indefinite, dotted where concealed*

MEMBER CONTACT — *between units of a formation* ····· **Prominent bed**

CONTACT BETWEEN SURFICIAL SEDIMENTS — *located only approximately in places*

FAULT: *Dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful. Parallel arrows indicate inferred relative lateral movement. Relative vertical movement is shown by U/D (U=upthrown side, D=downthrown side). Short arrow indicates dip of fault plane. Sawteeth are on upper plate of low angle thrust fault.* U / D, 25, ?

FOLDS: overturned — **ANTICLINE** — **SYNCLINE**

arrow on axial trace of fold indicates direction of plunge; dotted where concealed by surficial sediments

Strike and dip of sedimentary rocks	18 *inclined*	20 *inclined (approximate)*	80 *overturned*	*horizontal*	*vertical*
Strike and dip of metamorphic or igneous rock foliation or flow banding or compositional layers	75 *inclined*	*inclined (approximate)*	*vertical*	80 *overturned*	

OTHER SYMBOLS: *Direction of landslide movement* — *outline of water bodies shown on map* — *water well* — *oil well* — *springs*

LEGEND

af / Qg / Qa

SURFICIAL SEDIMENTS

af *Artificial cut and fill*
Qg *Gravel and sand of major stream channels*
Qa *Alluvial gravel, sand and clay of valley areas*

gr | grd

LEUCOCRATIC GRANITIC ROCKS
Late Mesozoic (Cretaceous) age (+/- 90 m.y., Crook et al. 1987)

gr *Nearly white, massive, medium to fine-grained granitic rocks mostly of quartz monzonite-granodorite composition; essentially of quartz, potassic feldspar and sodic plagioclase feldspar, sparse biotite; complexly intruded into quartz diorite (**qd**) and gneiss (**gn**), moderately coherent; not everywhere differentiated from **qd***
grd *Granodiorite-quartz monzonite (Mt. Josephine Granodiorite of Carter 1980, 1982, north of San Gabriel Fault), nearly white, massive, medium grained granitic rock composed essentially of quartz, potassic feldspar and sodic plagioclase feldspar and minor biotite; moderately coherent; intrusive into Mendenhall gneiss (**mgn**)*

qd / gqd

QUARTZ DIORITE
(Wilson Diorite of Miller 1934; Crook et al.* 1987; granodiorite of Oakeshott 1958)
Late Mesozoic (early Cretaceous?) age (*+/-102 m.y.)

qd *Gray, medium-grained quartz diorite with variations to diorite; composed of sodic plagioclase feldspar (oligoclase-andesine), biotite, hornblende, and minor quartz; massive to vaguely gneissoid, somewhat incoherent where weathered, complexly intruded by **gr***
gqd *Gneissoid quartz diorite, similar to **qd**, but gneissoid, in southeastern Verdugo Mountains; porphyritic with small phenocrysts of white feldspar and of black hornblende in dark, very fine grained ground mass; in many places contains remnants of gneiss similar to gn, but too small to map; in few places contains dark gray-brown andesitic dikes, also too small to map*

hd

HORNBLENDE DIORITE-GABBRO
(Rubio Diorite of Miller 1934)

hd *Amphibolite: dark gray to black, massive, medium-grained diorite-gabbro, composed mostly of hornblende and calcic plagioclase feldspar associated with biotite-rich gneiss (**gn**); includes coarse grained white veinlets of mostly feldspar; engulfed with gneiss in quartz diorite*

mq / mi / gn

GNEISSIC ROCKS
Exposed southwest of San Gabriel Fault; (includes dioritic gneiss and Placerita series of Oakeshott 1958; Placerita Formation of Miller 1934)
Cretaceous age or older
Rocks severely metamorphosed under conditions of high temperature and pressure, probably from metasedimentary rocks; complexly injected, recrystallized and migmatized by qd, in places complexly intruded by gr

gn *Medium to dark gray biotite-quartz-feldspar gneiss; hard coherent, but much fractured; ranges from thin-layered gneiss to somewhat incoherent gneissoid quartz diorite or biotite diorite; includes small remnants of metaquartzite, biotite schist-gneiss locally containing graphite and hornfelsic gneiss, containing calc-silicate minerals (garnet, epidote, diopside, and sillimanite)*
ml *Small lenses of white layered marble and associated calc-silicate rocks*
mq *Metaquartzite with coarse grained feldspar*

Scale:

0 — 0.5 — 1 Mile

- Existing Cantara Trunk Line to be replaced
- Existing Cantara Trunkline that can be reused
- Boundary Limits of Study Area

Base Map: Dibblee, T.W. and Ehrenspeck, H.E., ed., 1991a and 1991b

Los Angeles Department of Water & Power

Regional Geologic Map
Cantara Trunk Line Replacement Project
Los Angeles, California

Figure: 2

Date: July 2019

Explanation

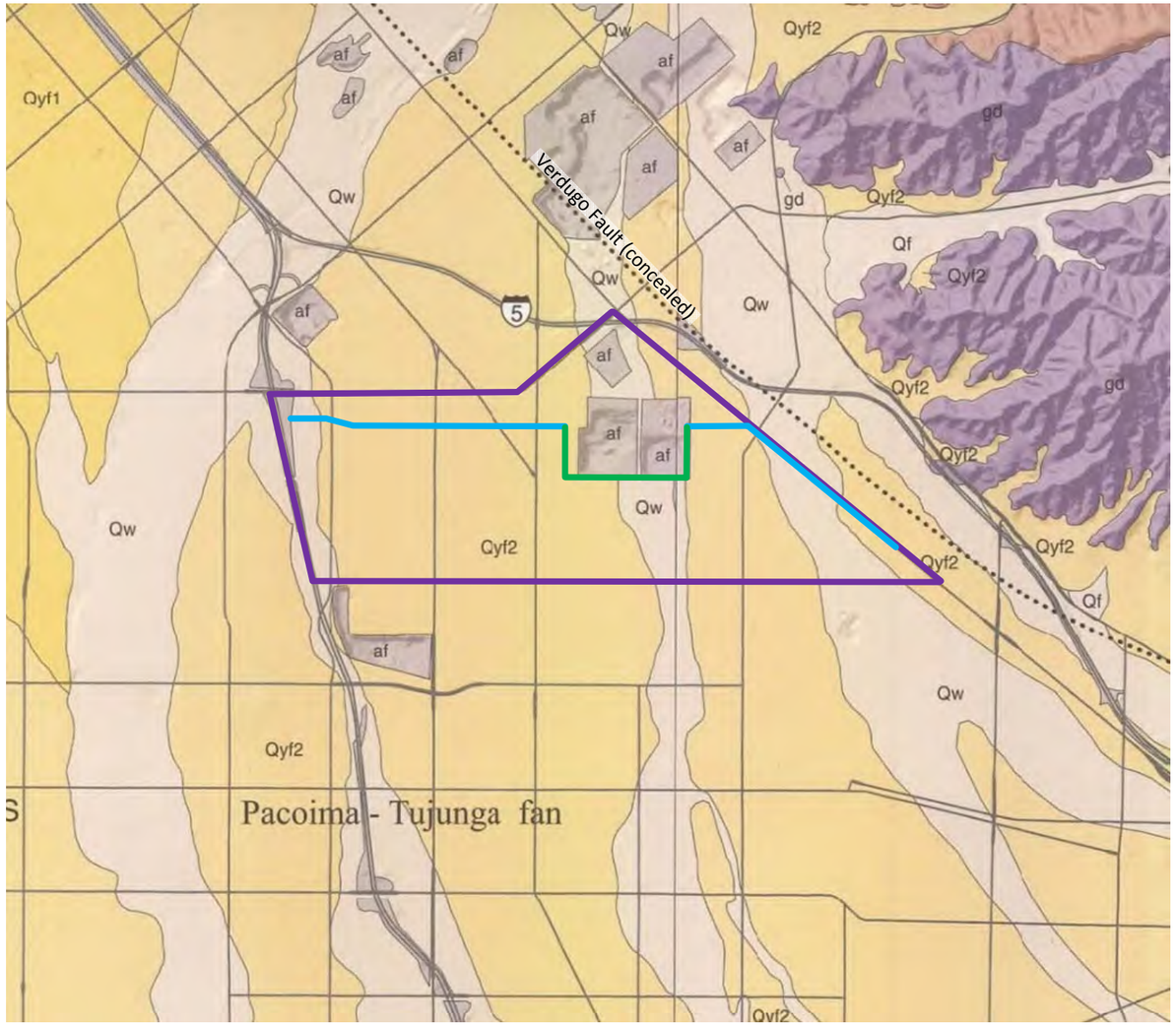
Holocene	late Holocene	artificial fill, engineered fill for dams and freeways, and waste landfills	af
		alluvial basin deposits composed of clay, with minor silty sand; deposits in man-made basins are generally sand and silty sand	Qa
		active wash deposits: loose to moderately dense sand and silty sand	Qw
		active alluvial fan deposits: loose to moderately dense sand and silty sand with minor clay	Qf
		alluvial and alluvial fan deposits: Qya where depositional form not preserved, loose to moderately dense sand and silty sand with minor clay	Qya / Qyf2
		alluvial fan deposits: loose to moderately dense sand and silty sand with minor clay	Qyf1
	late Pleistocene-Holocene	alluvial fan deposits: moderately dense to dense silty sand and silt	Qof2
		alluvial and alluvial fan deposits: Qoa where depositional form not preserved, dense to very dense sand and silty sand	Qoa / Qof1
	late Pleistocene	alluvial fan deposits: generally uplifted, deformed, with reddish soils, typically dense to very dense	Qvof2
		alluvial deposits: Qvoa where depositional form not preserved; generally uplifted and deformed	Qvoa / Qvoa1
		alluvial fan deposits: generally uplifted remnants of alluvial fans on ridge-tops, deformed, typically dense to very dense	Qvof1
		"Pacoima Formation:" dense, poorly-consolidated conglomerate and sandstone	Qpa
		Saugus Formation: sandstone and conglomerate with minor claystone	Qs
Tertiary		pre-Quaternary sedimentary rock	Ts
Mesozoic		crystalline rocks	gd
		water	

roads and freeways

1971 surface fault rupture

concealed fault

Note: bedrock units not differentiated; faults not shown in bedrock areas



Existing Cantara Trunk Line to be replaced

Existing Cantara Trunkline that can be reused

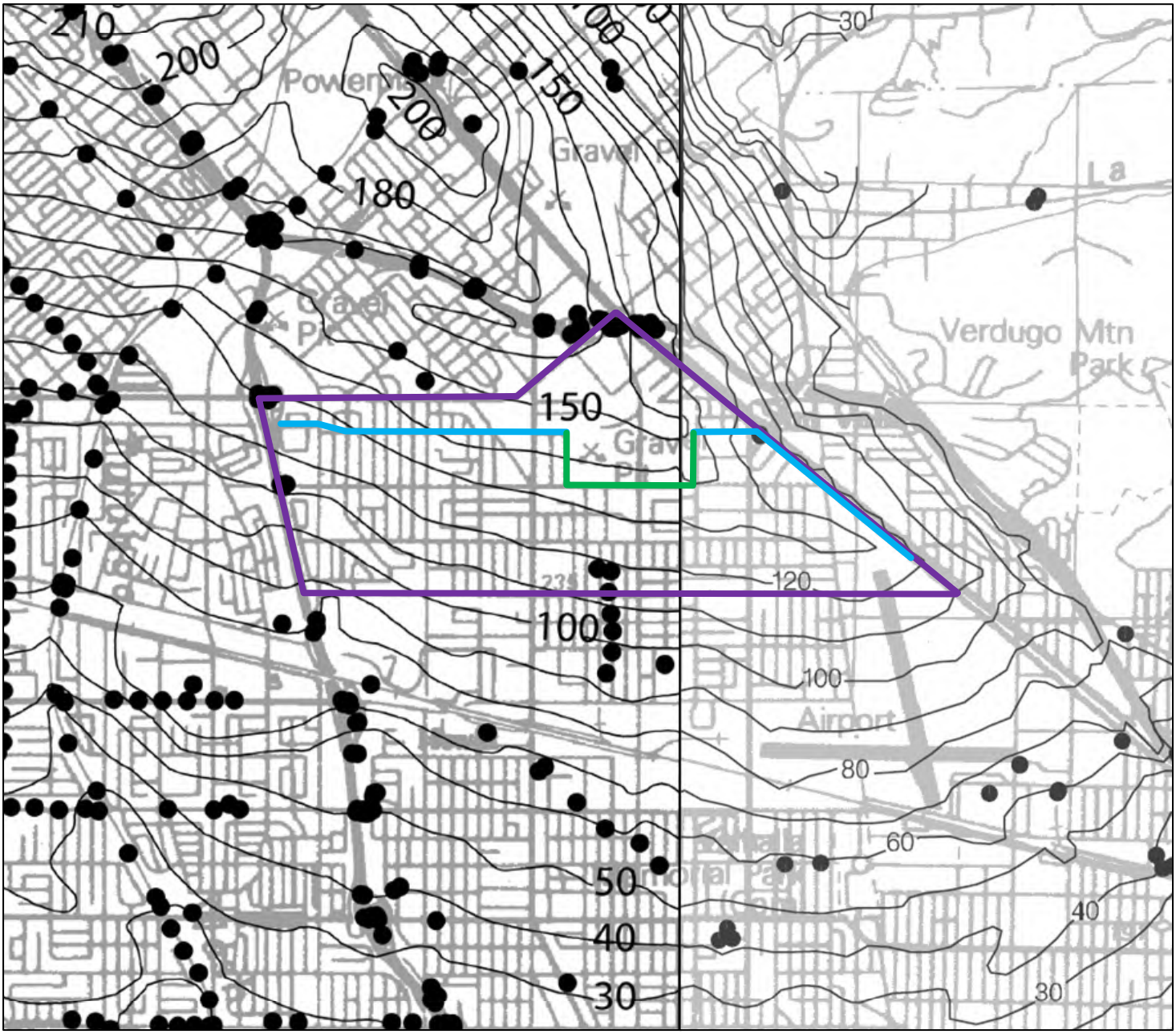
Boundary Limits of Study Area

N

Scale: 0 0.5 1 Mile

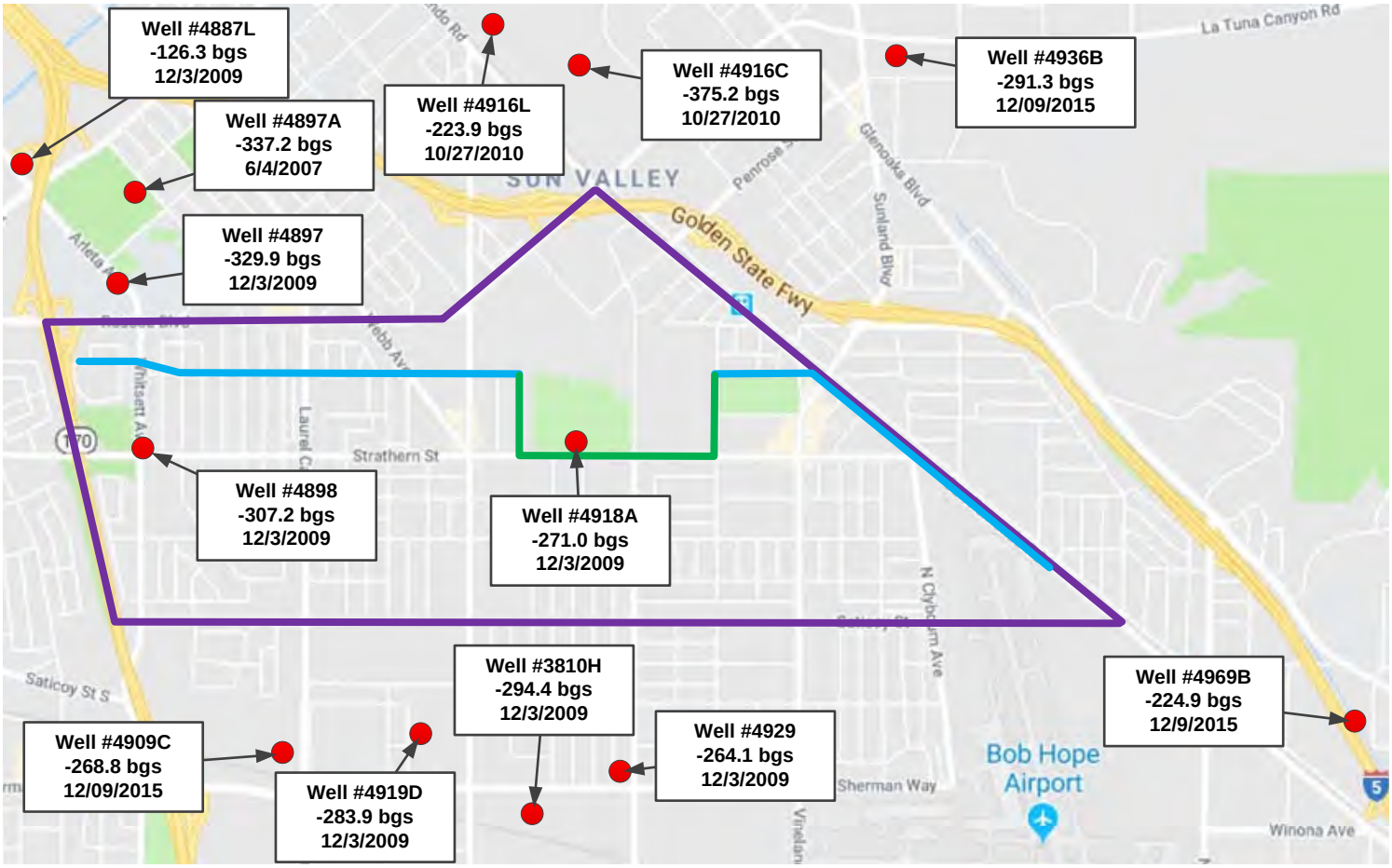
Reference: Hitchcock and Willis, 2000

LA DWP Los Angeles Department of Water & Power	**Quaternary Geologic Map** Cantara Trunk Line Replacement Project Los Angeles, California	Figure: 3 Date: July 2019



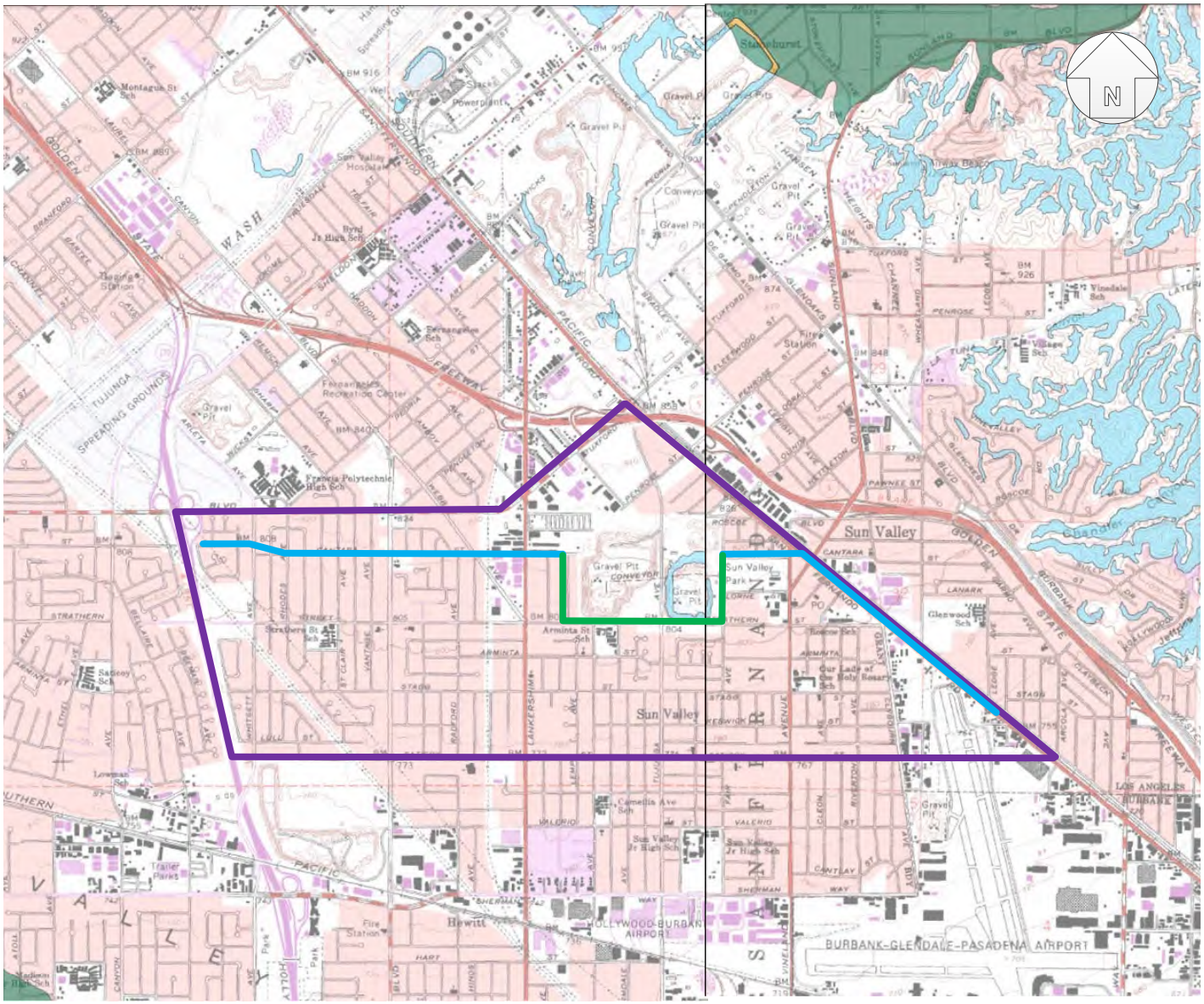
Base Map: CDMG 1997 and 1998

LA DWP Los Angeles Department of Water & Power	**Historically Highest Groundwater Levels** Cantara Trunk Line Replacement Project Los Angeles, California	Figure: 4 Date: July 2019



Base Map: Google Maps, accessed June 10, 2019

LA DWP Los Angeles Department of Water & Power	**Groundwater Wells** Cantara Trunk Line Replacement Project Los Angeles, California	Figure: 5 Date: July 2019



SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

1906 C

? ?

Existing Cantara Trunk Line to be replaced
Existing Cantara Trunkline that can be reused
Boundary Limits of Study Area

Scale: 0 1 Mile

Base Map: CGS 1979, 1998, 1999

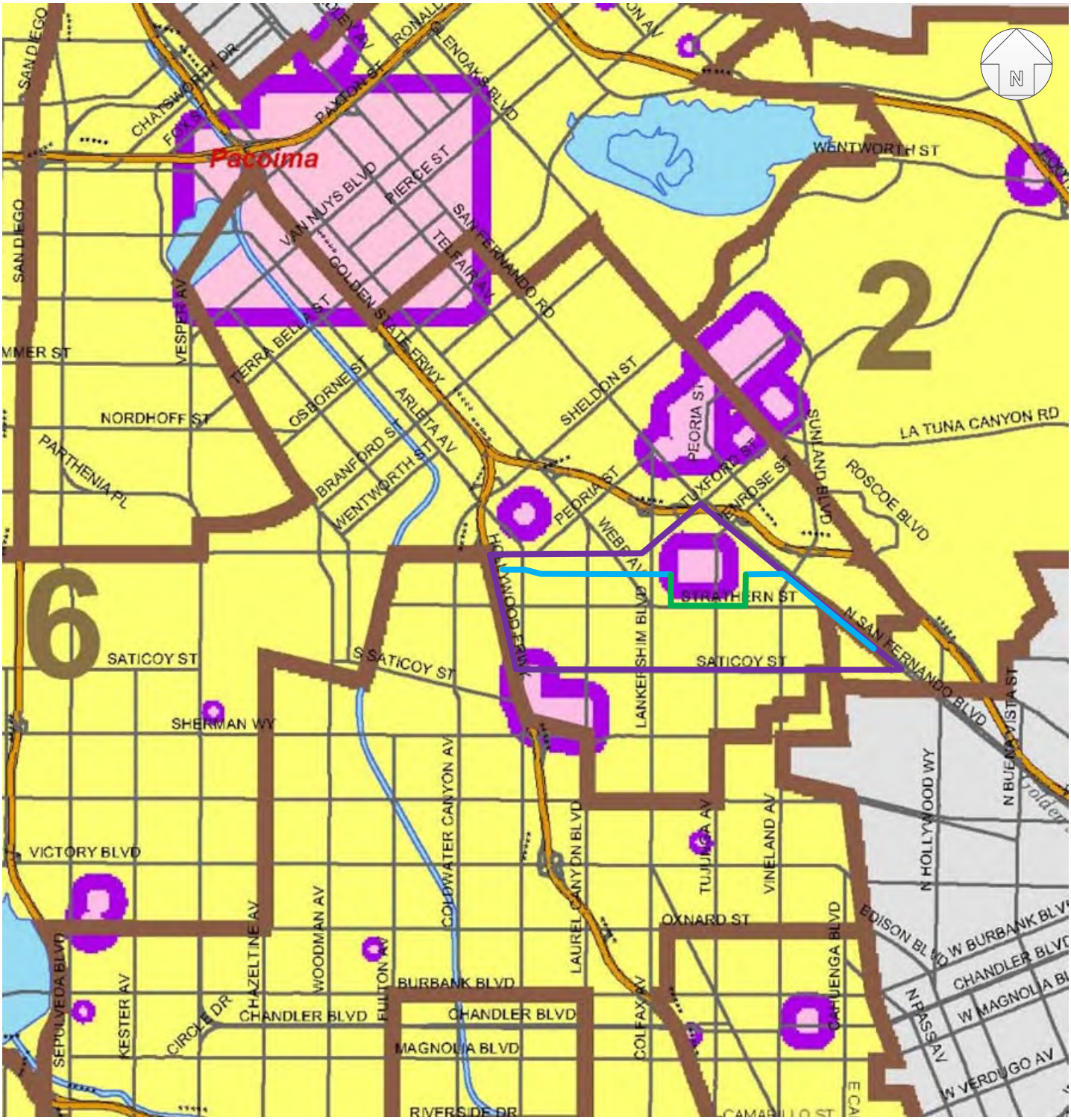
LA DWP Los Angeles Department of Water & Power

Alquist-Priolo Fault Zones and Seismic Hazard Zones Map

Cantara Trunk Line Replacement Project
Los Angeles, California

Figure: 6

Date: July 2019



MAP EXPLANATION

0 Scale: 1 Mile

- Methane Zone
- Methane Buffer Zone
- Council District Boundary
- Existing Cantara Trunk Line to be replaced
- Existing Cantara Trunkline that can be reused
- Boundary Limits of Study Area

Base Map: LADPW, 2004

Los Angeles Department of Water & Power

Methane and Methane Buffer Zones
Cantara Trunk Line Replacement Project
Los Angeles, California

Figure: 7

Date: July 2019

ATTACHMENT A

Cantara Trunk Line Replacement Project

Latitude, Longitude: 34.215715, -118.379087



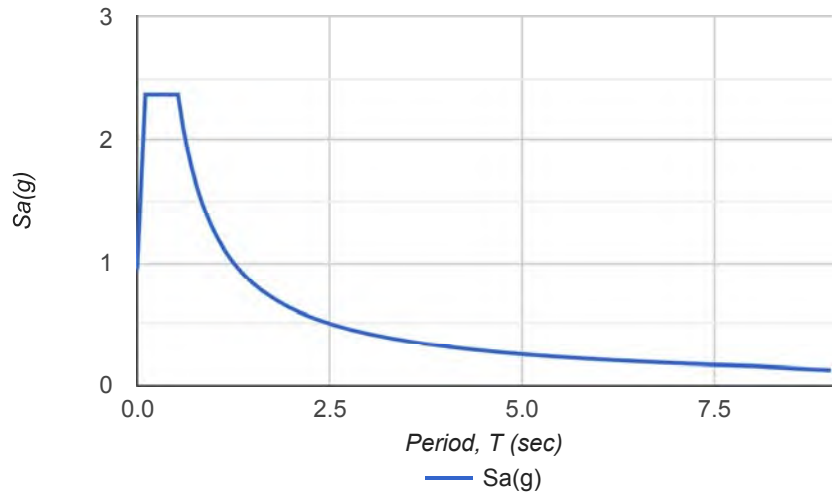
Date	7/5/2019, 1:34:24 PM
Design Code Reference Document	ASCE7-10
Risk Category	IV
Site Class	D - Stiff Soil

Type	Value	Description
S_S	2.364	MCE_R ground motion. (for 0.2 second period)
S_1	0.836	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.364	Site-modified spectral acceleration value
S_{M1}	1.254	Site-modified spectral acceleration value
S_{DS}	1.576	Numeric seismic design value at 0.2 second SA
S_{D1}	0.836	Numeric seismic design value at 1.0 second SA

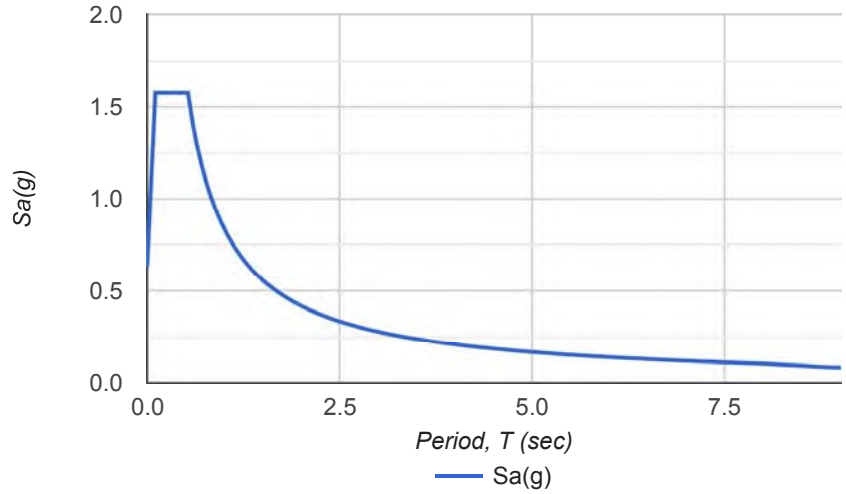
Type	Value	Description
SDC	F	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	1.5	Site amplification factor at 1.0 second
PGA	0.834	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.834	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.364	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.382	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.444	Factored deterministic acceleration value. (0.2 second)
S1RT	0.836	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.832	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.945	Factored deterministic acceleration value. (1.0 second)
PGAd	0.933	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.993	Mapped value of the risk coefficient at short periods

Type	Value	Description
C_{R1}	1.005	Mapped value of the risk coefficient at a period of 1 s

MCER Response Spectrum



Design Response Spectrum



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Appendix E
Noise Technical Memorandum

MEMORANDUM

To:	Alexandria Fortaleza, Environmental Specialist (Los Angeles Department of Water and Power [LADWP], Environmental Planning and Assessment Department)
From:	Cole Martin, INCE (Dudek); Mark Storm, INCE Bd. Cert. (Dudek)
Subject:	LADWP Cantara Trunk Line Replacement Project - Noise Technical Memorandum
Date:	July 30, 2025
cc:	Michele Finneyfrock, Project Manager (Dudek)
Attachments:	A – Noise and Vibration Field Measurement Data B – Construction Noise Prediction Model Worksheets C – Traffic Noise Modeling Calculation Worksheets

The Los Angeles Department of Water and Power (LADWP) proposes to install approximately 8,200 feet of 30-inch-diameter underground pipe along Strathern Street and Cantara Street, and approximately 5,100 feet of 20-inch-diameter underground pipe along San Fernando Road in the Sun Valley community in the City of Los Angeles, which is within the County of Los Angeles. The installation of the new 20-inch-diameter distribution mainline and 30-inch-diameter trunk line (referred to herein as the Cantara Trunk Line Replacement [CTLR] Project, or proposed project) would replace aging and deteriorated segments of the existing Cantara Trunk Line to provide greater operational flexibility for water flow and delivery and to improve system redundancy and resiliency. The CTLR Project would also include approximately 7,010 feet of 8-inch-diameter distribution mainline improvements along Cantara Street.

Dudek has conducted an evaluation pursuant to the requirements of the California Environmental Quality Act (CEQA), California Public Resources Code 21000, et seq., to determine the presence of potential impacts related to noise associated with the proposed project). This technical memorandum provides the results of the noise assessment.

1 Project Location and Setting

The CTLR Project is located within the Sun Valley community of the City of Los Angeles (City). Sun Valley is approximately 13 miles northwest of downtown Los Angeles. The City of Los Angeles communities of Arleta, Pacoima, Sunland, Tujunga, Lake View Terrace, Shadow Hills, and East La Tuna Canyon are located to the north of Sun Valley, and the City of Burbank is to the east. The City of Los Angeles communities of North Hollywood and Valley Village are to the south, and the City of Los Angeles communities of Mission Hills, Panorama City, and North Hills are to the west.

Within Sun Valley, the project alignment is situated between the Hollywood Freeway (State Route [SR]-170) and the Interstate (I) 5 freeway. Figure 1, Regional Location, shows the project location within a regional context, and Figure 2, Project Location, shows the project location within a local context.

The proposed project would occur within the public roadway (right-of-way) ROW of Cantara Street, Strathern Street, Irvine Avenue, and San Fernando Road as well as across the surface parking areas of private industrial parcels. Periodic intrusions into the sidewalks and/or parkways along these roadways would also occur for installation of

pipeline appurtenances (e.g., valves, hydrants, combination air/vacuum breaker valves, water service connections). Below are descriptions of each roadway and the surrounding land uses.

Cantara Street. Along the project alignment, Cantara Street is a two-way, east–west trending roadway with one lane in each direction. Parking is generally allowed on both sides of the roadway, and sidewalks and parkways are generally located on both sides of the roadway. Cantara Street is largely surrounded by residential properties. Exceptions include a church, a park (Sun Valley Recreation Center), and several industrial properties between Irvine Avenue and Lankershim Boulevard.

Strathern Street. Along the project alignment, Strathern Street is a two-way, east–west trending roadway with one lane in each direction. Left turn pockets are striped along the roadway, and a bicycle lane is striped on both sides. Parking is generally allowed on both sides of the roadway, and sidewalks and parkways are generally located on both sides of the roadway. Land uses along the project alignment are generally residential in nature, with the exception of Jaime Beth Slavin Park, Strathern Park North, Strathern Street Elementary School, several churches, and commercial uses near the intersections with Laurel Canyon Boulevard and Lankershim Boulevard.

San Fernando Road. Along the project alignment, San Fernando Road is a two-way, northwest–southeast trending roadway with two lanes in each direction. Left-turn pockets or two-way left-turn lanes extend along the center of the roadway. Parking is generally allowed on the southwest side of the roadway, and the southwest side of the roadway is also lined with a sidewalk and street trees. Land uses along the southwest side of the roadway include commercial and industrial uses, including the Hollywood Burbank Airport and a motel. Along the northeast side of the roadway is a protected bicycle path, separated from the roadway with a vegetation strip. The project would not encroach into the bicycle path. Beyond the bicycle path is the Southern Pacific Railroad alignment, which trends in a northwest–southeast along San Fernando Road. The project would not encroach into the railroad ROW. Land uses to the northeast of the railroad alignment consist largely of commercial and industrial land uses.

Private Industrial Parcels. The project alignment is within the surface parking area for several one-story industrial warehouse buildings. The project alignment would specifically extend through Assessor's Identification Numbers (AINs) 2310-007-025 and 2310-006-008 and would abut AIN 2310-007-024 at this location. Ingress/egress to the parking area is provided via Lankershim Boulevard at the intersection with Cantara Street. Land uses to the north, south, and east include industrial uses. Land uses to the west include a government-owned utility parcel, industrial, and residential uses.

Collectively, the areas where pipeline work would occur, including pipeline installation, abandonment, and connection work, will be termed the "project alignment" in this technical memorandum. As shown in greater detail in Figures 3A and 3B, Project Components, the project alignment includes the following pipeline segments proposed for installation:

- Replacement Cantara Trunk Line (TL) would extend along Strathern Street from a location just east of the SR-170, eastward to the intersection of Strathern Street with Irvine Avenue.
- Replacement Cantara TL would extend along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Rhodes Avenue to the intersection of Cantara Street with Webb Avenue.

- New distribution mainline spur would extend approximately 400 feet west from the intersection of Lankershim Boulevard with Cantara Street across the surface parking lot of private industrial parcels.
- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Lankershim Boulevard to the intersection of Cantara Street with Irvine Avenue.
- New distribution mainline would extend along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- Replacement distribution mainline would extend along San Fernando Road from the intersection of San Fernando Road with Cantara Street to just east of the intersection of San Fernando Road with Arvilla Avenue.

The project would involve pipeline abandonment along the segments listed below, as shown in Figures 3A and 3B. Pipeline abandonment would involve filling the old pipe with cement slurry, which requires injection of slurry at the ends of each abandonment limit and intermittently along the abandoned segments. (While some segments proposed for abandonment extend across private property, most slurry injection activities would occur within the public roadway right-of-way [ROW]. Slurry injection activities may occur in conjunction with an approximately 400-foot segment of open trench excavation across several private industrial parcels located west of the intersection of Lankershim Boulevard with Cantara Street.)

- Existing Cantara TL would be abandoned along Cantara Street from the intersection of Cantara Street with Potter Avenue to the intersection of Cantara Street with Irvine Avenue.
- Existing Cantara TL would be abandoned along Irvine Avenue from the intersection of Irvine Avenue with Cantara Street to the intersection of Irvine Avenue with Strathern Street.
- Existing Cantara TL would be abandoned along Cantara Street from the intersection of Cantara Street with Fair Avenue to the intersection of Cantara Street with San Fernando Road.
- Existing distribution mainline would be abandoned along San Fernando Road from the intersection of San Fernando Road with Cantara Street to just east of the intersection of San Fernando Road with Arvilla Avenue.

Construction of the new and replacement pipelines and abandonment of the above-listed existing pipeline segments would also require construction activities at certain connection points and tie-in locations, listed below:

- At Cantara Street and Potter Avenue, a short segment of the existing Cantara TL would be removed, and the two resulting exposed pipe ends would be plugged.
- The replacement Cantara TL would be connected to the existing North Hollywood Collector TL along Strathern Street, just east of the SR-170.
- The replacement Cantara TL would be connected to an existing-to-remain segment of the Cantara TL at the intersection of Strathern Street and Irvine Avenue.
- The replacement Cantara TL would be connected to an existing-to-remain segment of the Cantara TL at the intersection of Cantara Street and Fair Avenue.
- The replacement Cantara TL would be reduced in size to 20 inches in diameter at the intersection of Cantara Street with San Fernando Road and would continue southeast along San Fernando Road as a 20-inch-diameter distribution mainline.

- The replacement distribution mainline within San Fernando Road would be connected to an existing 16-inch-diameter pipe near the intersection of San Fernando Road with Arvilla Avenue.
- The replacement distribution mainline within Cantara Street would be connected to existing pipelines at the intersection of Cantara Street with the following roadways: Rhodes Avenue, Laurelgrove Avenue, Saint Clair Avenue, Bellingham Avenue, Vantage Avenue, Laurel Canyon Boulevard, Agnes Avenue, Ben Avenue, Gentry Avenue (two connections), Burton Street, Radford Avenue, Hinds Avenue, Lankershim Boulevard (two connections), Troost Avenue, Irvine Avenue, Fair Avenue, Case Avenue, Ensign Avenue, Vineland Avenue, and San Fernando Road. These connections would involve a cross or a tee on the new 8-inch-diameter distribution mainline at each of these intersections.



SOURCE: Bing Maps, OpenStreetMaps

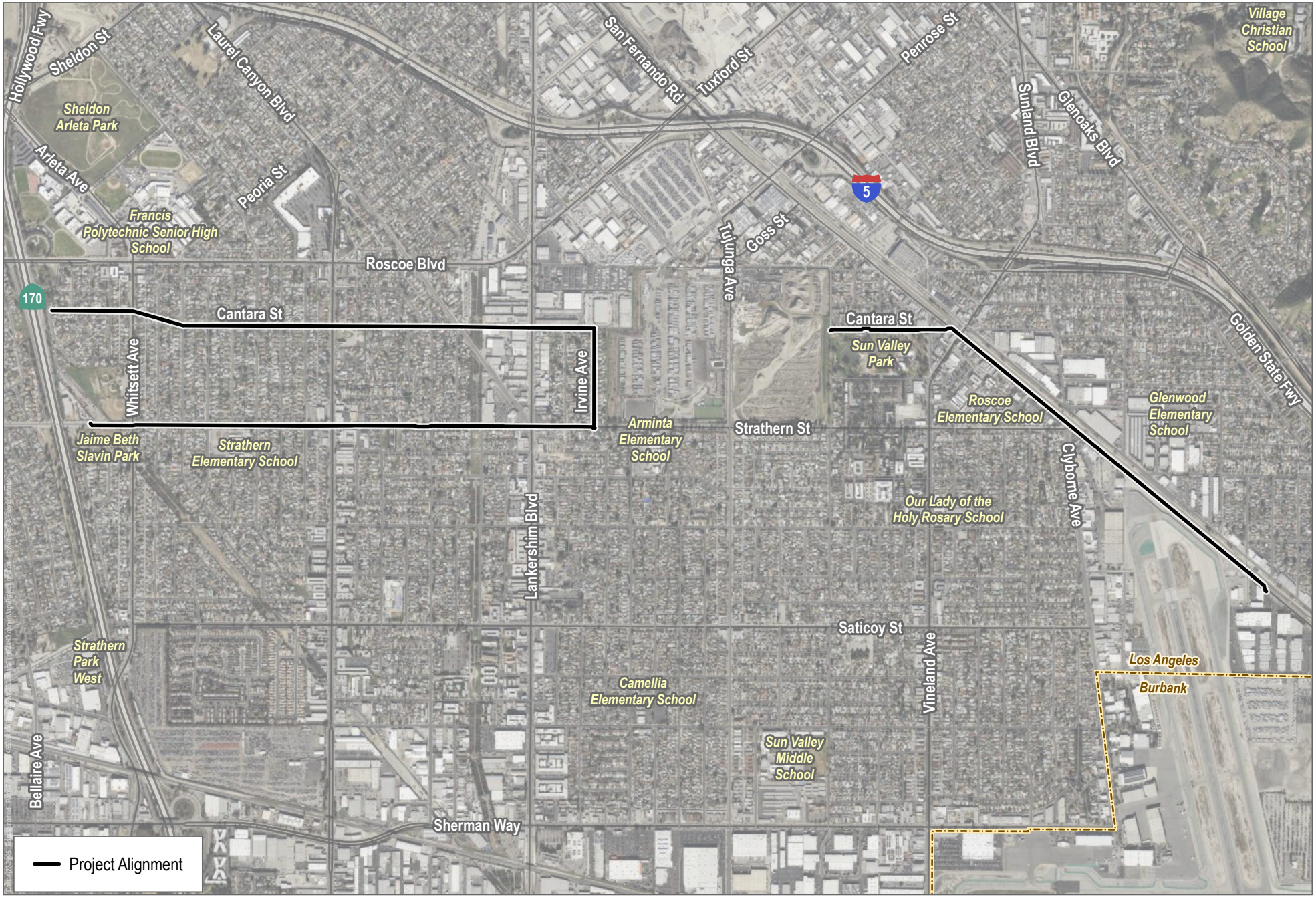
Los Angeles Department of Water & Power

0 0.5 1 Miles

FIGURE 1

Regional Location

Cantara Trunk Line Replacement Project



SOURCE: Bing Maps, OpenStreetMap

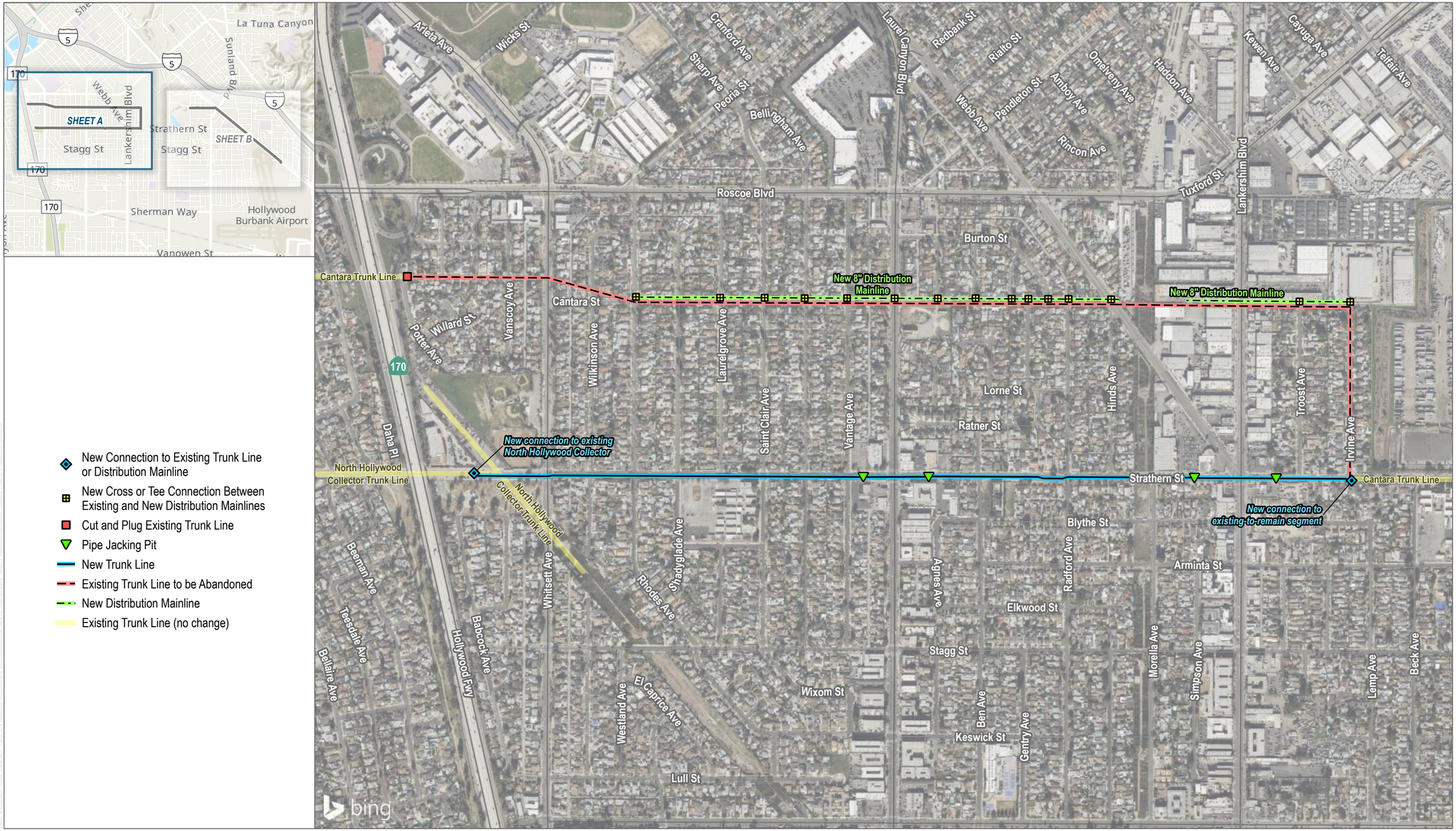
Los Angeles Department of Water & Power

0 850 1,700 Feet

FIGURE 2

Project Location

Cantara Trunk Line Replacement Project



- New Connection to Existing Trunk Line or Distribution Mainline
- New Cross or Tee Connection Between Existing and New Distribution Mainlines
- Cut and Plug Existing Trunk Line
- Pipe Jacking Pit
- New Trunk Line
- Existing Trunk Line to be Abandoned
- New Distribution Mainline
- Existing Trunk Line (no change)

SOURCE: Bing Maps, OpenStreetMap

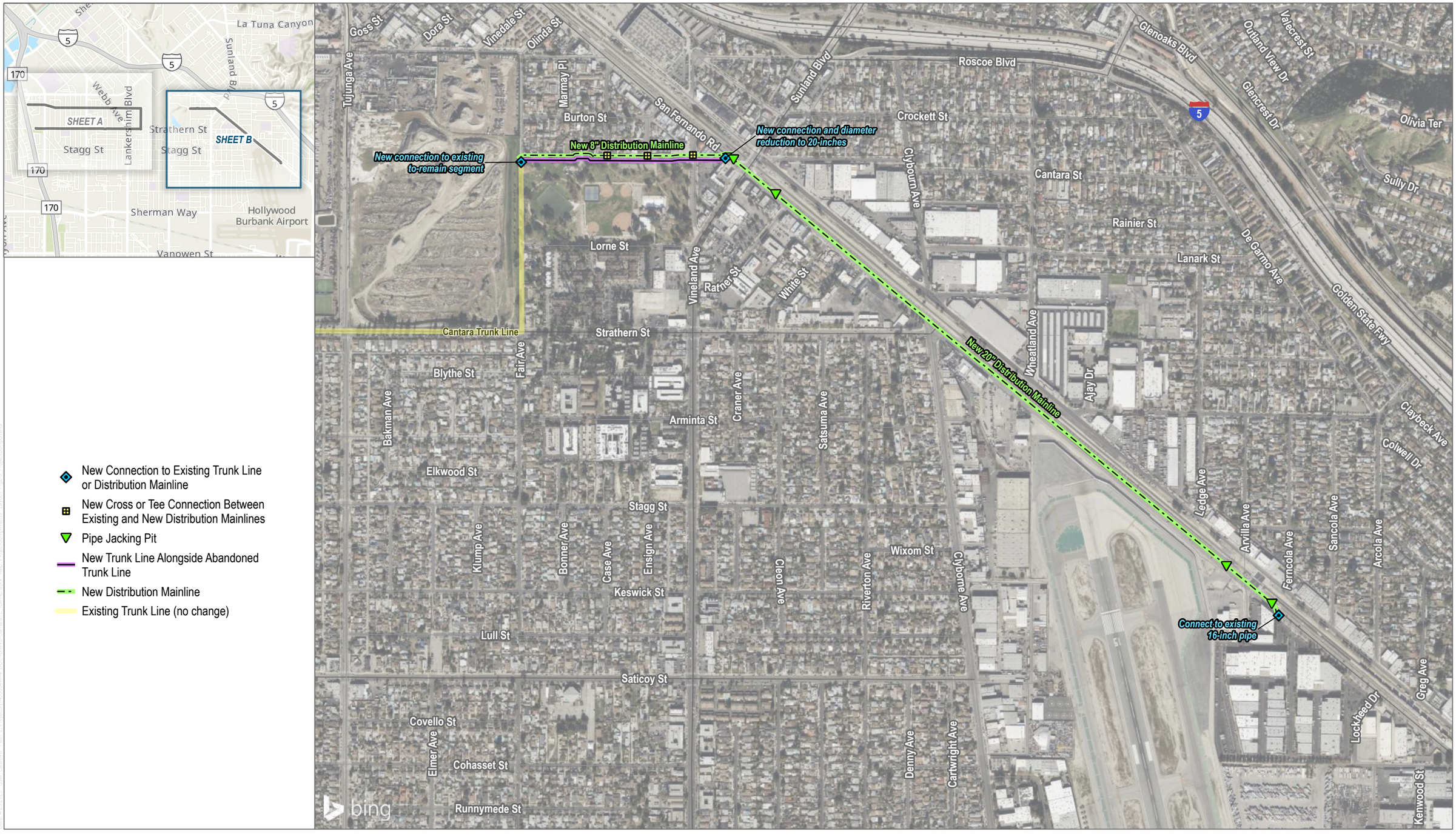
LA DWP Los Angeles Department of Water & Power

0 335 670 Feet

FIGURE 3A

Project Components

Cantara Trunk Line Replacement Project



- New Connection to Existing Trunk Line or Distribution Mainline
- New Cross or Tee Connection Between Existing and New Distribution Mainlines
- Pipe Jacking Pit
- New Trunk Line Alongside Abandoned Trunk Line
- New Distribution Mainline
- Existing Trunk Line (no change)

SOURCE: Bing Maps, OpenStreetMap

Los Angeles Department of Water & Power

0 335 670 Feet

FIGURE 3B

Project Components

Cantara Trunk Line Replacement Project

2 Project Description

The proposed TL alignment is approximately 8,200 feet along Strathern Street and Cantara Street. On the west, the proposed TL would connect to the North Hollywood Collector TL east of SR-170. An approximately 60-foot-long segment of the North Hollywood Collector TL would be removed in order to connect the replacement Cantara TL. The North Hollywood Collector TL, which was installed circa 1990, connects to City TL South at the intersection of Coldwater Canyon Avenue and Strathern Street. As such, after project implementation, water would still ultimately flow from the City TL South to the Cantara TL.

On the east, the proposed TL would connect to the existing-to-remain Cantara TL at Irvine Avenue. The proposed TL would resume along Cantara Street, where it would connect to the existing Cantara TL at Fair Avenue and continue easterly onto San Fernando Road, where it would transition to the new 20-inch-diameter distribution mainline along San Fernando Road to just east of Arvilla Avenue. The 36.75-inch-diameter welded steel pipe section of existing Cantara TL from Coldwater Canyon Avenue to Potter Avenue and the 32-inch-diameter welded steel pipe sections of existing Cantara TL located along Strathern Street and Fair Avenue would not be replaced and would remain in service. At Cantara Street and Potter Avenue, a short segment of the existing Cantara TL would be removed, and the two resulting exposed pipe ends would be plugged. The existing Cantara TL west of the two plugs would remain in service and would include a new connection to an existing parallel distribution mainline. The existing TL east of the two plugs would be abandoned.

Approximately 5,100 feet of new 20-inch-diameter distribution mainline would be installed along San Fernando Road. The project would also involve installation of appurtenant devices, including the following: one 60-inch Butterfly Valve (BV) would be installed on the North Hollywood Collector TL along Strathern Street, west of Whitsett Avenue; one 30-inch BV would be installed along Strathern Street, west of Whitsett Avenue; one 30-inch BV would be installed along Strathern Street, west of Laurel Canyon Boulevard; two 30-inch BVs would be installed along Strathern Street, west of Irvine Avenue; and one 30-inch BV would be installed along Cantara Street, east of Fair Avenue. The Cantara TL and associated 20-inch-diameter distribution mainline would utilize seismically resilient pipe to prevent or minimize potential service disruptions and maintain supply to the system in an earthquake event.

LADWP would install approximately 1,550 feet of new 8-inch-diameter distribution mainline along Cantara Street from Fair Avenue to San Fernando Road and another 5,460 feet of new 8-inch-diameter distribution mainline along Cantara Street from Rhodes Avenue to Irvine Avenue.

To determine the appropriate size for the replacement pipes, LADWP analyzed the operating criteria for the pipelines, including the service areas' current and anticipated demand. The predicted ultimate maximum day peak hour demand was used for the analysis; 30-inch-diameter pipe segments for the trunkline and 20-inch- and 8-inch-diameter pipe segments for the distribution mainlines were determined to be sufficient. The proposed sizes are fairly similar to existing pipe sizes. Existing riveted steel sections of Cantara TL along Cantara Street from Potter Avenue to Irvine Avenue, as well as from Fair Avenue to San Fernando Road, would be abandoned and slurry filled. Similarly, the existing distribution mainline along San Fernando Road would be abandoned and slurry filled.

Open-Trench Excavation

Open-trench excavation is a construction method typically used to install pipelines and their appurtenances. In general, the process consists of site preparation, excavation, shoring, pipe installation, backfilling, and worksite

restoration. The majority of construction would occur within the public ROW, with work areas divided into lengths of approximately 1,000 feet. The maximum length of open trench at any one time would be approximately 1,000 feet. Construction work areas would occur on the streets adjacent to the proposed pipelines and would move iteratively as construction progresses. A work area of approximately 1,000 feet in length can be used for both pipe installation activities and staging equipment. Work areas would be approximately 28 feet wide for pipeline installation on Strathern Street and San Fernando Road and 20 feet wide for pipeline installation on Cantara Street.

Work areas would be barricaded with chain-linked fences and K-rails (i.e., modular traffic barriers) to prevent vehicles and pedestrians from entering work areas throughout the construction duration of a given work area. During the open-trench construction processes, approximately 27 cubic yards of excavated material are expected to be removed and hauled off per day. Each work area would be occupied for approximately 4 months. The following is a description of the phases of construction for open-trench excavation.

Pipe Jacking Methods

Pipe jacking, which is a form of trenchless construction, would be used to reduce traffic disruptions at busy intersections. Pipe jacking would be used along Strathern Street at the intersections of Lankershim Boulevard and Laurel Canyon Boulevard. Along San Fernando Road, LADWP is considering use of pipe jacking (as opposed to open trench) at the intersections of Sunland Boulevard and Arvilla Avenue. Because pipe jacking is more intensive than open-trench methods in terms of construction activity, this environmental document assumes that pipe jacking would be used at these two intersections.

3 Analysis Methodology

The analysis presented herein considers the potential environmental impacts of the proposed project relative to existing conditions. Establishment of the project area's existing noise conditions and assessment of project-attributed environmental noise impacts have been prepared using the following contemporary data sources and techniques:

- Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) reference maximum sound levels (L_{max} at 50 feet distance) and acoustical usage factors (AUF);
- FHWA RD-77-108 for the prediction of traffic noise changes due to the project; and
- California Department of Transportation (Caltrans) and Federal Transit Administration (FTA) guidance (Caltrans 2020 and FTA 2018) to estimate project construction vibration levels.

4 Noise

4.1 Acoustical Fundamentals

4.1.1 Sound

Noise is defined as unwanted sound. Sound may be described in terms of level or amplitude (measured in decibels [dB]), frequency or pitch (measured in hertz or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the amplitude of sound is the decibel. Because the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is used to relate noise to human sensitivity. The dBA scale performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear. Several descriptors of noise (noise metrics) exist to help predict average community reactions to the adverse effects of environmental noise, including traffic-generated noise, on a community. These descriptors include the equivalent noise level over a given period (L_{eq}), the statistical sound level, the day–night average noise level (L_{dn}), and the Community Noise Equivalent Level (CNEL). Each of these descriptors uses units of dBA. Table 1, Typical Exterior and Interior Sound Levels in the Environment, provides examples of A-weighted noise levels from common sounds. In general, human sound perception is such that a change in sound level of 3 dBA is barely noticeable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as either doubling or halving the sound level depending on whether the sound is increasing or decreasing.

Table 1. Typical Exterior and Interior Sound Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
—	110	Rock band
Jet flyover at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kilometers per hour (50 mph)	80	Food blender at 1 meter (3 feet) Garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area Heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban daytime	50	Large business office Dishwasher, next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night, concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2020.
Note: dBA = A-weighted decibel.

The L_{eq} value is a sound level energy-averaged over a specified period (typically no less than 15 minutes for environmental studies). It is a single numerical value that, if constant over time, represents the same amount of variable sound energy received by a receptor during a time interval. For example, a 1-hour L_{eq} measurement would represent the average amount of energy contained in all the noise that occurred in that hour. The L_{eq} value is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors.

Unlike the L_{eq} metric, L_{dn} and CNEL descriptors always represent 24-hour periods, often on an annualized basis. The L_{dn} and CNEL descriptors also differ from L_{eq} because they apply a time-weighted dB adjustment designed to emphasize noise events that occur during the evening and nighttime hours (when speech and sleep disturbance is of more concern). "Time weighted" refers to the fact that L_{dn} and CNEL penalize noise that occurs during certain sensitive periods. In the case of CNEL, noise occurring during the daytime (7:00 a.m.–7:00 p.m.) receives no penalty. Noise during the evening (7:00 p.m.–10:00 p.m.) is penalized by adding 5 dB, while nighttime (10:00 p.m.–7:00 a.m.) noise is penalized by adding 10 dB. L_{dn} differs from CNEL in that the daytime period is defined as 7:00 a.m.–10:00 p.m., thus eliminating the evening period. The L_{dn} and CNEL descriptors are predominant criteria used to measure roadway noise affecting residential receptors. These two metrics generally differ from one another by no more than 0.5 dB to 1 dB and, as such, are often treated as equivalent to one another.

4.1.2 Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earthmoving equipment.

Vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep. Sufficiently high levels of vibration can damage fragile buildings or interfere with equipment that is highly sensitive to vibration (e.g., electron microscopes). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway surface on which even heavy vehicles travel is smooth, the vibration from such traffic (that features inflated rubber tires contacting the roadway surface) is rarely perceptible.

Ground-borne vibration generated by construction projects is usually highest during pile driving, rock blasting, soil compacting, jack hammering, and demolition-related activities where sudden releases of subterranean energy or powerful impacts of tools on hard materials occur. Depending on their distances to a sensitive receptor, operation of large bulldozers, graders, loaded dump trucks, or other heavy construction equipment and vehicles on a construction site also have the potential to cause high vibration amplitudes.

Several different methods are used to quantify vibration. Peak particle velocity (PPV), expressed in inches per second (ips), is defined as the maximum instantaneous peak of the vibration signal and is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body and is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to describe this RMS magnitude with respect to a reference value, which acts to compress the range of numbers required to discuss vibration in the context of impact assessment.

The calculation to determine PPV at a given distance is as follows:

$$PPV_{distance} = PPV_{ref} * (25/D)^{1.5}$$

Where:

$PPV_{distance}$ = the peak particle velocity in inches per second of the equipment adjusted for distance

PPV_{ref} = the reference vibration level in inches per second at 25 feet

D = the distance from the equipment to the receptor

4.1.3 Sensitive Receptors

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Consistent with the City's General Plan, residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would be considered noise sensitive and may warrant unique measures for protection from intruding noise. Potential sensitive receptors in the vicinity of the project site are numerous, consisting of residential land uses, parks, schools, churches and a motel. Additionally, there are numerous commercial land uses along the project alignment. The nearest identified residential land uses are as close as 20 feet to proposed construction activity boundaries. These potentially sensitive receptors represent the nearest noise-sensitive land uses with the potential to be impacted by construction of the project.

4.2 Existing Noise Conditions

Sound pressure level (SPL) measurements were conducted during daytime hours in the vicinities of representative offsite noise-sensitive receptors (NSR) near the proposed project alignment on March 24, 2025, to quantify and characterize the existing outdoor ambient sound levels in the project area.

Table 2 provides the locations and time periods at which these baseline noise level measurements were performed by an attending Dudek field investigator. Noise measurements were conducted using two types of sound level meters (SLMs): a Rion Model NL-52 (Type 1, Precision Grade) and a Soft dB Piccolo II (Type 2, General Purpose). Both SLMs were equipped with 0.5-inch, pre-polarized condenser microphones with pre-amplifiers and met the current American National Standards Institute (ANSI) specifications for their respective types. The accuracy of each SLM was verified using a field calibrator before and after the measurements. For consistency, the microphones were positioned approximately 5 feet above the ground during data collection.

The 16 locations listed in Table 2 are represented by the names of adjacent cross streets or other landmarks, with corresponding geographic positions depicted on Figure 4. The primary noise sources at these SPL survey sites consisted of traffic along adjacent roadways, distant conversations, birdsong, landscaping noise, and rustling leaves. As shown in Table 2, the measured daytime SPL ranged from 53.4 dBA L_{eq} at Cantara Street and Irvine Avenue to 70.2 dBA L_{eq} at Strathern Street and Clybourn Avenue. Beyond the summarized information presented in Table 2, detailed noise measurement data is included in Attachment A.

Table 2. Measured Baseline Outdoor Ambient Noise Levels

Nearest Intersection or Landmark	Measurement Time	L_{eq} (dBA)	L_{max} (dBA)
Strathern St. and Clybourn Ave.	10:24 a.m. to 10:39 a.m.	70.2	87.1
Cantara St. and Case Ave.	11:01 a.m. to 11:16 a.m.	57.9	70.7
Cantara St. and Fair Ave.	11:25 a.m. to 11:40 a.m.	53.9	67.3
Cantara St. and Irvine Ave.	11:54 a.m. to 12:09 p.m.	53.4	67.3
Cantara St. and Troost Ave.	12:21 p.m. to 12:36 p.m.	56.5	72.0
Cantara St. and Webb Ave.	12:49 a.m. to 13:04 p.m.	65.4	75.1
Cantara St. and Bellingham Ave.	13:09 p.m. to 13:24 p.m.	59.2	69.3
Strathern St. and Irvine Ave.	09:50 a.m. to 10:05 a.m.	69.1	78.9
Strathern St. and Troost Ave.	10:17 a.m. to 10:32 a.m.	69.0	98.6
Tacos Johnny (8011 Webb Ave.)	10:49 a.m. to 11:04 a.m.	64.0	75.0
Strathern St. and Radford Ave.	11:13 a.m. to 11:28 a.m.	65.2	75.1
Strathern St. and Vantage Ave.	11:37 a.m. to 11:52 a.m.	65.8	83.8
Strathern St. and Laurelgrove Ave.	12:02 p.m. to 12:17 p.m.	64.9	77.6
Strathern St. and Wilkinson Ave.	12:21 p.m. to 12:36 p.m.	64.6	77.4
Cantara St. and Whitsett Ave.	12:42 p.m. to 12:57 p.m.	68.5	80.8
Cantara St. and Potter Ave.	1:07 p.m. to 1:23 p.m.	61.8	70.0

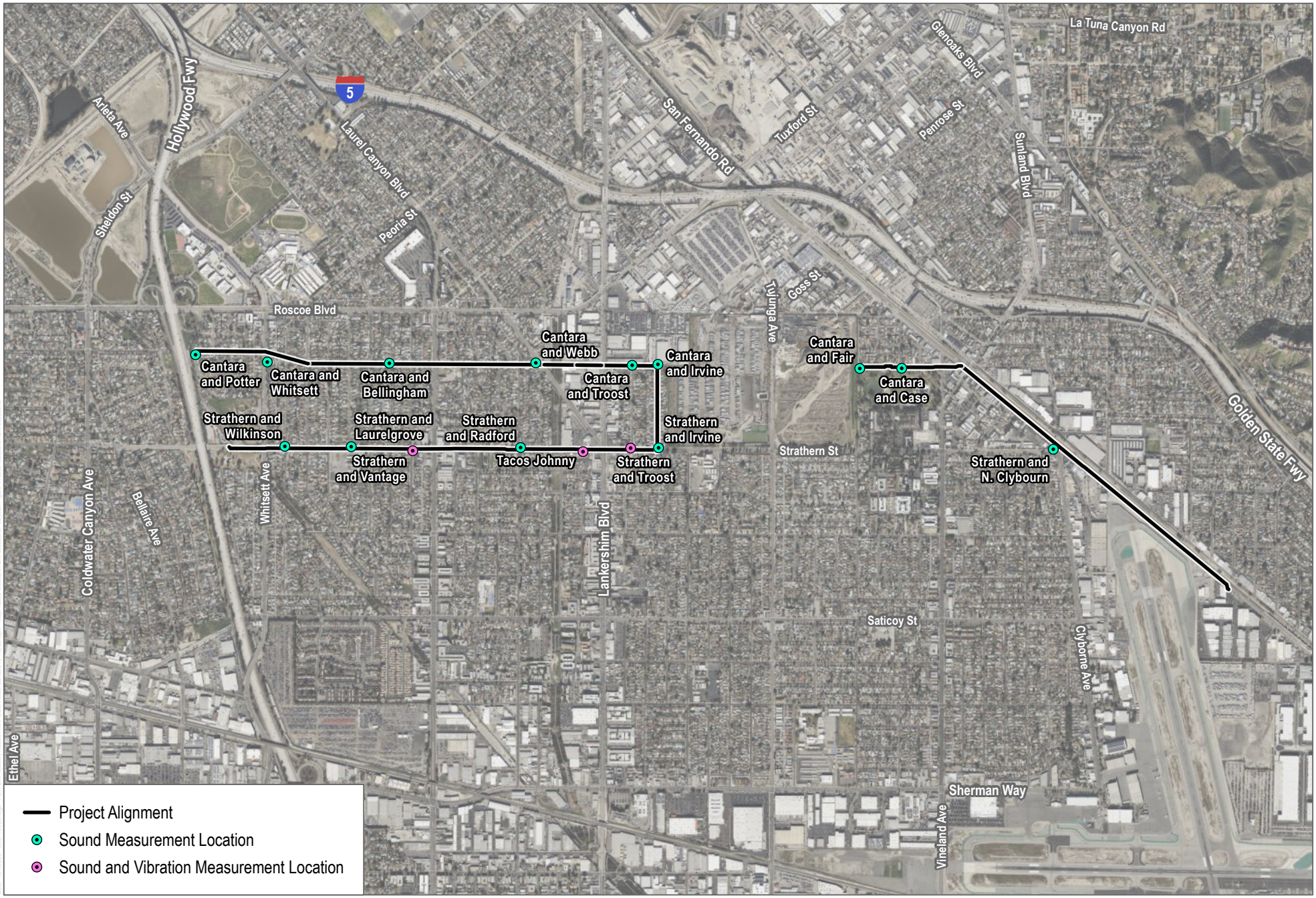
Source: Attachment A.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels.

In addition to the short-term SPL measurement samples of outdoor ambient sound conducted along the proposed project alignment, three baseline groundborne vibration measurements were conducted in the project area. These vibration measurements were conducted using an Instantel Micromate instrument connected to a weighted geophone. Table 3 displays the monitoring location, measurement period, and the resulting peak tri-axial vector sum values in units of inches per second (ips) peak particle velocity (PPV). See Attachment A for more detailed information from the vibration measurements at each site.

Table 3. Measured Baseline Groundborne Vibration Levels

Site (e.g., nearest intersection or landmark)	Time	Peak Vector Sum (ips)
Strathern St. and Troost Ave.	10:14 a.m. to 10:31 a.m.	0.0081
Tacos Johnny (8011 Webb Ave.)	10:46 a.m. to 11:04 a.m.	0.0274
Strathern St. and Vantage Ave.	11:34 a.m. to 11:51 a.m.	0.0097

Source: Attachment A.
Notes: ips = inches per second



SOURCE: Bing Imagery 2024; OpenStreetMaps 2019

LA DWP Los Angeles Department of Water & Power

0 1,000 2,000 Feet

FIGURE 4

Noise and Vibration Measurement Locations

Cantara Trunk Line Replacement Project

4.3 Regulatory Setting

4.3.1 Federal

There are no federal noise standards that would directly regulate environmental noise during construction of the project. The following is provided because guidance summarized herein is provided for informative context with respect to typical noise level thresholds for environmental impact assessment.

Federal Transit Administration

In its Transit Noise and Vibration Impact Assessment guidance manual, the FTA recommends a daytime construction noise level threshold of 80 dBA L_{eq} over an 8-hour period (FTA 2018) when "detailed" construction noise assessments are performed to evaluate potential impacts to community residences surrounding a project. Although this FTA guidance is not a regulation, it can serve as a quantified standard in the absence of such limits at the state and local jurisdictional levels.

Federal Interagency Committee on Noise

Some guidance regarding the determination of a substantial permanent increase in ambient noise levels in the project vicinity above existing levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON 1992), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a qualitative measure of the adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown below are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis to define a substantial increase in community noise levels related to all transportation noise sources and permanent non-transportation noise sources.

- Outdoor ambient sound level without the project is less than 60 dBA L_{dn}, then a project-attributed increase of 5 dBA or more would be considered significant;
- Outdoor ambient sound level without the project is between 60 and 65 dBA L_{dn}, project-attributed increase of 3 dBA or more would be considered significant; and
- Outdoor ambient sound level without the project is greater than 65 dBA L_{dn}, then project-attributed increase of 1.5 dBA or more would be considered significant.

4.3.2 State of California

California Department of Health Services

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types.

The California Department of Health Services guidelines of community noise acceptability for use by local agencies (OPR 2017). Selected relevant levels are listed here:

- Below 60 dBA CNEL: normally acceptable for low-density residential use
- 50 to 70 dBA CNEL: conditionally acceptable for low-density residential use
- Below 65 dBA CNEL: normally acceptable for high-density residential use and transient lodging
- 60 to 70 dBA CNEL: conditionally acceptable for high-density residential, transient lodging, churches, educational, and medical facilities

The normally acceptable exterior noise level for high-density residential use is up to 65 dBA CNEL. Additionally, this exterior noise level limit is consistent with the City of Los Angeles General Plan Noise Element.

California Department of Transportation

The Caltrans Transportation and Construction Vibration Guidance Manual contains vibration damage threshold guidelines to assess potential vibration damage to structures adjacent to project construction. According to Caltrans criteria, activities shall not exceed the following building damage thresholds for the identified structures:

- Fragile Buildings: 0.1 PPV
- Historic Buildings: 0.25 PPV
- Older Residential Structures: 0.3 PPV
- New Residential Structures: 0.5 PPV
- Modern Industrial/Commercial Buildings: 0.5 PPV

4.3.3 City of Los Angeles

Municipal Code

Section 41.40 of the City of Los Angeles Municipal Code (LAMC) contains regulations restricting the hours of noise-generating construction activities. Per Section 41.40(a), noise-generating construction activities are restricted to between the hours of 7:00 a.m. and 9:00 p.m. on weekdays. Section 41.40(c) further states that noise-generating construction activities must not occur within 500 feet of residential uses before 8:00 a.m. or after 6:00 p.m. on Saturdays, and construction is prohibited within 500 feet of residential uses on Sundays and national holidays. Most of the project alignment is located in residential areas or within at least 500 feet of a residential area. Per

Section 41.40(b) and 41.40(j), the Executive Director of the Board of Police Commissioners may issue variances to allow for construction work outside of the allowable hours specified in Sections 41.40(a) and 41.40(c).

Section 112.05(a) limits noise generated by powered construction equipment in residential zones or within 500 feet of residential zones to a maximum noise level of 75 dBA at 50 feet. Section 112.05 also states that this limitation shall not apply when compliance is technically infeasible. The proposed project extends primarily through residential areas; as such, this regulation applies throughout nearly all areas of the project alignment.

The proposed project would not result in new or different operational maintenance activities; as such, operational noise and vibration thresholds have not been identified herein.

5 Impact Analysis and Conclusions

5.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the proposed project related to noise are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (Cal. Code Regs., Title 14, Chapter. 3, sections 15000-15387.). A significant impact under CEQA would occur if the proposed project would:

a) Result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
b) Result in generation of excessive groundborne vibration or groundborne noise levels.
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

In light of these above significance criteria, this analysis uses the following standards to evaluate potential noise and vibration impacts.

- Construction noise – The proximity of existing noise-sensitive receptors located adjacent to Strathern Street, Irvine Avenue, and Cantara Street suggests that project construction boundary to receiver distances are a minimum of approximately 20 feet to noise-sensitive land uses Therefore, consistent with the LAMC thresholds discussed in Section 4.3.3, this analysis will use 75 dBA L_{eq} as the construction noise impact criterion assessed at these offsite noise-sensitive receivers.
- Off-site project-attributed transportation noise – For purposes of this analysis, a noise impact due to transportation noise would be considered significant if predicted noise levels exceeded the FICON thresholds noted in Section 4.3.1. More specifically, an impact due to the project contribution to existing and future predicted ambient noise levels would be considered significant if it meets the following criteria:
    - Outdoor ambient sound level without the project is less than 60 dBA L_{dn}, then an increase of 5 dBA or more due to project-related construction traffic would be considered significant;
    - Outdoor ambient sound level without the project is between 60 and 65 dBA L_{dn}, then an increase of 3 dBA or more due to project-related construction traffic would be considered significant; and

- Outdoor ambient sound level without the project is greater than 65 dBA L_{dn}, then an increase of 1.5 dBA or more due to project-related construction traffic would be considered significant.

- Construction vibration – Guidance from Caltrans indicates that architectural damage may occur above the thresholds listed for the following:
  - Fragile Buildings: 0.1 PPV
  - Historic Buildings: 0.25 PPV
  - Older Residential Structures: 0.3 PPV
  - New Residential Structures: 0.5 PPV

5.2 Impact Analysis

a) Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Short-Term Construction Noise

Less Than Significant with Mitigation. Construction noise and vibration are temporary phenomena, with emission levels varying from hour to hour and day to day, depending on the equipment in use, the operations performed, and the distance between the source and receptor. Equipment that would be in use during construction would include graders, backhoes, rubber-tired dozers, loaders, cranes, forklifts, pavers, rollers, and air compressors. The typical maximum noise levels at a distance of 50 feet from various pieces of construction equipment and activities anticipated for use on the proposed project site are presented in Table 4. Note that the equipment noise levels presented in Table 4 are maximum noise levels. Usually, construction equipment operates in alternating cycles of full power and low power, producing average noise levels over time that are less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

Table 4. Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max}, dBA at 50 Feet)
Backhoe	78
Compressor (air)	78
Concrete Saw	90
Crane	81
Dozer	82
Excavator	81
Flat Bed Truck	74
Front End Loader	79
Generator	72
Grader	85
Man Lift	75
Paver	77

Table 4. Typical Construction Equipment Maximum Noise Levels

Equipment Type	Typical Equipment (L_{max}, dBA at 50 Feet)
Roller	80
Scraper	84
Welder / Torch	73
All Other Equipment > 5 HP	85

Source: DOT 2006.
Note: L_{max} = maximum sound level; dBA = A-weighted decibels.

For purposes of this study, and in a manner resembling the "general assessment" methodology per Federal Transit Administration (FTA) guidance, this analysis assumes that the three loudest types of equipment per construction phase would be located at the nearest possible distance to a noise-sensitive receptor. This would be considered a conservative analysis as construction equipment would unrealistically "stack" at the nearest possible distance as opposed to operating at various locations (and therefore various distances from the nearest noise-sensitive receptor) throughout a given work area. Additionally, the FTA guidance recommends using the two loudest types of equipment per phase, while this analysis considers three of the loudest types of equipment per phase, which is more conservative.

Noise-sensitive receptors adjacent to the project alignment include residences, schools, churches, parks, and a motel. The closest noise-sensitive receptors along the alignment are located approximately 20 feet from the proposed areas of construction.

Construction activities are primarily expected to occur between the hours of 7:00 a.m. and 5:00 p.m. However, as required by LADOT, nighttime work may occur in select areas due to traffic concerns. Other nighttime work would primarily be associated with turning on/off water supply and thus would not be associated with heavy construction activity having the potential to generate substantial noise levels. Construction activity would therefore typically comply with the allowable hours of construction in the LAMC. However, some nighttime construction may be required that would occur outside the allowable hours of construction. Per LAMC Section 41.40(d), the provisions of LAMC Section 41.40, including the allowable hours of construction, do not apply to major public works construction by the City or its proprietary departments, such as the project. LADWP would be granted a variance to construct outside of the allowable hours of construction during nighttime hours, if required.

This analysis is focused on determining whether project construction could exceed the LAMC construction noise level limit of 75 dBA L_{eq} at a distance of 50 feet within or in 500 feet of residential zones. It is noted that a majority of the project alignment extends through or within 500 feet of residential zones.

A Microsoft Excel–based noise prediction model emulating and using reference data from the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest noise-sensitive land uses. Although the RCNM was funded and promulgated by the FHWA, it is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are often used for other types of construction. Input variables for the predictive modeling consist of the equipment type and number of each (e.g., a dozer, a backhoe, a tractor, and an excavator) the duty cycle for each piece of equipment (e.g., percentage of time within a specific time period, such as an hour, when the equipment is expected to operate at full power or capacity and thus make noise at a level comparable to what is presented in Table 4), and the distance from the noise-sensitive receptor. The predictive model also considers how

many hours that equipment may be on-site and operating (or idling) within an established work shift. Conservatively, no topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis.

By a process of input variable iteration, the FHWA RCNM emulator worksheet was used to estimate the minimum perpendicular horizontal distances between the proposed work areas and the nearest noise-sensitive receptor position (considered to be as close as 20 feet from the construction boundary) for the Open-Trench Pipe Installation phase. Assumptions used include the following:

- As shown in Exhibit I, construction progress along the project alignment is a finite length (approximately 1,000 feet, as indicated in the Project Description), which means construction equipment involved in the Open Trench Pipe Installation phase will not be located at the closest perpendicular distance to an offsite receptor for an entire 8-hour work day; instead, this analysis approximates detail of project daily progress as follows:
    - 40% of the total usage hours at the start and end positions of the 1,000 foot-long segment, where they are most distant from the offsite receptor position;
    - 40% of the total usage hours at the first-quarter and third-quarter progress positions of the 1,000 foot-long segment, where they are closer to the offsite receptor position; and
    - 20% of the total usage hours at the halfway point (a.k.a., the closest or perpendicular distance between the activity and the receptor position).

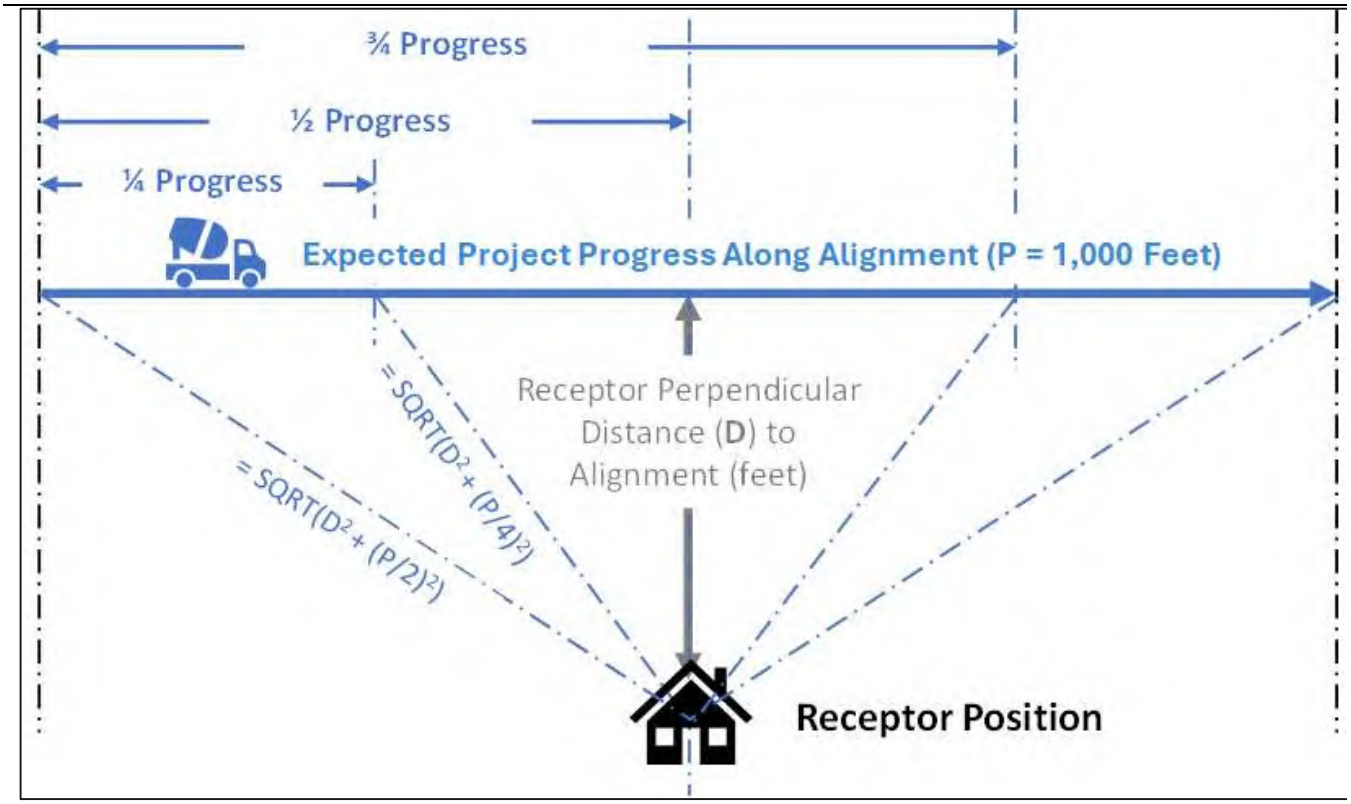


Exhibit I. Diagram of Project Construction Activity Progress and Change in Distance to Receptor

For the Pipe Jacking phases, consisting of the separate "Construction of Jacking and Receiving Pits" and "Pipe Installation via Jacking" activities, a perpendicular distance of 40 feet was assumed for the nearest noise-sensitive land uses adjacent to the jacking and receiving pits.

Attachment B contains the RCNM worksheets used to predict the construction noise levels per activity phase. Table 5 presents the predicted construction noise levels per activity phase using the distances and methodologies described above.

Table 5. Predicted Construction Noise Levels per Activity Phase (Unmitigated)

Construction Phase	Predicted L_{eq} at Nearest Receptor from Construction Boundary (dBA)*
Open Trench Pipe Installation & Slurry Fill Activities	83
Pipe Jacking – Construction of Jacking and Receiving Pits	85
Pipe Jacking – Pipe Installation via Jacking	82

Source: Attachment B.
Notes: L_{eq} = equivalent noise level; dBA = A-weighted decibels.
* Distance from construction activities to the nearest sensitive receptor is assumed to be approximately 20 feet for open-trench activities and approximately 40 feet for pipe jacking activities.

Based on the levels reported in Table 5, all three phases would be expected to exceed the LAMC construction noise limit of 75 dBA L_{eq} at a distance of 50 feet. Mitigation is therefore required to reduce construction noise.

During open trench and slurry fill activities, use of a concrete/asphalt saw cutter and pavement grinder would be the primary generators of the threshold exceedances. As such, MM-NOI-1 requires the use of noise barriers around concrete/asphalt saw cutters and pavement grinders used during open-trench pipe installation and slurry fill activities. MM-NOI-1 would also require noise barriers around pipe jacking and receiving pits. Because a majority of the project alignment extends through or within at least 500 feet of residential zones, MM-NOI-1 would be applicable along the entirety of the project alignment.

MM-NOI-1 Temporary Open-Trench Pipe Installation and Pipe Jacking/Receiving Pit Noise Reduction. The Los Angeles Department of Water and Power shall ensure that the following measures are implemented and monitored for compliance throughout construction:

- All construction equipment must have supplier-approved sound muffling devices (e.g., engine air intake or exhaust treatment) installed and used in compliance with relevant industry standards and California Occupational Safety and Health (Cal/OSHA) regulations pertaining to construction noise, which shall be properly maintained and used at all times such equipment is in operation.
- Stationary construction equipment shall be placed so that emitted noise is directed away from noise-sensitive receptors.
- Equipment staging areas shall be located so as to maximize the distance between construction-related noise sources and noise-sensitive receptors nearest the project site during the construction period.
- All noise-producing construction activities, including warming-up or servicing equipment and any preparation for construction, shall be limited to weekdays between 7:00 a.m. and 9:00 p.m. and 8:00 a.m. to 6:00 p.m. on Saturdays.
- A temporary noise barrier shall be erected within a minimum of approximately 5 feet of concrete/asphalt saw cutters and pavement grinders (during open-trench pipe installation and slurry fill activities) and within a minimum of approximately 5 feet of pipe jacking/receiving pits. The temporary noise barrier for the concrete/asphalt saw cutters and pavement grinders shall have a minimum required height of 6 feet, while the pipe jacking/receiving pits barrier shall have a minimum required height of 8 feet. The barrier may consist of any combination of the following, as determined most feasible by LADWP. Feasibility includes, but is not limited to, ensuring that the enclosures do not create safety hazards associated with vehicle sight lines or pedestrian activities.
  - A “shroud” barrier (i.e., a three-sided portable barrier with the open side directed away from the nearest noise-sensitive receptors)
  - A temporary curtain barrier hung in place on construction fencing. (the curtain barrier could also be hung on K-rails, assuming the rails have been extended to the required height based upon the activity, as specified above)
  - A K-rail mounted sound barrier

As demonstrated in Table 6, implementation of MM-NOI-1 would reduce project construction noise to less than significant levels. Given that the noise levels shown in Table 6 are modeled at 20 to 40 feet from sensitive receptor locations, and all levels are at or below 75 dBA L_{eq}, the LAMC construction noise limit of 75 dBA L_{eq} at a distance of 50 feet would be met. For informational purposes, Table 7 compares the predicted construction noise levels per phase to measured ambient noise levels (from Table 2) for the identified closest noise-sensitive receivers. As shown, noise levels at each modeled location would meet LAMC requirements for construction noise. It is noted that residents in the area would have the option to remain indoors during construction hours to avoid potential annoyance or disruption of outdoor speech or other activities. Indoors, and after being attenuated by the process of exterior-to-interior noise intrusion through the envelope of a receiving enclosed structure, the resulting construction noise exposure levels would not be anticipated to exceed 60 dBA L_{eq}, which would not interfere with conversations or other daytime indoor activities (FHWA 2011).

Construction noise impacts are thus considered less than significant with mitigation incorporated.

Table 6. Predicted Construction Noise Levels per Activity Phase (Mitigated)

Construction Phase	8-Hour L_{eq} at Nearest Receptor from Construction Boundary with Mitigation (dBA)*
Open Trench Pipe Installation	75
Pipe Jacking – Construction of Jacking and Receiving Pits	71
Pipe Jacking – Pipe Installation via Jacking	69

Source: Attachment B.
Notes: L_{eq} = equivalent noise level; dBA = A-weighted decibels.
* Distance from construction activities to the nearest sensitive receptor is assumed to be approximately 20 feet for open-trench activities and approximately 40 feet for pipe jacking activities.

Table 7. Highest Predicted Construction Noise Level Compared to Ambient Noise Levels

Nearest Intersection/Landmark	Measured Noise Level L_{eq} (dBA)	Highest Predicted Unmitigated Construction Noise Level L_{eq} (dBA)	Amount of Largest Increase – Unmitigated Construction Noise Levels Over Existing (dBA)	Highest Predicted Mitigated Construction Noise Level L_{eq} (dBA)	Amount of Largest Increase – Mitigated Construction Noise Levels Over Existing (dBA)
Strathern St. and Clybourn Ave.	70	83	13	75	5
Cantara St. and Case Ave.	58	83	25	75	17
Cantara St. and Fair Ave.	54	83	29	75	21
Cantara St. and Irvine Ave.	53	83	30	75	22
Cantara St. and Troost Ave.	57	83	26	75	18
Cantara St. and Webb Ave.	65	83	18	75	10
Cantara St. and Bellingham Ave.	59	83	24	75	16

Table 7. Highest Predicted Construction Noise Level Compared to Ambient Noise Levels

Nearest Intersection/Landmark	Measured Noise Level L_{eq} (dBA)	Highest Predicted Unmitigated Construction Noise Level L_{eq} (dBA)	Amount of Largest Increase – Unmitigated Construction Noise Levels Over Existing (dBA)	Highest Predicted Mitigated Construction Noise Level L_{eq} (dBA)	Amount of Largest Increase – Mitigated Construction Noise Levels Over Existing (dBA)
Strathern St. and Irvine Ave.	69	83	14	75	6
Strathern St. and Troost Ave.	69	85	16	71	2
Tacos Johnny (8011 Webb Ave.)	64	85	20	71	7
Strathern St. and Radford Ave.	65	83	18	75	10
Strathern St. and Vantage Ave.	66	85	19	71	5
Strathern St. and Laurelgrove Ave.	65	83	18	75	10
Strathern St. and Wilkinson Ave.	65	83	18	75	10
Cantara St. and Whitsett Ave.	69	83	14	75	6
Cantara St. and Potter Ave.	62	83	21	75	13

Source: Attachments A and B.
Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); dBA = A-weighted decibels

Construction Traffic Noise

Less than Significant Impact. The project would result in local, short-term increases in roadway noise as a result of construction traffic. Based on information developed as part of the project's air quality analysis, project-related traffic would include workers commuting to and from the project area as well as vendor and haul trucks bringing or removing materials. The highest number of peak period construction trips expected for the project is a total of 20 non-passenger car equivalent (PCE) trips occurring during either the a.m. or p.m. peak hour. When adjusted to PCE, the highest number of peak period construction trips expected for the project is a total of 26 PCE trips occurring during either the a.m. or p.m. peak hour.[1]

Utilizing this information as well as existing baseline traffic count data collected by Dudek investigators while conducting the short-term noise measurements, the FHWA's Highway Traffic Noise Prediction Model RD-77-108 (FHWA 1978) was used to estimate potential noise impacts at noise-sensitive uses adjacent to roadway segments expected to experience added traffic volumes attributed to the proposed project. Information used in the model included adjusted 1-hour traffic volumes (based upon the traffic counts from the noise measurements), posted traffic speeds, and truck mix percentage. For the baseline existing traffic noise model, the truck mix (as a percentage of total vehicle traffic) is assumed to be 2.0% medium trucks and 1.0% heavy trucks. Truck percentages used in the baseline existing traffic plus project construction trips model vary by roadway depending on the contribution of trucks by the project and can be found in Attachment C. The modeled traffic speed is 25 miles per hour (mph) for Cantara Street; 35 mph for Strathern Street, Whitsett Avenue, and Webb Avenue; and 40 mph for San Fernando Road.

[1] See Section 3.17 for more details on passenger car equivalencies (PCE) and project-related vehicle trip estimates.

Full road closures are not anticipated during construction. Within the vicinity of construction work areas on Strathern Street and San Fernando Road, one lane of travel is anticipated to be maintained in each direction. Within the vicinity of construction work areas on Cantara Street, half of the curb-to-curb width is expected to be closed, and the street would be reduced to one lane of travel for use by vehicles traveling in both directions. Temporary full road closure may occur along a short segment of Cantara Street (approximately 200 feet) between Vineland Avenue and San Fernando Road during open-trench construction within that area (with local access permitted for residents and workers); however, through traffic would still have access to San Fernando Road from Cantara Street via Vineland Avenue. Additionally, the residents and workers along this segment of Cantara Street would have alternative access points via Vineland Avenue and San Fernando Road. K-rails, traffic delineators, and signage would be stationed around work areas, and construction workers with flags may be deployed near work areas when necessary. Any potential changes in traffic patterns are thus expected to be minor, temporary, and highly localized. As such, this analysis is focused on changes in roadway noise based on the addition of construction-related traffic to the project area.

The change in roadway noise levels was determined for two conditions: baseline existing traffic and baseline existing traffic plus project construction traffic. Traffic noise levels were calculated for intersections along Strathern Street, Cantara Street, Whitsett Avenue, Webb Avenue, and San Fernando Road.

Table 8 presents the predicted baseline and baseline plus project construction traffic noise levels based on the methodology described above.

Table 8. Predicted Traffic Noise Levels

Modeled Intersection	Baseline Noise Level (L_{eq}, dBA) at 50 Feet from Centerline	Baseline Plus Project Construction Trips Noise Level (L_{eq}, dBA) at 50 Feet from Centerline	Project Construction-Related Traffic Noise Level Increase (dBA)
Strathern St./Irvine Ave.	63.6	63.9	0.3
Strathern St./Troost Ave.	63.5	63.8	0.3
Strathern St./Radford Ave.	62.1	62.5	0.4
Strathern St./Vantage Ave.	62.1	62.5	0.4
Strathern St./Laurelgrove Ave.	62.0	62.4	0.4
Strathern St./Wilkinson Ave.	61.8	62.3	0.4
San Fernado Rd./Strathern St.-Clybourne St.	66.8	67.0	0.2
Whitsett Ave./Cantara St.	62.6	63.0	0.4
Cantara St./Case Ave.	49.0	52.7	3.7
Cantara St./Fair Ave.	49.0	52.7	3.7
Cantara St./Irvine Ave.	49.6	52.9	3.4
Cantara St./Troost Ave.	48.7	52.5	3.9
Cantara St./Bellingham Ave.	49.8	53.0	3.2
Webb Ave./Cantara St.	47.9	52.3	4.3
Tacos Johnny (8011 Webb Ave.)	62.4	62.8	0.4

Source: Attachment C.

Based upon the Federal Interagency Committee on Noise (FICON 1992) thresholds, the following increases in traffic noise are considered insubstantial: an increase of less than 5 dBA when the ambient sound level is less than 60 dBA L_{dn}/CNEL; an increase of less than 3 dBA when the ambient sound level is between 60 and 65 dBA L_{dn}/CNEL; or an increase of less than 1.5 dBA when the ambient sound level is greater than 65 dBA L_{dn}/CNEL. As shown in Table 8, the predicted traffic noise increases due to the project construction traffic are not greater than any of the FICON thresholds for a given modeled intersection. Therefore, potential impacts due to project-related construction traffic would be less than significant.

b) Result in generation of excessive groundborne vibration or groundborne noise levels.

Less Than Significant Impact. Construction activities may expose persons to excessive ground-borne vibration or ground-borne noise, causing a potentially significant impact. Information from Caltrans (Caltrans 2020) indicates that continuous vibrations with a PPV of approximately 0.3 ips can potentially damage older residential structures. For context, heavier pieces of construction equipment, such as a roller that may be expected on the project site, have peak particle velocities of approximately 0.210 ips or less at a reference distance of 25 feet (DOT 2006).

Caltrans' guidance for building damage shows more stringent vibration thresholds for fragile buildings and historic buildings. However, no fragile or designated historic structures are present along the project alignment or within the vicinity of the project alignment. As such, the vibration threshold of 0.3 ips PPV is considered appropriate for the project area, given that many of the residential structures along the project alignment were generally constructed in the 1950s and are thus considered "older residential structures" for the purposes of the Caltrans' vibration guidance.

Ground-borne vibration attenuates rapidly, even over short distances. The attenuation of ground-borne vibration as it propagates from source to receptor through intervening soils and rock strata can be estimated with expressions found in FTA (FTA 2018) and Caltrans (Caltrans 2020) guidance. By way of example, for a roller operating on-site and as 20 feet from the nearest residential structure, the estimated vibration velocity would be 0.293 ips per the equation as follows (FTA 2018):

$PPV_{rcvr} = PPV_{ref} * (25/D)^{1.5} = 0.293 = 0.210 * (25/20)^{1.5}$

In the above equation, PPV_{rcvr} is the predicted vibration velocity at the receptor position, PPV_{ref} is the reference value at 25 feet from the vibration source (the roller), and D is the actual horizontal distance to the receptor.

Anticipated construction vibration associated with the proposed project would yield a maximum amplitude of 0.293 ips, which does not surpass the City vibration threshold of 0.3 ips PPV for preventing damage to older residential structures. Because the predicted vibration level at 20 feet is less than this guidance limit, the risk of vibration damage to nearby structures is considered less than significant.

Table 9 presents a comparison between measured vibration levels and the highest predicted vibration level shown above.

Table 9. Measured Vibration Levels and Highest Predicted Vibration Level Comparison

Site	Measured Vibration Level (PPV, ips)	Highest Predicted Vibration Level (PPV, ips)	Difference in Potential Vibration Level (PPV, ips)
Strathern St. and Troost Ave.	0.0081	0.293	0.2849
Tacos Johnny (8011 Webb Ave.)	0.0274	0.293	0.2656
Strathern St. and Vantage Ave.	0.0097	0.293	0.2833

Source: Attachment A.
Note: PPV = Peak Particle Velocity; ips = inches per second

Construction activities are primarily expected to occur between the hours of 7:00 a.m. and 5:00 p.m. However, as required by LADOT, nighttime (7:00 p.m. to 7:00 a.m.) work may occur in select areas due to traffic concerns. Other nighttime work may involve turning on/off water supply and thus would not be associated with heavy construction activity having the potential to generate substantial vibration. Per LAMC Section 41.40(d), the provisions of LAMC Section 41.40, including the allowable hours of construction, do not apply to major public works construction by the City or its proprietary departments, such as the project. LADWP would be granted a variance to construct outside of the allowable hours of construction during nighttime hours, if required.

Vibration annoyance is another concern related to construction activity. However, perceptible vibration is not typically a concern for human health and is a common occurrence within the urban environment. While vibration may be perceptible at the nearest sensitive receptors, the elevated vibration levels would only occur intermittently during transitory pipeline construction activities.

Special uses such as select medical facilities (e.g., hospitals), research facilities, and recording studios would be potentially impacted by construction vibration annoyance due to the presence of sensitive equipment. One recording studio has been identified in the project vicinity; however, it is located approximately 300 feet from the project alignment and thus is not anticipated to experience significant vibration from project construction. No other such uses have been identified within the immediate project vicinity. In addition to on-site construction activities, construction trucks on the roadway network have the potential to expose vibration-sensitive land uses. Rubber-tired vehicles, including trucks, rarely generate perceptible vibration. It is anticipated that project-related trucks would not generate perceptible vibration adjacent to the roadway network. Therefore, the proposed project would result in a less than significant impact related to on-site vibration annoyance.

Once operational, the proposed project would not be expected to feature major producers of ground-borne vibration. LADWP's existing maintenance activities in the project area would be expected to continue, in the same manner as existing conditions. Overall, impacts would be considered less than significant.

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.*

The proposed project alignment is located adjoining to the Hollywood Burbank Airport, and portions of the project alignment are within the Los Angeles County Airport Land Use Plan LAC ALUP Planning Boundary/Airport Influence Area, as well as the 65 CNEL (Community Noise Equivalent Level) Noise Contour area, and the Runway Protection Zone (LAC ALUP 2004). This indicates an average daily noise level of up to 65 decibels over a 24-hour period. In

accordance with Cal/OSHA regulations (Title 8 Section 5096) the action level for occupational noise, the level at which protective measures are required for workers in the area, is 85 dBA, and the permissible exposure limit (PEL), the maximum sustained noise level at which workers can be exposed for an 8-hour day, is 90 dBA. While the 65 CNEL does not exceed Cal/OSHA safety requirements for noise and the proposed project alignment would not expose construction workers to excessive noise levels from airplanes alone, airplane noise compounded with construction noise could result in exceedances of noise action levels, thus exposing workers to noise levels in exceedance of Cal/OSHA worker protections. However, federal OSHA and Cal/OSHA require preparation and implementation of on-site health and safety plans, which must require hearing protection for noise exposures over applicable action levels. Site-specific health and safety plans would be required, under these regulations, to account for accumulated noise from environmental factors (airplanes, traffic) and site-specific ones (construction equipment). Upon required preparation and implementation of site-specific health and safety plans, workers are not expected to be exposed to airport-related noise levels that are considered excessive under state law.

The proposed project would not include the construction of any habitable structures, and, as such, would not expose any residents to excessive noise levels as a result of its proximity to the Hollywood Burbank Airport. Additionally, no permanent workers would be required to operate or maintain the proposed project. Periodic maintenance activities could place workers in the vicinity of the Hollywood Burbank Airport; however, maintenance events are anticipated to be brief and intermittent, and workers would be protected by required compliance with Cal/OHSA safety requirements. Therefore, the presence of the airport influence area would not result in a safety hazard or excessive noise during project operations. Impacts would be less than significant.

6 References

Caltrans. 2020. Transportation and Construction Vibration Guidance Manual. Division of Environmental Analysis, Environmental Engineering, Hazardous Waste, Air, Noise, Paleontology Office. Sacramento, California. April.

DOT (U.S. Department of Transportation). 2006. *FHWA Roadway Construction Noise Model: User's Guide*. Final Report. FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. Cambridge, Massachusetts: DOT, Research and Innovative Technology Administration. Final Report. August.

FHWA. 1978. Traffic Noise Model RD-77-108.

FHWA. 2008. Roadway Construction Noise Model (RCNM), Software Version 1.1. U.S. Department of Transportation, Research and Innovative Technology Administration, John A. Volpe National Transportation Systems Center, Environmental Measurement and Modeling Division.

FHWA. 2011. Highway Traffic Noise: Analysis and Abatement Guidance. December 2011.

FICON (Federal Interagency Committee on Noise). 1992. Federal Agency Review of Selected Airport Noise Analysis Issues. Federal Interagency Committee on Noise. August 1992.

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. September 2018.

LAC ALUP (Los Angeles County Airport Land Use Plan). 2004. Los Angeles County Airport Land Use Plan – Los Angeles County – Airport Land Use Commission. Adopted December 19, 1991. Revised December 1, 2004. https://planning.lacounty.gov/wp-content/uploads/2022/10/Los-Angeles-County-Airport-Land-Use-Plan.pdf.

OPR (Governor's Office of Planning and Research). 2017. *State of California General Plan Guidelines*. July 2017.

Attachment A

Noise and Vibration Field Measurement Data

FORMS DUDEK FIELD DATA REPORT

Field Noise Measurement Data

Record: 2060	
Project Name	*Cantara*
Observer(s)	
Date	*2025-03-24*

Meteorological Conditions	
Temp (F)	*85*
Humidity % (R.H.)	*28*
Wind	*Calm*
Wind Speed (MPH)	*4*
Wind Direction	*North*
Sky	*Clear*

Instrument and Calibrator Information	
Instrument Name List	*(ENC) Rion NL-52*
Instrument Name	*(ENC) Rion NL-52*
Instrument Name Lookup Key	*(ENC) Rion NL-52*
Manufacturer	*Rion*
Model	*NL-52*
Serial Number	*553896*
Calibrator Name	*(ENC) LD CAL150*

Calibrator Name	*(ENC) LD CAL150*
Calibrator Name Lookup Key	*(ENC) LD CAL150*
Calibrator Manufacturer	*Larson Davis*
Calibrator Model	*LD CAL150*
Calibrator Serial #	*5152*
Pre-Test (dBA SPL)	*94*
Post-Test (dBA SPL)	*94*
Windscreen	*Yes*
Weighting?	*A-WTD*
Slow/Fast?	*Slow*

Monitoring	
Record #	*1*
Site ID	*Strathern St and irvine ave*
Site Location Lat/Long	*34.215869, -118.385191*
Begin (Time)	*09:50:00*
End (Time)	*10:05:00*
Leq	*69.1*
Lmax	*78.9*
Lmin	*47.2*
Other Lx?	*L90, L50, L10*
L90	*54*
L50	*65.4*

L10	*73.2*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*3*
Distance to Roadway (m)	*0.9*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts	
Vehicle Count Summary	*A 183, MT 5, HT 1, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	

Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*183*
Number of Vehicles - Medium Trucks	*5*
Number of Vehicles - Heavy Trucks	*1*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing south*

Site Photos

Photo	
Comments / Description	*Facing west*

Site Photos

Photo	
Comments / Description	*Facing east*

Monitoring	
Record #	*2*
Site ID	*Strathern and troost*
Site Location Lat/Long	*34.215810, -118.386486*
Begin (Time)	*10:17:00*
End (Time)	*10:32:00*
Leq	*69*
Lmax	*98.6*
Lmin	*44.2*
Other Lx?	*L90, L50, L10*
L90	*54.1*
L50	*66.2*
L10	*72.6*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*2*
Distance to Roadway (m)	*0.6*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts	
Vehicle Count Summary	*A 182, MT 2, HT 0, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*182*
Number of Vehicles - Medium Trucks	*2*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing west*

Site Photos

Photo	

Comments / Description	*Facing east*

Monitoring	
Record #	*4*
Site ID	*Radford and strathern*
Site Location Lat/Long	*34.215865, -118.391981*
Begin (Time)	*11:13:00*
End (Time)	*11:28:00*
Leq	*65.2*
Lmax	*75.1*
Lmin	*40.4*
Other Lx?	*L90, L50, L10*
L90	*47.8*
L50	*61.8*
L10	*69.5*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling, Distant Gardener / Landscape Noise*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*7*
Distance to Roadway (m)	*2.1*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

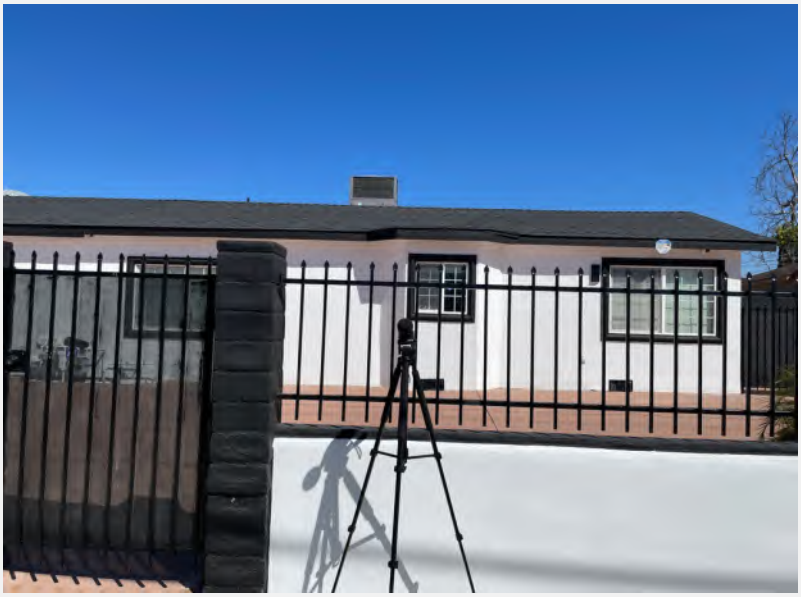
Traffic Counts	
Vehicle Count Summary	*A 131, MT 3, HT 0, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*131*
Number of Vehicles - Medium Trucks	*3*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing west*

Site Photos

Photo	

Comments / Description	*Facing south*

Site Photos	
Photo	
Comments / Description	*Facing east*

Monitoring	
Record #	*5*
Site ID	*Strathern and vantage*
Site Location Lat/Long	*34.215666, -118.397881*
Begin (Time)	*11:37:00*
End (Time)	*11:52:00*
Leq	*65.8*
Lmax	*83.8*

Lmin	*46.7*
Other Lx?	*L90, L50, L10*
L90	*52.6*
L50	*60.7*
L10	*69.2*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Conversations / Yelling, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*0*
Distance to Roadway (m)	*0*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Roadway Type	*3*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts

Vehicle Count Summary	*A 131, MT 4, HT 0, B 0, MC 0*
Select Method for Recording Count Duration	*Enter Manually*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*131*
Number of Vehicles - Medium Trucks	*4*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo



Comments / Description	*Facing west*

Site Photos

Photo	
Comments / Description	*Facing east*

Site Photos

Photo	

Comments / Description	*Facing north*

Monitoring	
Record #	*6*
Site ID	*Strathern and laurel grove*
Site Location Lat/Long	*34.215849, -118.400676*
Begin (Time)	*12:02:00*
End (Time)	*12:17:00*
Leq	*64.9*
Lmax	*77.6*
Lmin	*45.2*
Other Lx?	*L90, L50, L10*
L90	*50.1*
L50	*60.6*
L10	*69.3*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Dog Barking, Distant Kids Playing*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*3*
Distance to Roadway (m)	*0.9*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts	
Vehicle Count Summary	*A 130, MT 2, HT 0, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*130*
Number of Vehicles - Medium Trucks	*2*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing west*

Site Photos

Photo	

Comments / Description	*Facing east*

Site Photos	
Photo	
Comments / Description	*Facing south*

Monitoring	
Record #	*7*
Site ID	*Stathern and wilkinson*
Site Location Lat/Long	*34.215881, -118.404426*
Begin (Time)	*12:21:00*
End (Time)	*12:36:00*
Leq	*64.6*
Lmax	*77.4*

Lmin	*48.9*
Other Lx?	*L90, L50, L10*
L90	*52.2*
L50	*60.3*
L10	*68.7*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*3*
Distance to Roadway (m)	*0.9*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts

Vehicle Count Summary	*A 123, MT 3, HT 0, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*123*
Number of Vehicles - Medium Trucks	*3*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo



Comments / Description	*Facing west*

Site Photos

Photo	
Comments / Description	*Facing east*

Site Photos

Photo	

Comments / Description	*Facing south*

Monitoring	
Record #	*8*
Site ID	*Cantara and whitsett*
Site Location Lat/Long	*34.219225, -118.405205*
Begin (Time)	*12:42:00*
End (Time)	*12:57:00*
Leq	*68.5*
Lmax	*80.8*
Lmin	*45.9*
Other Lx?	*L90, L50, L10*
L90	*52.4*
L50	*62.7*
L10	*73*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Conversations / Yelling, Rustling Leaves*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*4*
Lane Width (feet)	*10*
Roadway Width (feet)	*40*
Roadway Width (m)	*12.2*
Distance to Roadway (feet)	*3*
Distance to Roadway (m)	*0.9*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts	
Vehicle Count Summary	*A 143, MT 6, HT 1, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*143*
Number of Vehicles - Medium Trucks	*6*
Number of Vehicles - Heavy Trucks	*1*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo	
Comments / Description	*Facing north*

Site Photos

Photo	

Comments / Description	*Facing south*

Site Photos	
Photo	
Comments / Description	*Facing west*

Monitoring	
Record #	*9*
Site ID	*Potter*
Site Location Lat/Long	*34.219765, -118.408847*
Begin (Time)	*13:07:00*
End (Time)	*13:23:00*
Leq	*61.8*
Lmax	*70*

Lmin	*57*
Other Lx?	*L90, L50, L10*
L90	*59.2*
L50	*61.4*
L10	*63.7*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Traffic*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Description / Photos

Site Photos

Photo



Comments / Description	*Facing north*

Site Photos

Photo	
Comments / Description	*Facing south*

Site Photos

Photo	

Comments / Description	*Facing east*

Monitoring	
Record #	*3*
Site ID	*Tacos johnny*
Site Location Lat/Long	*34.215693, -118.389140*
Begin (Time)	*10:49:00*
End (Time)	*11:04:00*
Leq	*64*
Lmax	*75*

Lmin	*57.5*
Other Lx?	*L90, L50, L10*
L90	*58.7*
L50	*61.4*
L10	*67.4*
Other Lx (Specify Metric)	*L*
Primary Noise Source	*Traffic*
Other Noise Sources (Background)	*Birds, Distant Aircraft, Distant Conversations / Yelling*
Other Noise Sources Additional Description	*Food truck*
Is the same instrument and calibrator being used as previously noted?	*Yes*
Are the meteorological conditions the same as previously noted?	*Yes*

Source Info and Traffic Counts	
Number of Lanes	*2*
Lane Width (feet)	*10*
Roadway Width (feet)	*20*
Roadway Width (m)	*6.1*
Distance to Roadway (feet)	*1*
Distance to Roadway (m)	*0.3*
Distance Measured to Centerline or Edge of Pavement?	*Edge of Pavement*
Estimated Vehicle Speed (MPH)	*0*

Traffic Counts

Vehicle Count Summary	*A 126, MT 3, HT 0, B 0, MC 0*
Counting Both Directions?	*Yes*
Count Duration (minutes)	*0*
Vehicle Count Tally	
Select Method for Vehicle Counts	*Enter Manually*
Number of Vehicles - Autos	*126*
Number of Vehicles - Medium Trucks	*3*
Number of Vehicles - Heavy Trucks	*0*
Number of Vehicles - Buses	*0*
Number of Vehicles - Motorcyles	*0*

Description / Photos

Site Photos

Photo



Comments / Description	*East*

Site Photos

Photo	
Comments / Description	*Facing west*

Site Photos

Photo	

Comments / Description	*Facing north*

DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANTARA TRUNK LINE — PROJECT #: 14557.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PETE VITAR
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 69 F — HUMIDITY: 49 %R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: — MPH — DIR. N NE E SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) — OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 2 — SERIAL#: 2606
CALIBRATOR: — SERIAL#:
CALIBRATION CHECK: — PRE-TEST ____ dBA SPL — POST-TEST ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
0001 -21									

COMMENTS: READING TAKE AT EASTERN EDGE OF SCHOOL PROPERTY; AT 3-WAY INTERSECTION OF SAN FERNANDO RD / STRATHERN ST / N. CLYBOURN AVE

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EOP: APX 45' TO C/L ON STATHERN ST
TRAFFIC COUNT DURATION: 15 MIN — SPEED ____ MIN SPEED

COUNT 1 (OR RDWY 1):

DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB
AUTOS	207			
MED TRKS	9			
HVY TRKS	5			
BUSES	1			
MOTRCLS	0			

IF OPERATING BOTH DIRECTIONS AS ONE, CHECK HERE ✓

COUNT 2 (OR RDWY 2):

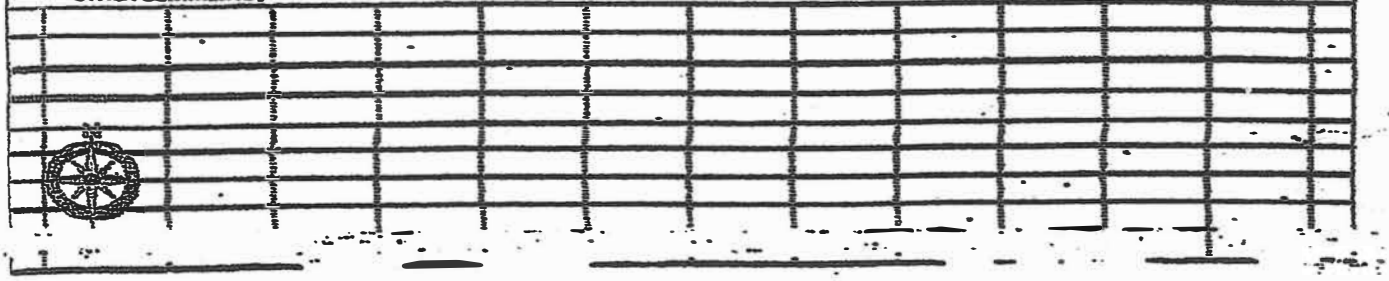
NB/EB	SB/WB	NB/EB	SB/WB

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVERSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPERS NOISE
OTHER: ~~[illegible]~~ JET PLANE ON LANDING AT 10:35AM

DESCRIPTION / SKETCH

TERRAIN: (HARD) SOFT MIXED FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANTARA TOWNHOME LINE — PROJECT #: 14553.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PEC VITAR
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 77 F — HUMIDITY: 32 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 3 MPH — DIR. N NE S SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 2 — SERIAL#: 2606
CALIBRATOR: — SERIAL#:
CALIBRATION CHECK: — PRE-TEST: ____ dBA SPL — POST-TEST: ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC.#	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
M22-38	11:02								

COMMENTS: READING TAKEN JUST INSIDE PARK; AT [redacted] T-INTERSECTION OF CANTARA ST & CASE AVE;

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL OTHER: DISTANT YELLING/CONVERSATION IN PARK
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EOP: APPX 45' TO C/L ON CANTARA

TRAFFIC COUNT DURATION: 15 MIN — SPEED: ____ MIN

COUNT 1 (OR RDWY 1)	DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB
	AUTOS	13			
	MED TRKS	1			
	HVY TRKS	0			
	BUSES	0			
	MOTRCLS	0			

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ✓

COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	NB/EB	SB/WB

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES (DIST. BARKING DOGS) (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING (DIST. CONVERSTNS / YELLING) DIST. TRAFFIC (JUST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: TRAIN WHISTLE AT 11:06 AM; [redacted] HELICOPTER FLYOVER [redacted] 11:14;

DESCRIPTION / SKETCH

TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANTARA TRUNK LINE — PROJECT #: 14553-34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PEYE VIJAN
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 79 F — HUMIDITY: 30 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 3 MPH — DIR. N NE E SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICOLO II — TYPE 1 2 — SERIAL #: 2606
CALIBRATOR: — SERIAL #:
CALIBRATION CHECK — PRE-TEST: dBA SPL — POST-TEST: dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
39-54	11:27								

COMMENTS: READING TAKEN JUST INSIDE PARK, AT T-INTERSECTION OF CANTARA ST & FAIR AVE;

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EDP: APX 45' FROM C/L ON CANTARA ST

TRAFFIC COUNT DURATION: 15 MIN — SPEED — MIN — SPEED

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB	IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ✓	COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	NB/EB	SB/WB
AUTOS	14									
MED TRKS	2									
HVY TRKS	0									
BUSES	0									
MOTRCLS	0									

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES (DIST. BARKING DOGS) (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING (DIST. CONVERSING / YELLING) DIST. TRAFFIC (JUST RDWYS BELOW) DIST. GARDENERS/LANDSCAPING NOISE
OTHER:

DESCRIPTION / SKETCH

TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANJARA TRUNK LINE — PROJECT #: 14563.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PETE VITAL
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 79 F — HUMIDITY: 30 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 3 MPH — DIR. N NE S SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 2 — SERIAL#: 2606
CALIBRATOR: — SERIAL#:
CALIBRATION CHECK — PRE-TEST: ____ dBA SPL — POST-TEST: ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
SS-70	11:50								

COMMENTS: READING TAKEN IN FRONT OF 8149 IRVINE AVE (RESIDENTIAL), A T-INTERSECTION OF CANJARA ST & IRVINE AVE.

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: TRAFFIC AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EOP: ANL 20-30 C/L ON CANJARA

TRAFFIC COUNT DURATION: 15 MIN — SPEED: ____ MIN

COUNT 1 (OR RDWY 1)

DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS	12			
MED TRKS	1			
HVY TRKS	0			
BUSES	0			
MOTRCLS	0			

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE: ✓

COUNT 2 (OR RDWY 2)

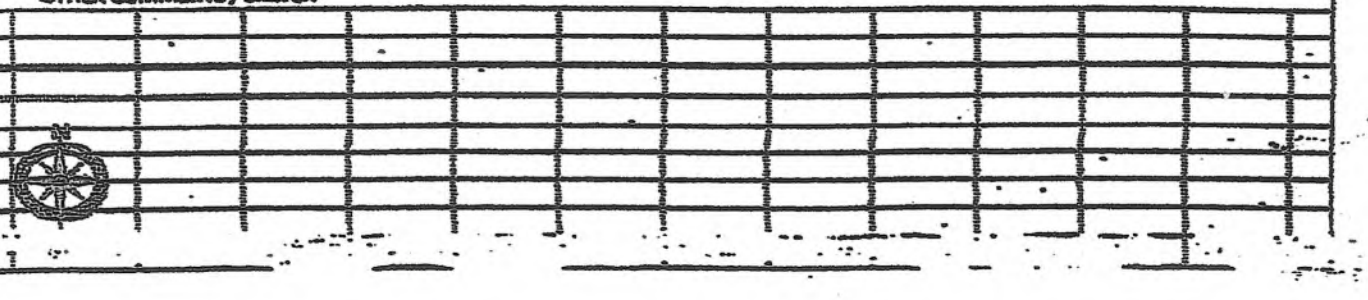
NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DISTD GARDENERS/LANDSCAPING NOISE
OTHER: DISTANT LANDSCAPERS MOWING; DISTANT HVAC UNITS ON INDUSTRIAL BUILDINGS NEARBY;

DESCRIPTION / SKETCH

TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANYANA TRUNK LINE — PROJECT #: 14552.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PETE VITAR
START DATE: 3/24/15 — END DATE: 3/24/15
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 84 F — HUMIDITY: 24 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 0 MPH — DIR. N NE E SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 2 — SERIAL #: 2606
CALIBRATOR: — SERIAL #:
CALIBRATION CHECK — PRE-TEST: ____ dBA SPL — POST-TEST: ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
71-86									

COMMENTS: READING TAKEN IN FRONT OF 8150 TROOST AVE, AT T-INTERSECTION OF CANYANA ST & TROOST AVE.

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EDP: APX 15' TO C/L ON CANYANA AVE
TRAFFIC COUNT DURATION: 15 MIN — SPEED ____ MIN

COUNT 1 (OR RDWY 1)

DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS	16			
MED TRKS	1			
HVY TRKS	0			
BUSES	0			
MOTRCLS	0			

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ✓

COUNT 2 (OR RDWY 2)

NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING (DIST. CONVRSTNS / YELLING) DIST. TRAFFIC (JUST RDWYS BELOW) (DISTD GARDENERS/LANDSCAPING NOISE)
OTHER: OCCASIONAL SOUND OF TABLE SAW BEING USED IN DISTANCE; SOUND OF TRUCKS LOADING FURNITURE AT BUSINESS ACROSS STREET ON CANYANA AVE ST.; CONVERSATIONS AT BUSINESS ACROSS STREET ON CANYANA ST;

DESCRIPTION / SKETCH

TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH



DUDEK

FIELD NOISE MEASUREMENT DATA

PROJECT: CANTANA TRUNK LINE — PROJECT #: 14553.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PETE VITAN
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 85 F — HUMIDITY: 23 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 2 MPH — DIR. N NE E SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO # — TYPE 1 2 — SERIAL #: 2606
CALIBRATOR: — SERIAL #:
CALIBRATION CHECK: PRE-TEST ____ dBA SPL — POST-TEST ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
87-102									

COMMENTS:
READING TAKEN IN FRONT OF 8151 HINDS AVE (DAYTIME), AT INTERSECTION OF CANTANA ST/ WEBB AVE/ HINDS AVE.

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EOP: APX 50' TO C/L OF WEBB AVE
TRAFFIC COUNT DURATION: 15 MIN — SPEED ____ MIN

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED
AUTOS	137			
MED TRKS	5			
HVY TRKS	0			
BUSES	2			
MOTRCLS	1			

IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ☐

COUNT 2 (OR RDWY 2)	NB/EB	SB/WB	NB/EB SPEED	SB/WB SPEED

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES DIST. BARKING DOGS (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (LIST RDWYS BELOW) DIST. GARDENERS/LANDSCAPING NOISE
OTHER: PRIMARY NOISE SOURCE IS TRAFFIC ON WEBB AVE

DESCRIPTION / SKETCH

TERRAIN HARD SOFT (MIXED) FLAT OTHER:
PHOTOS
OTHER COMMENTS / SKETCH



FIELD NOISE MEASUREMENT DATA

DUDEK

PROJECT: CANTARA TRUNK LINE — PROJECT #: 14553.34
SITE ID:
SITE ADDRESS: — OBSERVER(S): PETE VITAR
START DATE: 3/24/25 — END DATE: 3/24/25
START TIME: — END TIME:

METEOROLOGICAL CONDITIONS

TEMP: 87 F — HUMIDITY: 21 % R.H. — WIND: (CALM) LIGHT MODERATE
WINDSPD: 2 MPH — DIR. N NE E SE S SW W NW — VARIABLE STEADY GUSTY
SKY: (SUNNY) (CLEAR) OVRCAST PRTLY CLDY FOG RAIN

ACOUSTIC MEASUREMENTS

MEAS. INSTRUMENT: PICCOLO II — TYPE 1 2 — SERIAL #: 266
CALIBRATOR: — SERIAL #:
CALIBRATION CHECK — PRE-TEST: ____ dBA SPL — POST-TEST: ____ dBA SPL — WINDSCRN: YES

SETTINGS: A-WTD SLOW FAST FRONTAL RANDOM ANSI OTHER:

REC. #	BEGIN	END	Leq	Lmax	Lmin	L90	L50	L10	OTHER (SPECIFY METRIC
103-119									

COMMENTS: READING TAKEN IN FRONT OF 8163 BELLINGHAM AVE, AT INTERSECTION OF CANTARA ST & BELLINGHAM AVE;

SOURCE INFO AND TRAFFIC COUNTS

PRIMARY NOISE SOURCE: (LIGHT TRAFFIC) AIRCRAFT RAIL INDUSTRIAL OTHER:
ROADWAY TYPE: ASPHALT — DIST. TO RDWY C/L OR EOP: APX 20' TO C/L ON CANTARA ST
TRAFFIC COUNT DURATION: 15 MIN — SPEED: ____ MIN — SPEED

COUNT 1 (OR RDWY 1) DIRECTION	NB/EB	SB/WB	NB/EB	SB/WB	IF COUNTING BOTH DIRECTIONS AS ONE, CHECK HERE ↓	COUNT 2 (OR RDWY 2) NB/EB	SB/WB	NB/EB	SB/WB
AUTOS	8								
MED TRKS	2								
HVY TRKS	1								
BUSES	0								
MOTRCLS	0								

SPEEDS ESTIMATED BY: RADAR / DRIVING THE PACE
POSTED SPEED LIMIT SIGNS SAY:

OTHER NOISE SOURCES (BACKGROUND): DIST. AIRCRAFT RUSTLING LEAVES (DIST. BARKING DOGS) (BIRDS) DIST. INDUSTRIAL
DIST. KIDS PLAYING DIST. CONVRSTNS / YELLING DIST. TRAFFIC (JUST RDWYS BELOW) DIST. GARDENERS/LANDSCAPING NOISE
OTHER: HELICOPTER FLYOVER 1:23PM;

DESCRIPTION / SKETCH

TERRAIN: HARD SOFT (MIXED) FLAT OTHER:
PHOTOS:
OTHER COMMENTS / SKETCH:



Event Report

Start	March 24, 2025 10:14:39	**Serial Number**	UM15476
Finish	March 24, 2025 10:31:56	**Model Number**	Micromate ISEE 10.89
Number of Intervals/Interval	518.12/2 sec	**Battery Level**	3.8 volts
Sample Rate	1024 sps	**Unit Calibration**	July 3, 2019 by Instantel
Setup File Name	CANTARA.MMB	**Event File Name**	UM15476_20250324101439.IDFH
Operator	Operator	**USB Sensor Support**	Disabled

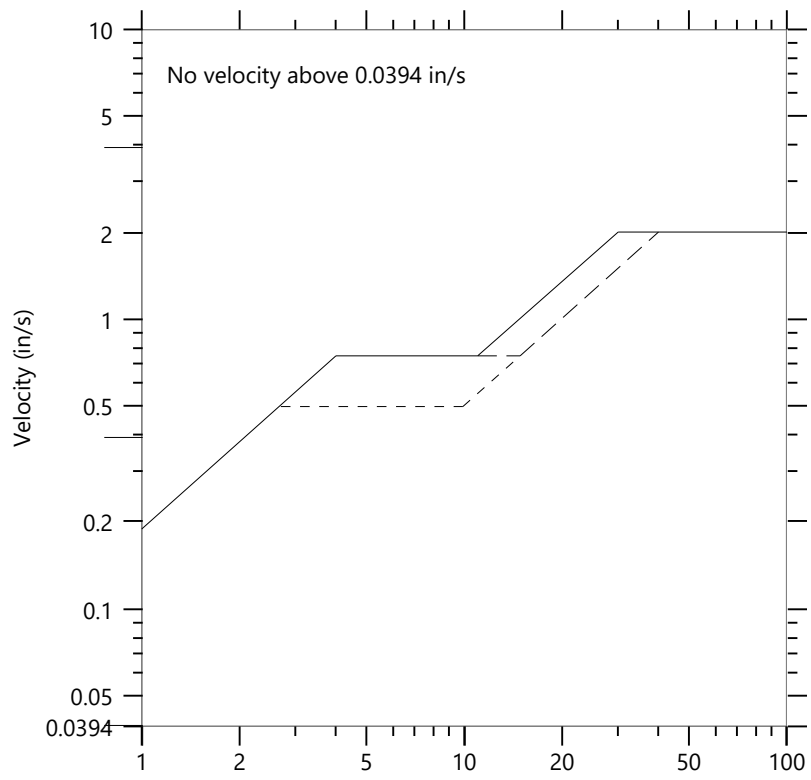
Notes
Location: LA
Client:
User Name:
General: CONSTRUCTION VIBRATION MONITORING

Post Event Notes No text to be displayed.

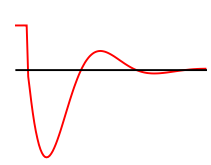
Geophone	**Tran**	**Vert**	**Long**
Peak Particle Velocity	<0.005 in/s	0.0062 in/s	0.0059 in/s
Zero Crossing Frequency	N/A	16.5 Hz	10.4 Hz
Date	Mar 24, 2025	Mar 24, 2025	Mar 24, 2025
Time	10:14:41	10:25:39	10:25:39
Sensor Check	✓ Passed	✓ Passed	✓ Passed
Frequency	7.3 Hz	7.3 Hz	7.3 Hz
Overswing Ratio	4.5	4.6	4.7

Peak Vector Sum 0.0081 in/s at March 24, 2025 10:14:41

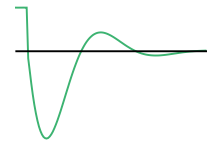
USBM RI8507 And OSMRE
Velocity versus Frequency (Zero Crossing)



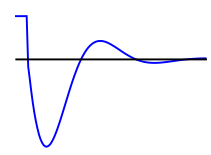
Sensor Check



✓ Passed



✓ Passed



✓ Passed

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Event Report

Start	March 24, 2025 11:34:46	**Serial Number**	UM15476
Finish	March 24, 2025 11:51:50	**Model Number**	Micromate ISEE 10.89
Number of Intervals/Interval	511.62/2 sec	**Battery Level**	3.8 volts
Sample Rate	1024 sps	**Unit Calibration**	July 3, 2019 by Instantel
Setup File Name	CANTARA.MMB	**Event File Name**	UM15476_20250324113446.IDFH
Operator	Operator	**USB Sensor Support**	Disabled

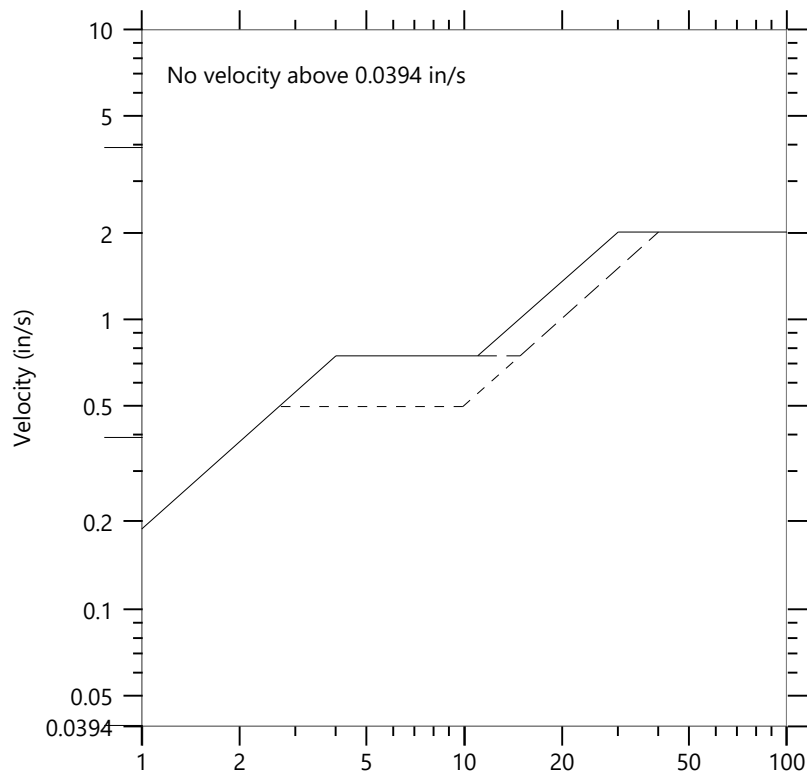
Notes
Location: LA
Client:
User Name:
General: CONSTRUCTION VIBRATION MONITORING

Post Event Notes No text to be displayed.

Geophone	**Tran**	**Vert**	**Long**
Peak Particle Velocity	0.0065 in/s	0.0068 in/s	0.0068 in/s
Zero Crossing Frequency	<1 Hz	16.0 Hz	N/A
Date	Mar 24, 2025	Mar 24, 2025	Mar 24, 2025
Time	11:50:24	11:42:54	11:34:48
Sensor Check	✓ Passed	✓ Passed	✓ Passed
Frequency	7.3 Hz	7.3 Hz	7.3 Hz
Overswing Ratio	4.5	4.5	4.6

Peak Vector Sum 0.0097 in/s at March 24, 2025 11:50:24

USBM RI8507 And OSMRE
Velocity versus Frequency (Zero Crossing)



Sensor Check

✓ Passed

✓ Passed

✓ Passed

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Event Report

Start	March 24, 2025 10:46:45	**Serial Number**	UM15476
Finish	March 24, 2025 11:04:21	**Model Number**	Micromate ISEE 10.89
Number of Intervals/Interval	528.38/2 sec	**Battery Level**	3.8 volts
Sample Rate	1024 sps	**Unit Calibration**	July 3, 2019 by Instantel
Setup File Name	CANTARA.MMB	**Event File Name**	UM15476_20250324104645.IDFH
Operator	Operator	**USB Sensor Support**	Disabled

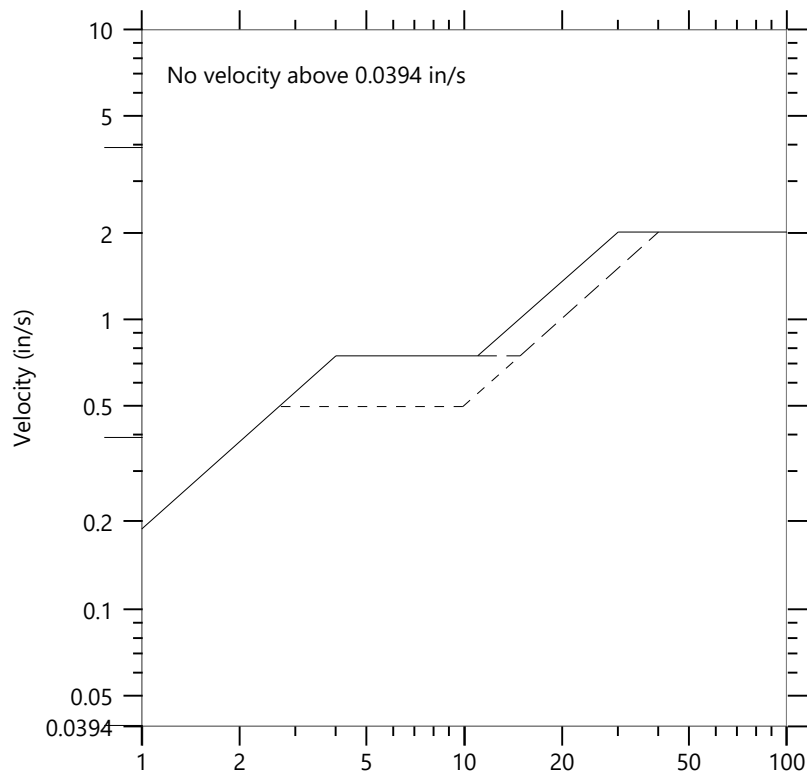
Notes
Location: LA
Client:
User Name:
General: CONSTRUCTION VIBRATION MONITORING

Post Event Notes No text to be displayed.

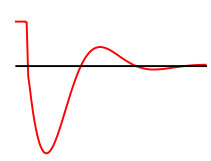
Geophone	**Tran**	**Vert**	**Long**
Peak Particle Velocity	0.0254 in/s	0.0236 in/s	0.0087 in/s
Zero Crossing Frequency	>100 Hz	>100 Hz	46.5 Hz
Date	Mar 24, 2025	Mar 24, 2025	Mar 24, 2025
Time	11:04:09	11:04:09	11:04:09
Sensor Check	✓ Passed	✓ Passed	✓ Passed
Frequency	7.3 Hz	7.3 Hz	7.3 Hz
Overswing Ratio	4.5	4.6	4.7

Peak Vector Sum 0.0274 in/s at March 24, 2025 11:04:09

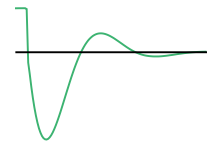
USBM RI8507 And OSMRE
Velocity versus Frequency (Zero Crossing)



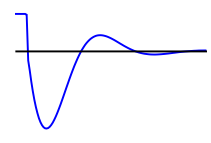
Sensor Check



✓ Passed



✓ Passed



✓ Passed

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Attachment B

Construction Noise Prediction Model Worksheets

Attachment B - Construction Noise Prediction Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

enter "0" or "1" to off/on factor: air abs? 1
enter "0" or "1" to off/on factor: grnd abs? 1

magnitude of threshold (dBA) = 75
time period of threshold metric (e.g., 8-hour Leq) = 8

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)
= Barrier of input height inserted between source and receptor

1000 = Project alignment progress (feet) per day
20 = perpendicular horizontal distance (feet): barrier to receptor

Phase No.	Project Phase Description	Client-Supplied Construction Equipment Type	Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)	Notes
1	Open Trench Pipe Installation	Excavators	Excavator	0	40	81	25	0		86.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Cranes	Crane	0	16	81	25	0		86.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Generators	Generator	0	50	72	25	0		77.9	0.4	24	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Backhoes	Backhoe	0	40	78	25	0		83.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Front End Loaders	Front End Loader	0	40	79	25	0		84.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Welders	Welder / Torch	0	40	73	25	0		78.9	1.2	72	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Power Brooms	Vacuum Street Sweeper	0	10	80	25	0		85.9	0.6	36	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Carry Decks (Cranes)	Crane	0	16	81	25	0		86.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	25	0		95.9	1.6	96	82	1	5	0	5	20	25	5.1	20.6	25.3	0.00	0.1	3.0	3.0	0.7	0.7	0.1	at furthest distance from receptor
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	25	0		77.9	1.2	72	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Skid Steer Loaders	Skidsteer*	0	40	80	25	0		85.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Forklifts	Man Lift	0	20	75	25	0		80.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Air Compressors	Compressor (air)	0	40	78	25	0		83.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Paving equipment	Paver	0	50	77	25	0		82.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Plate compactors	Compactor (ground)	0	20	80	25	0		85.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Rollers	Roller	0	20	80	25	0		85.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scrafier	1	20	85	25	0		90.9	1.6	96	77	1	5	0	5	20	25	5.1	20.6	25.3	0.00	0.1	3.0	3.0	0.7	0.7	0.1	at furthest distance from receptor
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	25	0		82.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Excavators	Excavator	0	40	81	256	0		62.5	2	120	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Cranes	Crane	0	16	81	256	0		62.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Generators	Generator	0	50	72	256	0		53.5	0.8	48	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Backhoes	Backhoe	0	40	78	256	0		59.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Front End Loaders	Front End Loader	0	40	79	256	0		60.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Welders	Welder / Torch	0	40	73	256	0		54.5	2.4	144	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Power Brooms	Vacuum Street Sweeper	0	10	80	256	0		61.5	1.2	72	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Carry Decks (Cranes)	Crane	0	16	81	256	0		62.5	2	120	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	256	0		71.2	3.2	192	60	1	5	0	5	251	256	5.1	250.8	255.8	0.00	0.1	3.0	3.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	256	0		53.5	2.4	144	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Skid Steer Loaders	Skidsteer*	0	40	80	256	0		61.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Forklifts	Man Lift	0	20	75	256	0		56.5	2	120	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Air Compressors	Compressor (air)	0	40	78	256	0		59.3	2	120	0	2	5	0	5	251	256	5.4	250.8	255.8	0.00	0.1	3.5	3.5	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Paving equipment	Paver	0	50	77	256	0		58.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Plate compactors	Compactor (ground)	0	20	80	256	0		61.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Rollers	Roller	0	20	80	256	0		61.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scrafier	1	20	85	256	0		66.2	3.2	192	55	1	5	0	5	251	256	5.1	250.8	255.8	0.00	0.1	3.0	3.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	256	0		58.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Excavators	Excavator	0	40	81	505	0		55.9	2	120	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Cranes	Crane	0	16	81	505	0		55.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Generators	Generator	0	50	72	505	0		46.9	0.8	48	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Backhoes	Backhoe	0	40	78	505	0		52.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Front End Loaders	Front End Loader	0	40	79	505	0		53.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Welders	Welder / Torch	0	40	73	505	0		47.9	2.4	144	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Power Brooms	Vacuum Street Sweeper	0	10	80	505	0		54.9	1.2	72	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Carry Decks (Cranes)	Crane	0	16	81	505	0		55.9	2	120	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	505	0		64.8	3.2	192	54	1	5	0	5	500	505	5.1	500.4	505.4	0.00	0.1	3.0	3.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	505	0		46.9	2.4	144	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Skid Steer Loaders	Skidsteer*	0	40	80	505	0		54.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Forklifts	Man Lift	0	20	75	505	0		49.9	2	120	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Air Compressors	Compressor (air)	0	40	78	505	0		52.8	2	120	0	2	5	0	5	500	505	5.4	500.4	505.4	0.00	0.1	3.5	3.5	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Paving equipment	Paver	0	50	77	505	0		51.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Plate compactors	Compactor (ground)	0	20	80	505	0		54.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Rollers	Roller	0	20	80	505	0		54.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scrafier	1	20	85	505	0		59.8	3.2	192	49	1	5	0	5	500	505	5.1	500.4	505.4	0.00	0.1	3.0	3.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	505	0		51.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position

Total Aggregate Noise Exposure from Open Trench Pipe Installation Phase: **83.2**

Attachment B - Construction Noise Prediction Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

enter "0" or "1" to off/on factor: air abs? 1
enter "0" or "1" to off/on factor: grnd abs? 1

magnitude of threshold (dBA) = 75
time period of threshold metric (e.g., 8-hour Leq) = 8

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)
= Barrier of input height inserted between source and receptor

1000 = Project alignment progress (feet) per day
20 = perpendicular horizontal distance (feet): barrier to receptor

Phase No.	Project Phase Description	Client-Supplied Construction Equipment Type	Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Source to NSR Distance (ft.)	*Temporary Barrier Insertion Loss (dB)*	*Additional Noise Reduction*	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)	Notes
1	Open Trench Pipe Installation	Excavators	Excavator	1	40	81	25	0		86.9	1	60	74	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Cranes	Crane	0	16	81	25	0		86.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Generators	Generator	0	50	72	25	0		77.9	0.4	24	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Backhoes	Backhoe	0	40	78	25	0		83.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Front End Loaders	Front End Loader	0	40	79	25	0		84.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Welders	Welder / Torch	0	40	73	25	0		78.9	1.2	72	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Power Brooms	Vacuum Street Sweeper	0	10	80	25	0		85.9	0.6	36	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Carry Decks (Cranes)	Crane	0	16	81	25	0		86.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	25	15		80.8	1.6	96	67	1	5	5	5	20	25	7.1	20.0	25.3	1.78	15.0	9.0	3.0	0.6	0.7	15.2	at furthest distance from receptor
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	25	0		77.9	1.2	72	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Skid Steer Loaders	Skidsteer*	0	40	80	25	0		85.9	0.8	48	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Forklifts	Man Lift	0	20	75	25	0		80.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Air Compressors	Compressor (air)	0	40	78	25	0		83.9	1	60	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Paving equipment	Paver	0	50	77	25	0		82.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Plate compactors	Compactor (ground)	0	20	80	25	0		85.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Rollers	Roller	0	20	80	25	0		85.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scarafier	1	20	85	25	15		75.8	1.6	96	62	1	5	5	5	20	25	7.1	20.0	25.3	1.78	15.0	9.0	3.0	0.6	0.7	15.2	at furthest distance from receptor
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	25	0		82.9	1.6	96	0	5	5	0	5	20	25	7.1	20.6	25.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Excavators	Excavator	1	40	81	256	0		62.5	2	120	53	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Cranes	Crane	0	16	81	256	0		62.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Generators	Generator	0	50	72	256	0		53.5	0.8	48	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Backhoes	Backhoe	0	40	78	256	0		59.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Front End Loaders	Front End Loader	0	40	79	256	0		60.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Welders	Welder / Torch	0	40	73	256	0		54.5	2.4	144	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Power Brooms	Vacuum Street Sweeper	0	10	80	256	0		61.5	1.2	72	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Carry Decks (Cranes)	Crane	0	16	81	256	0		62.5	2	120	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	256	14		56.8	3.2	192	46	1	5	5	5	251	256	7.1	250.8	255.8	2.04	15.0	9.0	3.0	0.6	0.7	14.5	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	256	0		53.5	2.4	144	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Skid Steer Loaders	Skidsteer*	0	40	80	256	0		61.5	1.6	96	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Forklifts	Man Lift	0	20	75	256	0		56.5	2	120	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Air Compressors	Compressor (air)	0	40	78	256	0		59.3	2	120	0	2	5	0	5	251	256	5.4	250.8	255.8	0.00	0.1	3.5	3.5	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Paving equipment	Paver	0	50	77	256	0		58.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Plate compactors	Compactor (ground)	0	20	80	256	0		61.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Rollers	Roller	0	20	80	256	0		61.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scarafier	1	20	85	256	14		51.8	3.2	192	41	1	5	5	5	251	256	7.1	250.8	255.8	2.04	15.0	9.0	3.0	0.6	0.7	14.5	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	256	0		58.5	3.2	192	0	5	5	0	5	251	256	7.1	250.8	255.8	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between 1/4 or 3/4 progress point and and receptor position
		Excavators	Excavator	1	40	81	505	0		55.9	2	120	46	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Cranes	Crane	0	16	81	505	0		55.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Generators	Generator	0	50	72	505	0		46.9	0.8	48	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Backhoes	Backhoe	0	40	78	505	0		52.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Front End Loaders	Front End Loader	0	40	79	505	0		53.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Welders	Welder / Torch	0	40	73	505	0		47.9	2.4	144	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Power Brooms	Vacuum Street Sweeper	0	10	80	505	0		54.9	1.2	72	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Carry Decks (Cranes)	Crane	0	16	81	505	0		55.9	2	120	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Saws (Concrete/Industrial Saws)	Concrete Saw	1	20	90	505	14		50.5	3.2	192	40	1	5	6	5	500	505	7.1	500.4	505.4	2.06	15.0	9.0	3.0	0.6	0.7	14.3	hypoteneuse between start/end of progress and receptor position
		Blower Mounted Trailers (Generator Sets)	Generator	0	50	72	505	0		46.9	2.4	144	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Skid Steer Loaders	Skidsteer*	0	40	80	505	0		54.9	1.6	96	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Forklifts	Man Lift	0	20	75	505	0		49.9	2	120	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Air Compressors	Compressor (air)	0	40	78	505	0		52.8	2	120	0	2	5	0	5	500	505	5.4	500.4	505.4	0.00	0.1	3.5	3.5	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Paving equipment	Paver	0	50	77	505	0		51.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Plate compactors	Compactor (ground)	0	20	80	505	0		54.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Rollers	Roller	0	20	80	505	0		54.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position
		Pavement Grinders (Concrete/Industrial Saws)	Pavement Scarafier	1	20	85	505	14		45.5	3.2	192	35	1	5	6	5	500	505	7.1	500.4	505.4	2.06	15.0	9.0	3.0	0.6	0.7	14.3	hypoteneuse between start/end of progress and receptor position
		Asphalt Paver Machine (Pavers)	Paver	0	50	77	505	0		51.9	3.2	192	0	5	5	0	5	500	505	7.1	500.4	505.4	0.00	0.1	5.0	5.0	0.7	0.7	0.1	hypoteneuse between start/end of progress and receptor position

Total Aggregate Noise Exposure from Open Trench Pipe Installation Phase: **74.9**

Attachment B - Construction Noise Prediction Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

enter "0" or "1" to off/on factor: air abs? 1 | magnitude of threshold (dBA) = 75

enter "0" or "1" to off/on factor: grnd abs? 1 | time period of threshold metric (e.g., 8-hour Leq) = 8

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)

= Barrier of input height inserted between source and receptor

0 = Project alignment progress (feet) per day

40 = perpendicular horizontal distance (feet): barrier to receptor

Phase No.	Project Phase Description	Client-Supplied Construction Equipment Type	Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)	Notes
2	Pipe Jacking - Construction of Jacking and Receiving Pits	Excavators	Excavator	1	40	81	45	81.8	8	480	78	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Cranes	Crane	0	16	81	45	81.8	5	300	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Cranes	Crane	0	16	81	45	81.8	6	360	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Generators	Generator	0	50	72	45	72.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Backhoes	Backhoe	0	40	78	45	78.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Front End Loaders	Front End Loader	1	40	79	45	79.8	8	480	76	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Welder / Torchs	Welder / Torch	0	40	73	45	73.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Paving Equipment	Paver	0	50	77	45	77.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Sweepers/Scrubbers	Vacuum Street Sweeper	0	10	80	45	80.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Concrete Saws	Concrete Saw	1	20	90	45	90.8	8	480	84	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Compactor (ground)	Compactor (ground)	0	20	80	45	80.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Rollers	Roller	0	20	80	45	80.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Forklifts	Man Lift	0	20	75	45	75.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Air Compressors	compressor (air)	0	40	78	45	78.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at perpendicular distance between activity source point (1/2 progress) and receptor
		Total Aggregate Noise Exposure from Pipe Jacking - Construction of Jacking and Receiving Pits Phase:									**85.3**																	
3	Pipe Jacking - Pipe Installation via Jacking	Excavators	Excavator	1	40	81	45	81.8	8	480	78	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Generators	Generator	0	50	72	45	72.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Lubrication Pumps	Pumps	1	50	77	45	77.8	8	480	75	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		High Pressure Water Pumps	Pumps	0	50	77	45	77.8	3	180	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Cranes	Crane	0	16	81	45	81.8	6	360	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Microtunnel Boring Machines	Drill Rig Truck	0	20	79	45	79.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Slurry Separation Plant	Slurry Plant	1	100	78	45	78.8	8	480	79	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Control Container	Generator	0	50	72	45	72.8	8	480	0	5	5	0	5	40	45	7.1	40.3	45.0	0.00	0.1	5.0	5.0	0.7	0.7	0.1	at furthest distance from receptor
		Total Aggregate Noise Exposure from Pipe Jacking - Pipe Installation via Jacking Phase:									**82.2**																	

Attachment B - Construction Noise Prediction Model Worksheets

To User: bordered cells are inputs, unbordered cells have formulae

enter "0" or "1" to off/on factor: air abs? 1 | magnitude of threshold (dBA) = 75

enter "0" or "1" to off/on factor: grnd abs? 1 | time period of threshold metric (e.g., 8-hour Leq) = 8

Source, receptor, and barrier all share same reference grade elevation; unless otherwise noted)

= Barrier of input height inserted between source and receptor

0 = Project alignment progress (feet) per day

40 = perpendicular horizontal distance (feet): barrier to receptor

Phase No.	Project Phase Description	Client-Supplied Construction Equipment Type	Comparable FHWA RCNM Construction Equipment Type	Quantity	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Source to NSR Distance (ft.)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq	Source Elevation (ft)	Receiver Elevation (ft)	Barrier Height (ft)	Source to Barr. ("A") Horiz. (ft)	Rcvr. to Barr. ("B") Horiz. (ft)	Source to Rcvr. ("C") Horiz. (ft)	"A" (ft)	"B" (ft)	"C" (ft)	Path Length Diff. "P" (ft)	Abarr (dB)	Heff (with barrier)	Heff (wout barrier)	G (with barrier)	G (without barrier)	ILbarr (dB)	Notes
2	Pipe Jacking - Construction of Jacking and Receiving Pits	Excavators	Excavator	1	40	81	45	69.1	8	480	65	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Cranes	Crane	0	16	81	45	69.1	5	300	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Cranes	Crane	0	16	81	45	69.1	6	360	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Generators	Generator	0	50	72	45	60.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Backhoes	Backhoe	0	40	78	45	66.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Front End Loaders	Front End Loader	1	40	79	45	67.1	8	480	63	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Welder / Torchs	Welder / Torch	0	40	73	45	61.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Paving Equipment	Paver	0	50	77	45	65.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Sweepers/Scrubbers	Vacuum Street Sweeper	0	10	80	45	68.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Concrete Saws	Concrete Saw	1	20	90	45	75.8	8	480	69	1	5	8	5	40	45	8.6	40.1	45.2	3.54	15.0	11.0	3.0	0.6	0.7	15.0	at perpendicular distance between activity source point (1/2 progress) and receptor
		Compactor (ground)	Compactor (ground)	0	20	80	45	68.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Rollers	Roller	0	20	80	45	68.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Forklifts	Man Lift	0	20	75	45	63.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Air Compressors	compressor (air)	0	40	78	45	66.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at perpendicular distance between activity source point (1/2 progress) and receptor
		Total Aggregate Noise Exposure from Pipe Jacking - Construction of Jacking and Receiving Pits Phase:									**71.1**																	
3	Pipe Jacking - Pipe Installation via Jacking	Excavators	Excavator	1	40	81	45	69.1	8	480	65	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Generators	Generator	0	50	72	45	60.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Lubrication Pumps	Pumps	1	50	77	45	62.8	8	480	60	2	5	8	5	40	45	7.8	40.1	45.1	2.82	15.0	11.5	3.5	0.5	0.7	15.1	at furthest distance from receptor
		High Pressure Water Pumps	Pumps	0	50	77	45	65.1	3	180	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Cranes	Crane	0	16	81	45	69.1	6	360	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Microtunnel Boring Machines	Drill Rig Truck	0	20	79	45	67.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Slurry Separation Plant	Slurry Plant	1	100	78	45	66.1	8	480	66	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Control Container	Generator	0	50	72	45	60.1	8	480	0	5	5	8	5	40	45	5.8	40.1	45.0	0.94	12.7	13.0	5.0	0.5	0.7	12.8	at furthest distance from receptor
		Total Aggregate Noise Exposure from Pipe Jacking - Pipe Installation via Jacking Phase:									**69.1**																	

Attachment C

Traffic Noise Modeling Calculation Worksheets

Attachment C

Traffic Noise Modeling Calculations - Summary

Project: 14533.34 Cantara TL Replacement Project

Segment Description and Location					
Number	Name	Intersecting Roadway	Baseline	Baseline + Project Construction Trip Traffic	Δ Baseline – Baseline + Project Construction Trip Traffic
Summary of Net Changes					
1	Strathern Street	Irvine Avenue	63.6	63.9	0.3
2	Strathern Street	Troost Avenue	63.5	63.8	0.3
3	Strathern Street	Radford Avenue	62.1	62.5	0.4
4	Strathern Street	Vantage Avenue	62.1	62.5	0.4
5	Strathern Street	Laurelgrove Avenue	62.0	62.4	0.4
6	Strathern Street	Wilkinson Avenue	61.8	62.3	0.4
7	San Fernando Road	Strathern Street/Clybourne Aven	66.8	67.0	0.2
8	Whitsett Avenue	Cantara Street	62.6	63.0	0.4
9	Cantara Street	Case Avenue	49.0	52.7	3.7
10	Cantara Street	Fair Avenue	49.0	52.7	3.7
11	Cantara Street	Irvine Avenue	49.6	52.9	3.4
12	Cantara Street	Troost Avenue	48.7	52.5	3.9
13	Cantara Street	Bellingham Avenue	49.8	53.0	3.2
14	Webb Avenue	Cantara Street	47.9	52.3	4.3
15	Tacos Johnny	8011 Webb Avenue	62.4	62.8	0.4

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustm

Attachment C

Traffic Noise Model Calculations

Project: 14533.34 Cantara TL Replacement Project

Noise Level Descriptor: Leq
Site Conditions: Soft
Traffic Input: Peak
Traffic K-Factor: 10

	Segment Description and Location		Input										Output				
					Distance to Directional Centerline, $(feet)_4$		Traffic Distribution Characteristics							Distance to Contour, $(feet)_3$			
Number	Name	Intersecting Roadway	Peak Hour Volume	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	Leq, $(dBA)_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Baseline Conditions																	
1	Strathern Street	Irvine Avenue	756	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.6	19	40	87	187
2	Strathern Street	Troost Avenue	736	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.5	18	40	85	184
3	Strathern Street	Radford Avenue	536	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.1	15	32	69	149
4	Strathern Street	Vantage Avenue	540	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.1	15	32	69	149
5	Strathern Street	Laurelgrove Avenue	528	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.0	15	32	68	147
6	Strathern Street	Wilkinson Avenue	504	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.8	14	31	66	143
7	San Fernando Road	Strathern Street/Clybourne Avenue	1,112	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.8	31	66	143	308
8	Whitsett Avenue	Cantara Street	600	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.6	16	35	74	160
9	Cantara Street	Case Avenue	56	25	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	49.0	2	4	9	20
10	Cantara Street	Fair Avenue	64	25	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	49.6	2	5	10	22
11	Cantara Street	Irvine Avenue	52	25	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	48.7	2	4	9	19
12	Cantara Street	Troost Avenue	68	25	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	49.8	2	5	10	23
13	Cantara Street	Bellingham Avenue	44	25	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	47.9	2	4	8	17
14	Webb Avenue	Cantara Street	580	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	62.4	16	34	73	157
15	Tacos Johnny	8011 Webb Avenue	516	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.9	14	31	67	145

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Attachment C

Traffic Noise Model Calculations

Project: 14533.34 Cantara TL Replacement Project

Noise Level Descriptor: Leq
Site Conditions: Soft
Traffic Input: Peak
Traffic K-Factor: 10

	Segment Description and Location		Input										Output				
					Distance to Directional Centerline, $(feet)_4$		Traffic Distribution Characteristics										
Number	Name	Intersecting Roadway	Peak Hour Volume	Speed (mph)	Near	Far	% Auto	% Med	% Hvy	% Day	% Eve	% Night	Leq, $(dBA)_{5,6,7}$	Distance to Contour, $(feet)_3$ 70 dBA	65 dBA	60 dBA	55 dBA
Baseline + Project Construction Trip Traffic Conditions																	
1	Strathern Street	Irvine Avenue	776	35	50	50	96.6%	2.2%	1.2%	80.0%	15.0%	5.0%	63.9	20	42	91	195
2	Strathern Street	Troost Avenue	756	35	50	50	96.6%	2.2%	1.2%	80.0%	15.0%	5.0%	63.8	19	41	89	192
3	Strathern Street	Radford Avenue	556	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.5	16	34	73	158
4	Strathern Street	Vantage Avenue	560	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.5	16	34	74	159
5	Strathern Street	Laurelgrove Avenue	548	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.4	16	34	73	157
6	Strathern Street	Wilkinson Avenue	524	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.3	15	33	71	152
7	San Fernando Road	Strathern Street/Clybourne Avenue	1,132	40	50	50	96.7%	2.1%	1.2%	80.0%	15.0%	5.0%	67.0	32	68	147	317
8	Whitsett Avenue	Cantara Street	620	35	50	50	96.5%	2.3%	1.3%	80.0%	15.0%	5.0%	63.0	17	37	79	169
9	Cantara Street	Case Avenue	76	25	50	50	92.5%	4.1%	3.4%	80.0%	15.0%	5.0%	52.7	3	8	16	35
10	Cantara Street	Fair Avenue	84	25	50	50	93.0%	3.9%	3.1%	80.0%	15.0%	5.0%	52.9	4	8	17	36
11	Cantara Street	Irvine Avenue	72	25	50	50	92.3%	4.2%	3.5%	80.0%	15.0%	5.0%	52.5	3	7	16	34
12	Cantara Street	Troost Avenue	88	25	50	50	93.1%	3.8%	3.0%	80.0%	15.0%	5.0%	53.0	4	8	17	37
13	Cantara Street	Bellingham Avenue	64	25	50	50	91.7%	4.5%	3.8%	80.0%	15.0%	5.0%	52.3	3	7	15	33
14	Webb Avenue	Cantara Street	600	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.8	17	36	77	166
15	Tacos Johnny	8011 Webb Avenue	536	35	50	50	96.4%	2.3%	1.3%	80.0%	15.0%	5.0%	62.4	15	33	72	155

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.