

MacArthur Lake Stormwater Capture Project

Draft Environmental Impact Report

Appendix F | Noise and Vibration Calculations



Prepared for
City of Los Angeles



Prepared by

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Appendix F

Noise and Vibration Calculations

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Construction Noise - Equipment

8-Hour Construction Noise Level at 50 Feet (dBA)										INDIVIDUAL CONTRIBUTIONS TO TOTALS	
Construction Area	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Lmax @ 50'	Total Leq(h) @ 50'	Total Lmax @ 50'	Total Leq(h) @ 50'
Lake Street <i>incl. installation of the diversion structure, drain-line upgrade, pretreatment unit, pump station, actuated valve and meter vaults, and installation of pipeline along Lake Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74	6.31E+07	2.52E+07
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75	7.94E+07	3.18E+07
	Water Truck	Dump Truck	40%	76	72	1	0	76	72	3.98E+07	1.59E+07
	Pickup Truck	Pickup Truck	40%	75	71	2	3	78	74	6.32E+07	2.53E+07
	Asphalt Milling Machine	Pavement Scarifier	20%	90	83	1	0	90	83	1.00E+09	2.00E+08
	Crane	Crane	16%	81	73	1	0	81	73	1.26E+08	2.01E+07
	Excavator	Excavator	40%	81	77	1	0	81	77	1.26E+08	5.04E+07
	Paving Equipment	Roller	20%	80	73	1	0	80	73	1.00E+08	2.00E+07
Lake Street Total								92	86		
Grand View Street <i>incl. installation of pipeline along Grand View Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74	6.31E+07	2.52E+07
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75	7.94E+07	3.18E+07
	Water Truck	Dump Truck	40%	76	72	1	0	76	72	3.98E+07	1.59E+07
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71	3.16E+07	1.26E+07
	Asphalt Milling Machine	Pavement Scarifier	20%	90	83	1	0	90	83	1.00E+09	2.00E+08
	Excavator	Excavator	40%	81	77	1	0	81	77	1.26E+08	5.04E+07
	Paving Equipment	Roller	20%	80	73	1	0	80	73	1.00E+08	2.00E+07
Grand View Street Total								92	86		
MacArthur Park (Pipeline) <i>incl. installation of pipeline along 7th Street within MacArthur Park and connection to the wetlands area</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74	6.31E+07	2.52E+07
	Water Truck	Dump Truck	40%	76	72	1	0	76	72	3.98E+07	1.59E+07
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71	3.16E+07	1.26E+07
	Excavator	Excavator	40%	81	77	1	0	81	77	1.26E+08	5.04E+07
MacArthur Park (Pipeline) Total								84	80		
MacArthur Park (Treatment Structures) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74	6.31E+07	2.52E+07
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75	7.94E+07	3.18E+07
	Water Truck	Dump Truck	40%	76	72	1	0	76	72	3.98E+07	1.59E+07
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71	3.16E+07	1.26E+07
	Excavator	Excavator	40%	81	77	1	0	81	77	1.26E+08	5.04E+07
MacArthur Park (Treatment Structures) Total								85	81		
MacArthur Park (Treatment Wetlands) <i>incl. installation of the wetlands</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74	6.31E+07	2.52E+07
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75	7.94E+07	3.18E+07
	Water Truck	Dump Truck	40%	76	72	1	0	76	72	3.98E+07	1.59E+07
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71	3.16E+07	1.26E+07
	Bulldozer	Front End Loader	40%	79	75	1	0	79	75	7.94E+07	3.18E+07
	Excavator	Excavator	40%	81	77	1	0	81	77	1.26E+08	5.04E+07
MacArthur Park (Treatment Wetlands) Total								86	82		

8-Hour Construction Noise Level Summary at the Receptor (dBA)

Noise-Sensitive Use	Distance from Loudest Construction Activity to a Receptor (ft)	8-Hour Construction Noise Level at the Receptor (dBA)	Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	Daytime Increase Over Existing (dBA)	Significant?
The American Cement Building Apartments	315	66	67	7	Yes
Parkview Terrace Apartments	265	68	68	8	Yes
Iglesia Pentecostes Unidos Por Cristo	335	65	67	7	Yes
2416-2422 W. 7th St. Residence	310	66	67	7	Yes
Churchill Lofts Apartments	280	67	68	8	Yes
MacArthur Park Visual and Performing Arts Elementary	25	92	92	32	Yes
LA New Times Western School/LA Onnuri Community Church	175	74	75	15	Yes
Grand View Street Residences	35	89	89	29	Yes
Cristo Salva Bilingual Church	75	82	82	22	Yes
La Vina En Los Angeles	19	94	94	34	Yes
Southeast Park Unhoused Population	250	72	72	12	Yes
MacArthur Park	--	--	--	--	Yes

Construction Noise - Equipment

8-Hour Construction Noise Level at the Receptor (dBA) - The American Cement Building Apartments

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	1035	725	385	555	315
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	26.3	23.2	17.7	20.9	16.0
Atmospheric Attenuation (dBA)	0.85	0.60	0.32	0.46	0.26
8-Hour Construction Noise Level at the Receptor (dBA)	59	62	62	60	66
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	62	64	64	63	67
Daytime Increase Over Existing (dBA)	2	4	4	3	7
Significant?	No	No	No	No	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - Parkview Terrace Apartments

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	945	585	290	415	265
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	25.5	21.4	15.3	18.4	14.5
Atmospheric Attenuation (dBA)	0.78	0.48	0.24	0.34	0.22
8-Hour Construction Noise Level at the Receptor (dBA)	60	64	65	63	68
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	63	65	66	65	68
Daytime Increase Over Existing (dBA)	3	5	6	5	8
Significant?	No	Yes	Yes	No	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - Iglesia Pentecostes Unidos Por Cristo

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	875	530	320	375	335
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	24.9	20.5	16.1	17.5	16.5
Atmospheric Attenuation (dBA)	0.72	0.44	0.26	0.31	0.28
8-Hour Construction Noise Level at the Receptor (dBA)	60	65	64	64	65
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	63	66	65	65	67
Daytime Increase Over Existing (dBA)	3	6	5	5	7
Significant?	No	Yes	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - 2416-2422 W. 7th St. Residence

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	825	480	280	325	310
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	24.3	19.6	15.0	16.3	15.8
Atmospheric Attenuation (dBA)	0.68	0.40	0.23	0.27	0.26
8-Hour Construction Noise Level at the Receptor (dBA)	61	65	65	65	66
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	63	67	66	66	67
Daytime Increase Over Existing (dBA)	3	7	6	6	7
Significant?	No	Yes	Yes	Yes	Yes

Construction Noise - Equipment

8-Hour Construction Noise Level at the Receptor (dBA) - Churchill Lofts Apartments

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	775	430	235	275	280
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	23.8	18.7	13.4	14.8	15.0
Atmospheric Attenuation (dBA)	0.64	0.35	0.19	0.23	0.23
8-Hour Construction Noise Level at the Receptor (dBA)	61	66	67	66	67
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	64	67	67	67	68
Daytime Increase Over Existing (dBA)	4	7	7	7	8
Significant?	No	Yes	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - MacArthur Park Visual and Performing Arts Elementary

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	375	25	95	100	245
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	17.5	-6.0	5.6	6.0	13.8
Atmospheric Attenuation (dBA)	0.31	0.02	0.08	0.08	0.20
8-Hour Construction Noise Level at the Receptor (dBA)	68	92	75	75	68
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	69	92	75	75	69
Daytime Increase Over Existing (dBA)	9	32	15	15	9
Significant?	Yes	Yes	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - LA New Times Western School/LA Onnuri Community Church

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	425	175	450	465	620
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	18.6	10.9	19.1	19.4	21.9
Atmospheric Attenuation (dBA)	0.35	0.14	0.37	0.38	0.51
8-Hour Construction Noise Level at the Receptor (dBA)	67	74	61	62	60
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	68	75	63	64	63
Daytime Increase Over Existing (dBA)	8	15	3	4	3
Significant?	Yes	Yes	No	No	No

8-Hour Construction Noise Level at the Receptor (dBA) - Grand View Street Residences

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	185	35	245	315	505
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	11.4	-3.1	13.8	16.0	20.1
Atmospheric Attenuation (dBA)	0.15	0.03	0.20	0.26	0.42
8-Hour Construction Noise Level at the Receptor (dBA)	74	89	66	65	62
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	75	89	67	66	64
Daytime Increase Over Existing (dBA)	15	29	7	6	4
Significant?	Yes	Yes	Yes	Yes	No

Construction Noise - Equipment

8-Hour Construction Noise Level at the Receptor (dBA) - Cristo Salva Bilingual Church

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	230	75	90	240	415
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	13.3	3.5	5.1	13.6	18.4
Atmospheric Attenuation (dBA)	0.19	0.06	0.07	0.20	0.34
8-Hour Construction Noise Level at the Receptor (dBA)	72	82	75	68	64
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	73	82	75	68	65
Daytime Increase Over Existing (dBA)	13	22	15	8	5
Significant?	Yes	Yes	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - La Vina En Los Angeles

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	19	385	240	585	755
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	-8.5	17.7	13.6	21.4	23.6
Atmospheric Attenuation (dBA)	0.02	0.32	0.20	0.48	0.62
8-Hour Construction Noise Level at the Receptor (dBA)	94	67	66	59	58
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	94	68	67	63	62
Daytime Increase Over Existing (dBA)	34	8	7	3	2
Significant?	Yes	Yes	Yes	No	No

8-Hour Construction Noise Level at the Receptor (dBA) - Southeast Park Unhoused Population

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	250	615	245	745	865
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	14.0	21.8	13.8	23.5	24.8
Atmospheric Attenuation (dBA)	0.21	0.51	0.20	0.61	0.71
8-Hour Construction Noise Level at the Receptor (dBA)	72	63	66	57	57
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	72	65	67	62	62
Daytime Increase Over Existing (dBA)	12	5	7	2	2
Significant?	Yes	No	Yes	No	No

8-Hour Construction Noise Level at the Receptor (dBA) - MacArthur Park

Phase Type	Lake Street	Grand View Street	MacArthur Park (Pipeline)	MacArthur Park (Treatment Structures)	MacArthur Park (Treatment Wetlands)
Distance from Construction Activity to a Receptor (ft)	630	605	335	380	420
8-Hour Construction Noise Level at 50 ft (dBA)	86	86	80	81	82
Distance Divergence (dBA)	22.0	21.7	16.5	17.6	18.5
Atmospheric Attenuation (dBA)	0.52	0.50	0.28	0.31	0.35
8-Hour Construction Noise Level at the Receptor (dBA)	63	63	63	63	63
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	65	65	65	65	65
Daytime Increase Over Existing (dBA)	5	5	5	5	5
Significant?	Yes	Yes	Yes	Yes	Yes

Minimum Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)

County

Los Angeles

Existing Noise Levels

Land Use Type	Urban Residential
Background Noise (dBA)	60

Significance Level

5 dBA (daytime increase over existing noise levels)

Reference: Significance threshold based on L.A. CEQA Thresholds Guide criteria

"A project would normally have a significant impact on noise levels from construction if... construction activities lasting more than 10 days in a three month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use..."

Construction Noise - Traffic**Construction Vehicles - Equivalent Noise Levels**

Roadway	Existing AADT	Maximum Daily Truck Hauling Trips	Maximum Daily Worker Trips	Speed (mph)	Equivalency Factor for Heavy-Duty Vehicles	Equivalent Vehicles	Total With Project	Increase Ratio
6th Street at Lake Street	26,002	24	13	55	10.4	263	26,265	1.01
7th Street at Parkview Street	5,909	24	13	55	10.4	263	6,172	1.04
8th Street at Alvarado Street	21,122	24	13	55	10.4	263	21,385	1.01
Alvarado Street at 3rd Street	33,944	24	13	55	10.4	263	34,207	1.01
Alvarado Street at Wilshire Boulevard	24,385	24	13	55	10.4	263	24,648	1.01
Alvarado Street at 6th Street	22,035	24	13	55	10.4	263	22,298	1.01
Alvarado Street at Olympic Boulevard	27,297	24	13	55	10.4	263	27,560	1.01
Pico Boulevard at Alvarado Street	18,433	24	13	55	10.4	263	18,696	1.01
Vermont Avenue at Venice Boulevard	25,077	24	13	55	10.4	263	25,340	1.01
State Route 110 at 5th Street/6th Street	516,000	24	13	55	10.4	263	516,263	1.00

Note:

*Impacts would be significant if traffic volume changes would result in a 5 dBA or higher increase to ambient noise**Doubling of the noise source produces only a 3 dB increase, which is a barely perceptible change; therefore, there would be no audible change in traffic noise***Maximum****1.04****Significant?****No**

References:

FHWA. 2011. *Highway Traffic Noise: Analysis and Abatement Guidance*.

Navigate LA - LADOT Traffic Data

California Department of Transportation. *Traffic Census Program 2020 AADT*. Available: <https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/census/aadt/2020-traffic-volumes.xls>Maximum daily truck hauling trips are for the **pump station** construction task. See Pump Station calemod outputs (sheet pump-station-calemod)

Noise Reductions from Mitigation Measures

Mitigation Type	Reduction (dBA)
Noise barrier or other obstruction just barely breaks the line-of-sight between the noise source and the receptor	3
Noise source completely shielded by a building	15
Noise source completely enclosed or completely shielded with solid barrier located close to the source	8
Enclosure and/or barrier with some gaps	5
Noise source completely enclosed and completely shielded with a solid barrier located close to the source	10
Noise source enclosed or shielded with heavy vinyl noise curtain material	5

Source

FHWA. RCNM User's Guide Appendix A Best Practices for Calculating Estimated Shielding for Use in the RCNM

Atmospheric Attenuation

Assumptions	Los Angeles
Ambient pressure (kPa)	101.3
Temperature (F)	68
Relative humidity (%)	90
Frequency of noise source (Hz)	500
Air Attenuation Coefficient (α, dB/km)	2.7
Air Attenuation Coefficient (α, dB/ft)	0.0008

$$A_{\text{air}} = \alpha d$$

Weather in Los Angeles County

Average temperature	64.2 °F
Average relative humidity	79.23 %

Reference:

Harris, Cyril M. 1998. *Handbook of Acoustical Measurements and Noise Control*. 3rd ed. - Chapter 3 Calculation of Attenuation
<http://www.usa.com/los-angeles-county-ca-weather.htm>

Equipment noise emissions and acoustical usage factors database

Equipment Description	Impact Device?	Acoustical Use Factor	Spec 721.560 Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50 ft (dBA, slow)
All Other Equipment > 5 hp	No	50%	85	N/A
Auger Drill Rig	No	20%	85	84
Backhoe	No	40%	80	78
Bar Bender	No	20%	80	N/A
Blasting	Yes	1%	94	N/A
Boring Jack Power Unit	No	50%	80	83
Chain Saw	No	20%	85	84
Clam Shovel (dropping)	Yes	20%	93	87
Compactor (ground)	No	20%	80	83
Compressor (air)	No	40%	80	78
Concrete Batch Plant	No	15%	83	N/A
Concrete Mixer Truck	No	40%	85	79
Concrete Pump Truck	No	20%	82	81
Concrete Saw	No	20%	90	90
Crane	No	16%	85	81
Dozer	No	40%	85	82
Drill Rig Truck	No	20%	84	79
Drum Mixer	No	50%	80	80
Dump Truck	No	40%	84	76
Excavator	No	40%	85	81
Flat Bed Truck	No	40%	84	74
Front End Loader	No	40%	80	79
Generator	No	50%	82	81
Generator (<25KVA, VMS signs)	No	50%	70	73
Gradall	No	40%	85	83
Grader	No	40%	85	N/A
Grapple (on backhoe)	No	40%	85	87
Horizontal Boring Hydr. Jack	No	25%	80	82
Hydra Break Ram	Yes	10%	90	N/A
Impact Pile Driver	Yes	20%	95	101
Jackhammer	Yes	20%	85	89
Man Lift	No	20%	85	75
Mounted Impact Hammer (hoe ram)	Yes	20%	90	90
Pavement Scarifier	No	20%	85	90
Paver	No	50%	85	77
Pickup Truck	No	40%	55	75
Pneumatic Tools	No	50%	85	85
Pumps	No	50%	77	81
Refrigerator Unit	No	100%	82	73
Rivit Buster/Chipping Gun	Yes	20%	85	79
Rock Drill	No	20%	85	81
Roller	No	20%	85	80
Sand Blasting (Single Nozzle)	No	20%	85	96
Scraper	No	40%	85	84
Shears (on backhoe)	No	40%	85	96
Slurry Plant	No	100%	78	78
Slurry Trenching Machine	No	50%	82	80
Soil Mix Drill Rig	No	50%	80	N/A
Tractor	No	40%	84	N/A
Vacuum Excavator (vac-truck)	No	40%	85	85
Vacuum Street Sweeper	No	10%	80	82
Ventilation Fan	No	100%	85	79
Vibrating Hopper	No	50%	85	87
Vibratory Concrete Mixer	No	20%	80	80
Vibratory Pile Driver	No	20%	95	101
Warning Horn	No	5%	85	83
Welder/Torch	No	40%	73	74

Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power. In case of

FHWA. RCNM User's Guide - Table 1. CA/T equipment noise emissions and acoustical usage factors database.

Average Ambient Noise Levels for Various Land Uses

Land Use Description	Average Ldn (dBA)	Daytime Leq (dBA)	Nighttime Leq (dBA)
Wilderness	35	35	25
Rural Residential	40	40	30
Quiet Suburban Residential	50	50	40
Normal Suburban Residential	55	55	45
Urban Residential	60	60	50
Noisy Urban Residential	65	65	55
Very Noisy Urban Residential	70	70	60

Source:

U.S. EPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an A

Notes:

The LA City ZIMAS model indicates that the land-use in the immediate vicinity of the project is zoned as "P" (Park) or "C2" (Light Commercial) with minimal areas zoned "R2" (Residential). The LA City noise ordinance indicates that the presumed noise level for these areas would be 60 dBA, consistent with the USEPA urban residential daytime Leq of 60 dBA.

Number of Equivalent Vehicles as a Function of Vehicle Type and Speed Based on TNM Reference Energy Mean Emission Levels

Speed (km/h (mph))		Equivalent Vehicles		
		1 Heavy Truck	1 Medium Truck	1 Auto
56	(35)	19.1	7.1	1
64	(40)	15.1	5.8	1
72	(45)	12.9	5	1
80	(50)	11.5	4.5	1
88.5	(55)	10.4	4.1	1
97	(60)	9.6	3.7	1
105	(65)	8.9	3.5	1
113	(70)	8.3	3.2	1

Source:

California Department of Transportation (Caltrans). Technical Noise Supplement to the Traffic Noise Analysis Protocol. September 2013.

Construction Vibration Structural

Significance Thresholds

References: Vibration annoyance threshold based on Caltrans *Transportation and Construction Vibration Guidance Manual* threshold for vibration damage. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Structural Results

Construction Area	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
Lake Street	0.404	0.551	0.320	0.006	0.004	0.010
Grand View Street	0.006	0.003	0.003	0.127	0.210	0.127
MacArthur Park (Pipeline)	0.014	0.013	0.003	0.013	0.012	0.003
MacArthur Park (Treatment Structures)	0.001	0.001	0.001	0.004	0.011	0.002
MacArthur Park (Treatment Wetlands)	0.001	0.001	0.001	0.002	0.003	0.001
Maximum	0.404	0.551	0.320	0.127	0.210	0.127
Caltrans Building Category	fragile structures	fragile structures	fragile structures	fragile structures	modern industrial or commercial structures	older residential structures
Threshold	0.10	0.10	0.10	0.10	0.50	0.30
Significant?	yes	yes	yes	yes	no	no

Construction Vibration Structural

				At Source	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
			Distance (ft):	25	16	13	19	265	375	185
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Lake Street <i>incl. installation of the diversion structure, drain-line upgrade, pretreatment unit, pump station, actuated valve and meter vaults, and installation of pipeline along Lake Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	0.006	0.008	0.005	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.146	0.199	0.116	0.002	0.001	0.004
	Water Truck	Loaded Trucks	1	0.076	0.146	0.199	0.116	0.002	0.001	0.004
	Pickup Truck	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.067	0.092	0.053	0.001	0.001	0.002
	Crane	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.171	0.234	0.136	0.003	0.002	0.004
	Paving Equipment	Vibratory Roller	1	0.210	0.404	0.551	0.320	0.006	0.004	0.010
Lake Street Total				N/A	0.404	0.551	0.320	0.006	0.004	0.010

				At Source	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
			Distance (ft):	25	265	390	385	35	25	35
Grand View Street <i>incl. installation of pipeline along Grand View Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	0.002	0.003	0.002
	Concrete Truck	Loaded Trucks	1	0.076	0.002	0.001	0.001	0.046	0.076	0.046
	Water Truck	Loaded Trucks	1	0.076	0.002	0.001	0.001	0.046	0.076	0.046
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.001	0.001	0.001	0.021	0.035	0.021
	Excavator	Large Bulldozer	1	0.089	0.003	0.001	0.001	0.054	0.089	0.054
	Paving Equipment	Vibratory Roller	1	0.210	0.006	0.003	0.003	0.127	0.210	0.127
Grand View Street Total				N/A	0.006	0.003	0.003	0.127	0.210	0.127

				At Source	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
			Distance (ft):	25	85	90	240	90	95	245
MacArthur Park (Pipeline) <i>incl. installation of pipeline along 7th Street within MacArthur Park and connection to the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Water Truck	Loaded Trucks	1	0.076	0.012	0.011	0.003	0.011	0.010	0.002
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.014	0.013	0.003	0.013	0.012	0.003
MacArthur Park (Pipeline) Total				N/A	0.014	0.013	0.003	0.013	0.012	0.003

Construction Vibration Structural

				At Source	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
			Distance (ft):	25	420	540	585	200	100	315
MacArthur Park (Treatment Structures) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	0.003	0.010	0.002
	Water Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	0.003	0.010	0.002
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.001	0.001	0.004	0.011	0.002
MacArthur Park (Treatment Structures) Total				N/A	0.001	0.001	0.001	0.004	0.011	0.002
				At Source	Southern California Surgery Center	Jimenez Arcade	La Vina En Los Angeles	2228 7th Street Building	MacArthur Park Visual and Performing Arts Elementary	Grand View Street Residences
			Distance (ft):	25	570	685	755	380	245	505
MacArthur Park (Treatment Wetlands) <i>incl. installation of the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.001	<0.001	0.001	0.002	0.001
	Water Truck	Loaded Trucks	1	0.076	0.001	0.001	<0.001	0.001	0.002	0.001
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Bulldozer	Large Bulldozer	1	0.089	0.001	0.001	0.001	0.002	0.003	0.001
	Excavator	Large Bulldozer	1	0.089	0.001	0.001	0.001	0.002	0.003	0.001
MacArthur Park (Treatment Wetlands) Total				N/A	0.001	0.001	0.001	0.002	0.003	0.001

Construction Vibration Annoyance

Significance Threshold
0.04 PPV
References: Vibration annoyance threshold based on Caltrans [Transportation and Construction Vibration Guidance Manual](#) threshold for distinctly perceptible vibration. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
Lake Street	0.001	0.001	0.001	0.001	0.001	0.004
Grand View Street	0.001	0.002	0.002	0.002	0.003	0.210
MacArthur Park (Pipeline)	0.001	0.002	0.002	0.002	0.003	0.012
MacArthur Park (Treatment Structures)	0.001	0.001	0.002	0.002	0.002	0.011
MacArthur Park (Treatment Wetlands)	0.002	0.003	0.002	0.002	0.002	0.003
Maximum	0.002	0.003	0.002	0.002	0.003	0.210
Threshold	0.040	0.040	0.040	0.040	0.040	0.040
Significant?	no	no	no	no	no	yes

Construction Vibration Annoyance

				At Source	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
			Distance (ft):	25	1,035	945	875	825	775	375
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Lake Street <i>incl. installation of the diversion structure, drain-line upgrade, pretreatment unit, pump station, actuated valve and meter vaults, and installation of pipeline along Lake Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Water Truck	Loaded Trucks	1	0.076	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Pickup Truck	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Crane	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	<0.001	<0.001	<0.001	<0.001	0.001	0.002
	Paving Equipment	Vibratory Roller	1	0.210	0.001	0.001	0.001	0.001	0.001	0.004
Lake Street Total				N/A	0.001	0.001	0.001	0.001	0.001	0.004
				At Source	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
			Distance (ft):	25	725	585	530	480	430	25
Grand View Street <i>incl. installation of pipeline along Grand View Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
	Concrete Truck	Loaded Trucks	1	0.076	<0.001	0.001	0.001	0.001	0.001	0.076
	Water Truck	Loaded Trucks	1	0.076	<0.001	0.001	0.001	0.001	0.001	0.076
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	<0.001	<0.001	<0.001	<0.001	<0.001	0.035
	Excavator	Large Bulldozer	1	0.089	0.001	0.001	0.001	0.001	0.001	0.089
	Paving Equipment	Vibratory Roller	1	0.210	0.001	0.002	0.002	0.002	0.003	0.210
Grand View Street Total				N/A	0.001	0.002	0.002	0.002	0.003	0.210
				At Source	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
			Distance (ft):	25	385	290	320	280	235	95
MacArthur Park (Pipeline) <i>incl. installation of pipeline along 7th Street within MacArthur Park and connection to the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Water Truck	Loaded Trucks	1	0.076	0.001	0.002	0.002	0.002	0.003	0.010
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.002	0.002	0.002	0.003	0.012
MacArthur Park (Pipeline) Total				N/A	0.001	0.002	0.002	0.002	0.003	0.012

Construction Vibration Annoyance

Significance Threshold
0.04 PPV
References: Vibration annoyance threshold based on Caltrans [Transportation and Construction Vibration Guidance Manual](#) threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
Lake Street	0.001	0.001	0.001	0.001	0.001	0.004
Grand View Street	0.001	0.002	0.002	0.002	0.003	0.210
MacArthur Park (Pipeline)	0.001	0.002	0.002	0.002	0.003	0.012
MacArthur Park (Treatment Structures)	0.001	0.001	0.002	0.002	0.002	0.011
MacArthur Park (Treatment Wetlands)	0.002	0.003	0.002	0.002	0.002	0.003
Maximum	0.002	0.003	0.002	0.002	0.003	0.210
Threshold	0.040	0.040	0.040	0.040	0.040	0.040
Significant?	no	no	no	no	no	yes

Construction Vibration Annoyance

				At Source	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
			Distance (ft):	25	555	415	375	325	275	100
MacArthur Park (Treatment Structures) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	0.002	0.002	0.010
	Water Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	0.002	0.002	0.010
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.001	0.002	0.002	0.002	0.011
MacArthur Park (Treatment Structures) Total				N/A	0.001	0.001	0.002	0.002	0.002	0.011
				At Source	The American Cement Building Apartments	Parkview Terrace Apartments	Iglesia Pentecostes Unidos Por Cristo	2416-2422 W. 7th St. Residence	Churchill Lofts Apartments	MacArthur Park Visual and Performing Arts Elementary
			Distance (ft):	25	315	265	335	310	280	245
MacArthur Park (Treatment Wetlands) <i>incl. installation of the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.002	0.002	0.002	0.002	0.002	0.002
	Water Truck	Loaded Trucks	1	0.076	0.002	0.002	0.002	0.002	0.002	0.002
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Bulldozer	Large Bulldozer	1	0.089	0.002	0.003	0.002	0.002	0.002	0.003
	Excavator	Large Bulldozer	1	0.089	0.002	0.003	0.002	0.002	0.002	0.003
MacArthur Park (Treatment Wetlands) Total				N/A	0.002	0.003	0.002	0.002	0.002	0.003

Construction Vibration Annoyance

Significance Threshold
0.04 PPV
References: Vibration annoyance threshold based on Caltrans [Transportation and Construction Vibration Guidance Manual](#) threshold for distinctly perceptible vibration. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
Lake Street	0.003	0.010	0.008	0.320	0.007	0.040
Grand View Street	0.011	0.127	0.040	0.003	0.002	0.040
MacArthur Park (Pipeline)	0.001	0.003	0.013	0.003	0.003	0.040
MacArthur Park (Treatment Structures)	0.001	0.002	0.003	0.001	0.001	0.040
MacArthur Park (Treatment Wetlands)	0.001	0.001	0.001	0.001	<0.001	0.040
Maximum	0.011	0.127	0.040	0.320	0.007	0.040
Threshold	0.040	0.040	0.040	0.040	0.040	0.040
Significant?	no	yes	yes	yes	no	yes

Construction Vibration Annoyance

				At Source	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
			Distance (ft):	25	425	185	230	19	250	75
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Lake Street <i>incl. installation of the diversion structure, drain-line upgrade, pretreatment unit, pump station, actuated valve and meter vaults, and installation of pipeline along Lake Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	0.005	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.004	0.003	0.116	0.002	0.015
	Water Truck	Loaded Trucks	1	0.076	0.001	0.004	0.003	0.116	0.002	0.015
	Pickup Truck	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	<0.001	0.002	0.001	0.053	0.001	0.007
	Crane	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.004	0.003	0.136	0.003	0.017
	Paving Equipment	Vibratory Roller	1	0.210	0.003	0.010	0.008	0.320	0.007	0.040
Lake Street Total				N/A	0.003	0.010	0.008	0.320	0.007	0.040
				At Source	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
			Distance (ft):	25	175	35	75	385	615	75
Grand View Street <i>incl. installation of pipeline along Grand View Street and crossing 7th Street into MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	0.002	0.001	<0.001	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.004	0.046	0.015	0.001	0.001	0.015
	Water Truck	Loaded Trucks	1	0.076	0.004	0.046	0.015	0.001	0.001	0.015
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.002	0.021	0.007	0.001	<0.001	0.007
	Excavator	Large Bulldozer	1	0.089	0.005	0.054	0.017	0.001	0.001	0.017
	Paving Equipment	Vibratory Roller	1	0.210	0.011	0.127	0.040	0.003	0.002	0.040
Grand View Street Total				N/A	0.011	0.127	0.040	0.003	0.002	0.040
				At Source	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
			Distance (ft):	25	450	245	90	240	245	43
MacArthur Park (Pipeline) <i>incl. installation of pipeline along 7th Street within MacArthur Park and connection to the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Water Truck	Loaded Trucks	1	0.076	0.001	0.002	0.011	0.003	0.002	0.034
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.003	0.013	0.003	0.003	0.040
MacArthur Park (Pipeline) Total				N/A	0.001	0.003	0.013	0.003	0.003	0.040

Construction Vibration Annoyance

Significance Threshold
0.04 PPV
References: Vibration annoyance threshold based on Caltrans [Transportation and Construction Vibration Guidance Manual](#) threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
Lake Street	0.003	0.010	0.008	0.320	0.007	0.040
Grand View Street	0.011	0.127	0.040	0.003	0.002	0.040
MacArthur Park (Pipeline)	0.001	0.003	0.013	0.003	0.003	0.040
MacArthur Park (Treatment Structures)	0.001	0.002	0.003	0.001	0.001	0.040
MacArthur Park (Treatment Wetlands)	0.001	0.001	0.001	0.001	<0.001	0.040
Maximum	0.011	0.127	0.040	0.320	0.007	0.040
Threshold	0.040	0.040	0.040	0.040	0.040	0.040
Significant?	no	yes	yes	yes	no	yes

Construction Vibration Annoyance

				At Source	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
			Distance (ft):	25	465	315	240	585	745	43
MacArthur Park (Treatment Structures) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.002	0.003	0.001	<0.001	0.034
	Water Truck	Loaded Trucks	1	0.076	0.001	0.002	0.003	0.001	<0.001	0.034
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.001	0.002	0.003	0.001	0.001	0.040
MacArthur Park (Treatment Structures) Total				N/A	0.001	0.002	0.003	0.001	0.001	0.040

				At Source	LA New Times Western School/LA Onnuri Community Church	Grand View Street Residences	Cristo Salva Bilingual Church	La Vina En Los Angeles	Southeast Park Unhoused Population	MacArthur Park Visitors
			Distance (ft):	25	620	505	415	755	865	43
MacArthur Park (Treatment Wetlands) <i>incl. installation of the wetlands</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	<0.001	<0.001	0.034
	Water Truck	Loaded Trucks	1	0.076	0.001	0.001	0.001	<0.001	<0.001	0.034
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Bulldozer	Large Bulldozer	1	0.089	0.001	0.001	0.001	0.001	<0.001	0.040
MacArthur Park (Treatment Wetlands) Total				N/A	0.001	0.001	0.001	0.001	<0.001	0.040

Equipment	PPV at 25 ft (in/sec)	Approximate Lv [†] at 25 ft
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.17	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall) - in soil	0.008	66
Hydromill (slurry wall) - in rock	0.017	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Source: Federal Transit Administration. 2018. Transit Noise and Vibrat.
Note:

Values for pile drivers are based on the typical vibration source levels.

† RMS velocity in decibels (VdB) re 1 micro-inch/second

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Construction Noise - Equipment

8-Hour Construction Noise Level at 50 Feet (dBA)

Construction Area	Equipment Description	RCNM Equipment Types	Usage Factor	Equipment Lmax @ 50'	Equipment Leq(h) @ 50'	Number of Equipment	Add to Single Source Level (dBA)	Total Lmax @ 50'	Total Leq(h) @ 50'
Diversion Structure <i>incl. installation of the diversion structure, and other supporting infrastructure. Equipment was assumed to match that of Lake Street construction element under the proposed project.</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75
	Water Truck	Dump Truck	40%	76	72	1	0	76	72
	Pickup Truck	Pickup Truck	40%	75	71	2	3	78	74
	Asphalt Milling Machine	Pavement Scarifier	20%	90	83	1	0	90	83
	Crane	Crane	16%	81	73	1	0	81	73
	Excavator	Excavator	40%	81	77	1	0	81	77
	Paving Equipment	Roller	20%	80	73	1	0	80	73
Diversion Structure Total								92	86
Stormwater Conveyance (non Park) <i>incl. installation of stormwater conveyance piping in the sidewalks or roadways parallel to Alvarado Street and 7th Street.</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75
	Water Truck	Dump Truck	40%	76	72	1	0	76	72
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71
	Asphalt Milling Machine	Pavement Scarifier	20%	90	83	1	0	90	83
	Excavator	Excavator	40%	81	77	1	0	81	77
	Paving Equipment	Roller	20%	80	73	1	0	80	73
Stormwater Conveyance (non Park) Total								92	86
MacArthur Park (Auxiliary Treatment) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75
	Water Truck	Dump Truck	40%	76	72	1	0	76	72
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71
	Excavator	Excavator	40%	81	77	1	0	81	77
MacArthur Park (Auxiliary Treatment) Total								85	81
MacArthur Park (Wetlands and Arroyo) <i>incl. installation of the wetlands</i>	Backhoe	Backhoe	40%	78	74	1	0	78	74
	Concrete Truck	Concrete Mixer Truck	40%	79	75	1	0	79	75
	Water Truck	Dump Truck	40%	76	72	1	0	76	72
	Pickup Truck	Pickup Truck	40%	75	71	1	0	75	71
	Bulldozer	Front End Loader	40%	79	75	1	0	79	75
	Excavator	Excavator	40%	81	77	1	0	81	77
MacArthur Park (Wetlands and Arroyo) Total								86	82

8-Hour Construction Noise Level at the Receptor (dBA) - Distance from construction within which noise impacts would be significant

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	630	605	380	420
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	22.0	21.7	17.6	18.5
Atmospheric Attenuation (dBA)	0.52	0.50	0.31	0.35
8-Hour Construction Noise Level at the Receptor (dBA)	63	63	63	63
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	65	65	65	65
Daytime Increase Over Existing (dBA)	5	5	5	5
Significant?	Yes	Yes	Yes	Yes

Receptor blocked completely by building

Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
98	93	58	64
85.9	85.5	81.3	82.2
5.8	5.4	1.3	2.1
0.08	0.08	0.05	0.05
80	80	80	80
80	80	80	80
5	5	5	5
Yes	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - N6 (MacArthur Park Elementary School)

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	925	290	330	450
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	25.3	15.3	16.4	19.1
Atmospheric Attenuation (dBA)	0.76	0.24	0.27	0.37
8-Hour Construction Noise Level at the Receptor (dBA)	60	70	65	63
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	63	70	66	65
Daytime Increase Over Existing (dBA)	3	10	6	5
Significant?	No	Yes	Yes	No

Construction Noise - Equipment

8-Hour Construction Noise Level at the Receptor (dBA) - N9 (Cristo Salva Bilingual Church)

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	815	165	205	325
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	24.2	10.4	12.3	16.3
Atmospheric Attenuation (dBA)	0.67	0.14	0.17	0.27
8-Hour Construction Noise Level at the Receptor (dBA)	61	75	69	66
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	64	75	69	67
Daytime Increase Over Existing (dBA)	4	15	9	7
Significant?	No	Yes	Yes	Yes

8-Hour Construction Noise Level at the Receptor (dBA) - N10 (La Vina en Los Angeles)

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	785	200	265	282
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	23.9	12.0	14.5	15.0
Atmospheric Attenuation (dBA)	0.65	0.16	0.22	0.23
8-Hour Construction Noise Level at the Receptor (dBA)	61	73	67	67
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	64	74	67	68
Daytime Increase Over Existing (dBA)	blocked by bldg	14	7	blocked by bldg
Significant?	No	Yes	Yes	No

8-Hour Construction Noise Level at the Receptor (dBA) - Multi-family residence at 622 S. Alvarado Street

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	335	385	365	465
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	16.5	17.7	17.3	19.4
Atmospheric Attenuation (dBA)	0.28	0.32	0.30	0.38
8-Hour Construction Noise Level at the Receptor (dBA)	69	67	64	62
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	70	68	65	64
Daytime Increase Over Existing (dBA)	10	8	5	4
Significant?	Yes	Yes	Yes	No

8-Hour Construction Noise Level at the Receptor (dBA) - MPM Apartments

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	450	475	530	490
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	19.1	19.6	20.5	19.8
Atmospheric Attenuation (dBA)	0.37	0.39	0.44	0.40
8-Hour Construction Noise Level at the Receptor (dBA)	66	66	60	62
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	67	67	63	64
Daytime Increase Over Existing (dBA)	blocked by bldg	7	3	4
Significant?	No	Yes	No	No

8-Hour Construction Noise Level at the Receptor (dBA) - Upper-story residences at 718 Alvarado Street

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	715	265	635	360
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	23.1	14.5	22.1	17.1
Atmospheric Attenuation (dBA)	0.59	0.22	0.52	0.30
8-Hour Construction Noise Level at the Receptor (dBA)	62	71	59	65
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	64	71	62	66
Daytime Increase Over Existing (dBA)	4	11	2	6
Significant?	No	Yes	No	Yes

Construction Noise - Equipment

8-Hour Construction Noise Level at the Receptor (dBA) - Northeast unhoused populations

Phase Type	Diversion Structure	Stormwater Conveyance (non Park)	MacArthur Park (Auxiliary Treatment)	MacArthur Park (Wetlands and Arroyo)
Distance from Construction Activity to a Receptor (ft)	180	265	170	260
8-Hour Construction Noise Level at 50 ft (dBA)	85.9	85.5	81.3	82.2
Distance Divergence (dBA)	11.1	14.5	10.6	14.3
Atmospheric Attenuation (dBA)	0.15	0.22	0.14	0.21
8-Hour Construction Noise Level at the Receptor (dBA)	75	71	71	68
Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)	75	71	71	68
Daytime Increase Over Existing (dBA)	15	11	11	8
Significant?	Yes	Yes	Yes	Yes

Minimum Daytime Unmitigated Leq (Construction Noise + Existing) (dBA)

<u>County</u>	<u>Significance Level</u>
Los Angeles	5 dBA (daytime increase over existing noise levels)
<u>Existing Noise Levels</u>	Reference: Significance threshold based on <u>L.A. CEQA Thresholds Guide</u> criteria
Land Use Type	"A project would normally have a significant impact on noise levels from construction if... construction activities lasting more than 10 days in a three month
Background Noise (dBA)	period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use..."
Urban Residential	
60	

Construction Vibration Structural

Significance Thresholds

References: Vibration annoyance threshold based on Caltrans *Transportation and Construction Vibration Guidance Manual* threshold for vibration damage. Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Construction Vibration Structural

			Distance (ft):	At Source	Southern California Surgery Center	Building located at 658 Alvarado Street
				25	n/a	10
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Diversion Structure <i>incl. installation of the diversion structure, and other supporting infrastructure. Equipment was assumed to match that of Lake Street construction element under the proposed project.</i>	Backhoe	Small bulldozer	1	0.003	n/a	0.012
	Concrete Truck	Loaded Trucks	1	0.076	n/a	0.300
	Water Truck	Loaded Trucks	1	0.076	n/a	0.300
	Pickup Truck	n/a	2	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	n/a	0.138
	Crane	n/a	1	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	n/a	0.352
	Paving Equipment	Vibratory Roller	1	0.210	n/a	0.830
Diversion Structure Total				N/A	0.000	0.830
			Distance (ft):	At Source	Southern California Surgery Center	Building located at 658 Alvarado Street
				25	30	n/a
Stormwater Conveyance (non Park) <i>incl. installation of stormwater conveyance piping in the sidewalks or roadways parallel to Alvarado Street and 7th Street.</i>	Backhoe	Small bulldozer	1	0.003	0.002	n/a
	Concrete Truck	Loaded Trucks	1	0.076	0.058	n/a
	Water Truck	Loaded Trucks	1	0.076	0.058	n/a
	Pickup Truck	n/a	1	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.027	n/a
	Excavator	Large Bulldozer	1	0.089	0.068	n/a
	Paving Equipment	Vibratory Roller	1	0.210	0.160	n/a
incl. installation of stormwater conveyance Total				N/A	0.160	0.000

Construction Vibration Annoyance

Significance Threshold

0.04 PPV
References: *Vibration annoyance threshold based on Caltrans Transportation and Construction Vibration Guidance Manual* threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
Diversion Structure	0.001	0.001	0.000	0.004	0.003	0.000
Stormwater Conveyance (non Park)	0.005	0.007	0.014	0.004	0.002	0.007
MacArthur Park (Auxiliary Treatment)	0.002	0.002	0.003	0.002	0.001	0.001
MacArthur Park (Wetlands and Arroyo)	0.001	0.002	0.003	0.001	0.001	0.002
Maximum	0.01	0.01	0.01	0.00	0.00	0.01
Threshold	0.04	0.04	0.04	0.04	0.04	0.04
Significant?	no	no	no	no	no	no

Construction Vibration Annoyance

				At Source	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
			Distance (ft):	25	925	900	>500	330	450	>500
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Diversion Structure <i>incl. installation of the diversion structure, and other supporting infrastructure. Equipment was assumed to match that of Lake Street construction element under the proposed project.</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	n/a	<0.001	<0.001	n/a
	Concrete Truck	Loaded Trucks	1	0.076	<0.001	<0.001	n/a	0.002	0.001	n/a
	Water Truck	Loaded Trucks	1	0.076	<0.001	<0.001	n/a	0.002	0.001	n/a
	Pickup Truck	n/a	2	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	<0.001	<0.001	n/a	0.001	<0.001	n/a
	Crane	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	<0.001	<0.001	n/a	0.002	0.001	n/a
	Paving Equipment	Vibratory Roller	1	0.210	0.001	0.001	n/a	0.004	0.003	n/a
Diversion Structure Total				N/A	0.001	0.001	0.000	0.004	0.003	0.000
				At Source	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
			Distance (ft):	25	290	250	150	380	480	250
Stormwater Conveyance (non Park) <i>incl. installation of stormwater conveyance piping in the sidewalks or roadways parallel to Alvarado Street and 7th Street.</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.002	0.002	0.005	0.001	0.001	0.002
	Water Truck	Loaded Trucks	1	0.076	0.002	0.002	0.005	0.001	0.001	0.002
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.001	0.001	0.002	0.001	<0.001	0.001
	Excavator	Large Bulldozer	1	0.089	0.002	0.003	0.006	0.002	0.001	0.003
	Paving Equipment	Vibratory Roller	1	0.210	0.005	0.007	0.014	0.004	0.002	0.007
Stormwater Conveyance (non Park) Total				N/A	0.005	0.007	0.014	0.004	0.002	0.007
				At Source	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
			Distance (ft):	25	330	300	260	350	510	500
MacArthur Park (Auxiliary Treatment) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.002	0.002	0.002	0.001	0.001	0.001
	Water Truck	Loaded Trucks	1	0.076	0.002	0.002	0.002	0.001	0.001	0.001
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.002	0.002	0.003	0.002	0.001	0.001
MacArthur Park (Auxiliary Treatment) Total				N/A	0.002	0.002	0.003	0.002	0.001	0.001

Construction Vibration Annoyance

Significance Threshold

0.04 PPV
References: *Vibration annoyance threshold based on Caltrans Transportation and Construction Vibration Guidance Manual* threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
Diversion Structure	0.001	0.001	0.000	0.004	0.003	0.000
Stormwater Conveyance (non Park)	0.005	0.007	0.014	0.004	0.002	0.007
MacArthur Park (Auxiliary Treatment)	0.002	0.002	0.003	0.002	0.001	0.001
MacArthur Park (Wetlands and Arroyo)	0.001	0.002	0.003	0.001	0.001	0.002
Maximum	0.01	0.01	0.01	0.00	0.00	0.01
Threshold	0.04	0.04	0.04	0.04	0.04	0.04
Significant?	no	no	no	no	no	no

Construction Vibration Annoyance

			Distance (ft):	At Source	MacArthur Park Elementary School	Grand View Street Residences	La Vina En Los Angeles	Multi-family residence at 622 S. Alvarado Street	MPM Apartments	Upper-story residences at 718 Alvarado Street
				25	450	380	265	460	495	355
MacArthur Park (Wetlands and Arroyo) incl. installation of the wetlands	Backhoe	Small bulldozer	1	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.001	0.001	0.002	0.001	0.001	0.001
	Water Truck	Loaded Trucks	1	0.076	0.001	0.001	0.002	0.001	0.001	0.001
	Pickup Truck	n/a	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Bulldozer	Large Bulldozer	1	0.089	0.001	0.002	0.003	0.001	0.001	0.002
	Excavator	Large Bulldozer	1	0.089	0.001	0.002	0.003	0.001	0.001	0.002
MacArthur Park (Wetlands and Arroyo) Total				N/A	0.001	0.002	0.003	0.001	0.001	0.002

Construction Vibration Annoyance

Significance Threshold

0.04 PPV
References: *Vibration annoyance threshold based on Caltrans Transportation and Construction Vibration Guidance Manual* threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	Northeast unhoused populations	MacArthur Park visitors
Diversion Structure	0.014	0.040
Stormwater Conveyance (non Park)	0.012	0.040
MacArthur Park (Auxiliary Treatment)	0.005	0.040
MacArthur Park (Wetlands and Arroyo)	0.003	0.040
Maximum	0.01	0.04
Threshold	0.04	0.04
Significant?	no	yes

Construction Vibration Annoyance

				At Source	Northeast unhoused populations	MacArthur Park visitors
			Distance (ft):	25	150	75
Construction Area	Equipment Description	Equivalent Equipment Types	Number of Equipment	PPV (in/sec)	PPV (in/sec)	PPV (in/sec)
Diversion Structure <i>incl. installation of the diversion structure, and other supporting infrastructure. Equipment was assumed to match that of Lake Street construction element under the proposed project.</i>	Backhoe	Small bulldozer	1	0.003	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.005	0.015
	Water Truck	Loaded Trucks	1	0.076	0.005	0.015
	Pickup Truck	n/a	2	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.002	0.007
	Crane	n/a	1	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.006	0.017
	Paving Equipment	Vibratory Roller	1	0.210	0.014	0.040
Diversion Structure Total				N/A	0.014	0.040
				At Source	Northeast unhoused populations	MacArthur Park visitors
			Distance (ft):	25	170	75
Stormwater Conveyance (non Park) <i>incl. installation of stormwater conveyance piping in the sidewalks or roadways parallel to Alvarado Street and 7th Street.</i>	Backhoe	Small bulldozer	1	0.003	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.004	0.015
	Water Truck	Loaded Trucks	1	0.076	0.004	0.015
	Pickup Truck	n/a	1	n/a	n/a	n/a
	Asphalt Milling Machine	Jackhammer	1	0.035	0.002	0.007
	Excavator	Large Bulldozer	1	0.089	0.005	0.017
	Paving Equipment	Vibratory Roller	1	0.210	0.012	0.040
Stormwater Conveyance (non Park) Total				N/A	0.012	0.040
				At Source	Northeast unhoused populations	MacArthur Park visitors
			Distance (ft):	25	160	43
MacArthur Park (Auxiliary Treatment) <i>incl. installation of pipeline along treatment structures within MacArthur Park</i>	Backhoe	Small bulldozer	1	0.003	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.005	0.034
	Water Truck	Loaded Trucks	1	0.076	0.005	0.034
	Pickup Truck	n/a	1	n/a	n/a	n/a
	Excavator	Large Bulldozer	1	0.089	0.005	0.040
MacArthur Park (Auxiliary Treatment) Total				N/A	0.005	0.040

Construction Vibration Annoyance

Significance Threshold

0.04 PPV
References: Vibration annoyance threshold based on Caltrans *Transportation and Construction Vibration Guidance Manual* threshold for distinctly perceptible vibration.
Available: <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf>

Summary of Vibration Annoyance Results

Construction Area	Northeast unhoused populations	MacArthur Park visitors
Diversion Structure	0.014	0.040
Stormwater Conveyance (non Park)	0.012	0.040
MacArthur Park (Auxiliary Treatment)	0.005	0.040
MacArthur Park (Wetlands and Arroyo)	0.003	0.040
Maximum	0.01	0.04
Threshold	0.04	0.04
Significant?	no	yes

Construction Vibration Annoyance

			Distance (ft):	At Source	Northeast unhoused populations	MacArthur Park visitors
				25	260	43
MacArthur Park (Wetlands and Arroyo) incl. installation of the wetlands	Backhoe	Small bulldozer	1	0.003	<0.001	0.001
	Concrete Truck	Loaded Trucks	1	0.076	0.002	0.034
	Water Truck	Loaded Trucks	1	0.076	0.002	0.034
	Pickup Truck	n/a	1	n/a	n/a	n/a
	Bulldozer	Large Bulldozer	1	0.089	0.003	0.040
	Excavator	Large Bulldozer	1	0.089	0.003	0.040
MacArthur Park (Wetlands and Arroyo) Total				N/A	0.003	0.040