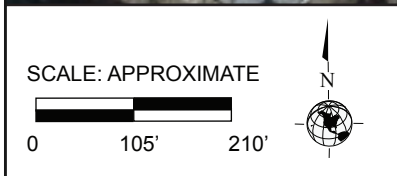
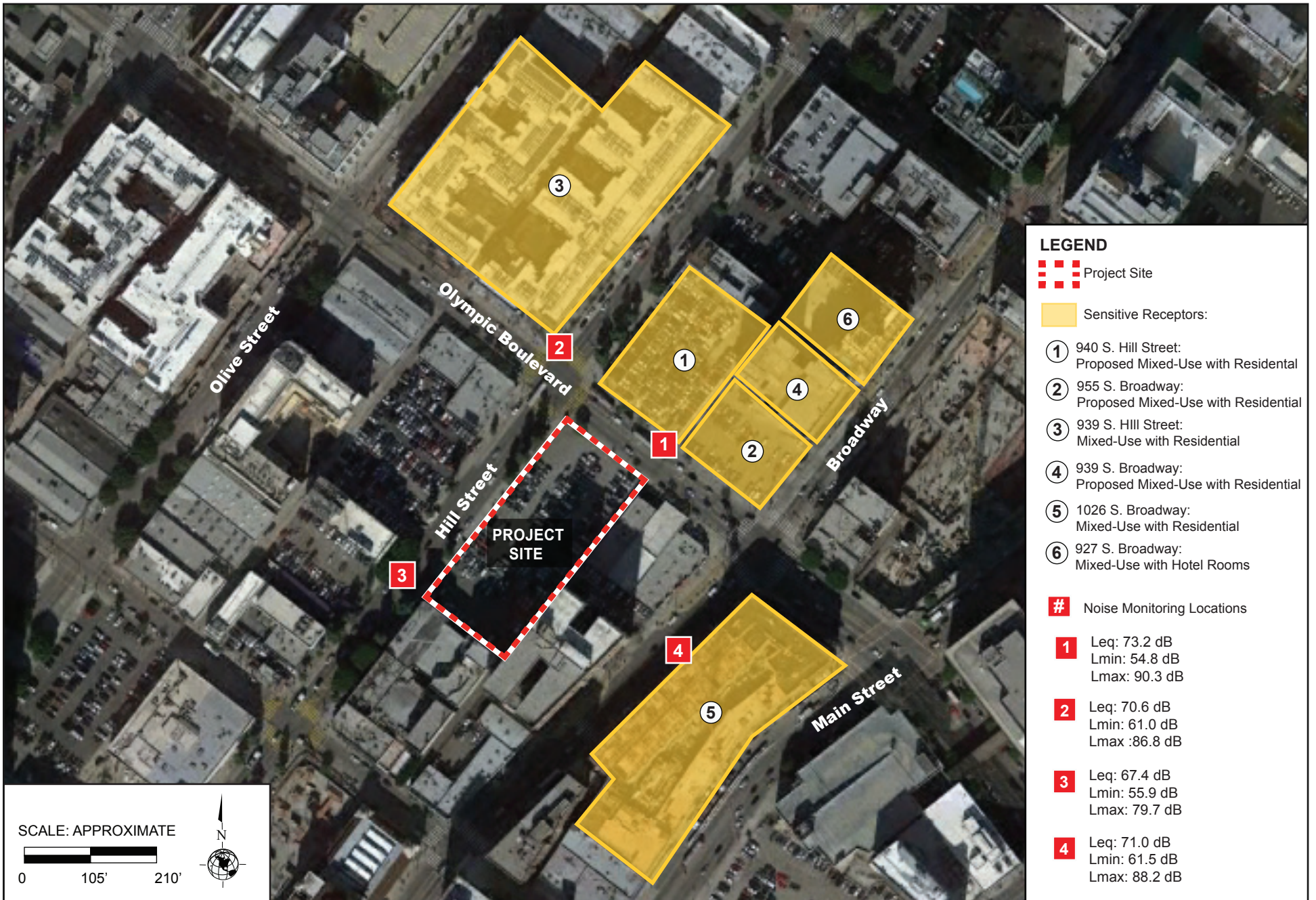


APPENDIX G: NOISE MONITORING DATA AND CALCULATION WORKSHEETS



Source: Google Earth, Aerial View, 2016

Summary

Filename 831_Data.182
 Serial Number 3748
 Model Model 831
 Firmware Version 2.300
 User Elise Lorenzana
 Location Location 1
 Job Description Olympic and Hill
 Note
 Measurement Description
 Start 2017/03/28 12:00:53
 Stop 2017/03/28 12:15:53
 Duration 0:15:00.0
 Run Time 0:15:00.0
 Pause 0:00:00.0
 Pre Calibration 2015/02/12 9:51:33
 Post Calibration None
 Calibration Deviation ---



Location: On the north side of Olympic Boulevard, across from Project Site
Noise Sources: vehicle traffic, buses, delivery trucks, pedestrians

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRM831
 Microphone Correction Off
 Integration Method Linear
 Gain 0.0 dB
 Overload 143.5 dB
 Under Range Peak **75.9** **72.9** **77.9** dB
 Under Range Limit **26.2** **26.5** **31.9** dB
 Noise Floor **17.1** **17.3** **22.6** dB

Results

LAeq 73.2 dB
 LAE 102.7 dB
 EA 2.077 mPa²h
 LApeak (max) 2017/03/28 12:10:01 110.0 dB
 LASmax 2017/03/28 12:15:42 90.3 dB
 LASmin 2017/03/28 12:13:56 54.8 dB
 SEA -99.9 dB
 LAS > 65.0 dB (Exceedence Counts / Duration) 16 713.4 s
 LAS > 85.0 dB (Exceedence Counts / Duration) 3 10.5 s
 LApeak > 135.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 137.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 140.0 dB (Exceedence Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00	LNight 22:00-07:00
LCeq	73.2	73.2	-99.9	73.2	73.2	-99.9	-99.9
LAeq	80.9 dB						
LCeq - LAeq	7.7 dB						
LALeq	76.9 dB						
LAeq	73.2 dB						
LALeq - LAeq	3.7 dB						
# Overloads	0						
Overload Duration	0.0 s						

Statistics

LAS5.00 77.6 dB
 LAS10.00 75.2 dB
 LAS33.30 71.0 dB
 LAS50.00 68.6 dB
 LAS66.60 66.0 dB
 LAS90.00 61.9 dB

Summary

Filename 831_Data.183
 Serial Number 3748
 Model Model 831
 Firmware Version 2.300
 User Elise Lorenzana
 Location Location 2
 Job Description Olympic and Hill
 Note
 Measurement Description
 Start 2017/03/28 12:17:32
 Stop 2017/03/28 12:32:32
 Duration 0:15:00.0
 Run Time 0:15:00.0
 Pause 0:00:00.0
 Pre Calibration 2015/02/12 9:51:33
 Post Calibration None
 Calibration Deviation ---



Location: On the northwest corner of Hill Street and Olympic Boulevard
Noise Sources: vehicle traffic, buses, pedestrians

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRM831
 Microphone Correction Off
 Integration Method Linear
 Gain 0.0 dB
 Overload 143.5 dB
 Under Range Peak **75.9** **72.9** **77.9** dB
 Under Range Limit **26.2** **26.5** **31.9** dB
 Noise Floor **17.1** **17.3** **22.6** dB

Results

LAeq 70.6 dB
 LAE 100.1 dB
 EA 1.142 mPa²h
 LApeak (max) 2017/03/28 12:26:15 103.1 dB
 LASmax 2017/03/28 12:24:14 86.8 dB
 LASmin 2017/03/28 12:22:07 61.0 dB
 SEA -99.9 dB
 LAS > 65.0 dB (Exceedence Counts / Duration) 9 873.9 s
 LAS > 85.0 dB (Exceedence Counts / Duration) 1 1.1 s
 LApeak > 135.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 137.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 140.0 dB (Exceedence Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00	LNight 22:00-07:00
LCEq	70.6	70.6	-99.9	70.6	70.6	-99.9	-99.9
LAeq	79.9 dB						
LAeq	70.6 dB						
LCeq - LAeq	9.3 dB						
LAlaq	74.6 dB						
LAeq	70.6 dB						
LAlaq - LAeq	4.0 dB						
# Overloads	0						
Overload Duration	0.0 s						

Statistics

LAS5.00 74.6 dB
 LAS10.00 73.2 dB
 LAS33.30 70.3 dB
 LAS50.00 69.0 dB
 LAS66.60 67.9 dB
 LAS90.00 65.0 dB

Summary

Filename	831_Data.184
Serial Number	3748
Model	Model 831
Firmware Version	2.300
User	Elise Lorenzana
Location	Location 3
Job Description	Olympic and Hill
Note	
Measurement Description	
Start	2017/03/28 12:35:52
Stop	2017/03/28 12:50:52
Duration	0:15:00.0
Run Time	0:15:00.0
Pause	0:00:00.0
Pre Calibration	2015/02/12 9:51:33
Post Calibration	None
Calibration Deviation	---



Location: On the west side of Hill Street, across from the Project Site
Noise Sources: vehicle traffic, pedestrians, delivery trucks, buses

Overall Settings

RMS Weight	A Weighting		
Peak Weight	A Weighting		
Detector	Slow		
Preamp	PRM831		
Microphone Correction	Off		
Integration Method	Linear		
Gain	0.0 dB		
Overload	143.5 dB		
	A	C	Z
Under Range Peak	75.9	72.9	77.9 dB
Under Range Limit	26.2	26.5	31.9 dB
Noise Floor	17.1	17.3	22.6 dB

Results

LAeq	67.4 dB		
LAE	97.0 dB		
EA	554.398 $\mu\text{Pa}^2\text{h}$		
LAp _{peak} (max)	2017/03/28 12:47:05	97.9 dB	
LAS _{max}	2017/03/28 12:38:03	79.7 dB	
LAS _{min}	2017/03/28 12:47:43	55.9 dB	
SEA	-99.9 dB		
LAS > 65.0 dB (Exceedence Counts / Duration)	34	476.1 s	
LAS > 85.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LAp _{peak} > 135.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LAp _{peak} > 137.0 dB (Exceedence Counts / Duration)	0	0.0 s	
LAp _{peak} > 140.0 dB (Exceedence Counts / Duration)	0	0.0 s	

Community Noise

	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00	LNight 22:00-07:00
	67.4		67.4	-99.9	67.4	67.4	-99.9
LCeq	74.7 dB						
LAeq	67.4 dB						
LCeq - LAeq	7.3 dB						
LALeq	69.6 dB						
LAEq	67.4 dB						
LALeq - LAeq	2.2 dB						
# Overloads	0						
Overload Duration	0.0 s						

Statistics

LAS5.00	72.9 dB
LAS10.00	71.3 dB
LAS33.30	67.0 dB
LAS50.00	64.2 dB
LAS66.60	61.8 dB
LAS90.00	58.0 dB



Summary

Filename 831_Data.046
 Serial Number 3748
 Model Model 831
 Firmware Version 2.300
 User Shane Parker
 Location Location 4
 Job Description
 Note Olympic and Hill
 Measurement Description
 Start 2017/06/20 11:59:35
 Stop 2017/06/20 12:14:35
 Duration 0:15:00.0
 Run Time 0:15:00.0
 Pause 0:00:00.0
 Pre Calibration 2015/02/12 9:51:33
 Post Calibration None
 Calibration Deviation ---

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRM831
 Microphone Correction Off
 Integration Method Linear
 Gain 0.0 dB
 Overload 143.2 dB
 Under Range Peak A C Z
 75.6 72.6 77.6 dB
 Under Range Limit 26.1 26.4 31.8 dB
 Noise Floor 17.0 17.3 22.4 dB

Results

LAeq 71.0 dB
 LAE 100.5 dB
 EA 1.251 mPa²h
 LApeak (max) 2017/06/20 12:00:04 98.2 dB
 LASmax 2017/06/20 12:10:54 88.2 dB
 LASmin 2017/06/20 12:08:52 61.5 dB
 SEA -99.9 dB
 LAS > 65.0 dB (Exceedence Counts / Duration) 4 888.4 s
 LAS > 85.0 dB (Exceedence Counts / Duration) 1 2.6 s
 LApeak > 135.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 137.0 dB (Exceedence Counts / Duration) 0 0.0 s
 LApeak > 140.0 dB (Exceedence Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-22:00	LNight 22:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-22:00	LNight 22:00-07:00
LCeq	71.0		71.0	-99.9	71.0	71.0	-99.9
LAeq	85.4 dB						
LCeq - LAeq	14.4 dB						
LAleq	72.8 dB						
LAeq	71.0 dB						
LAleq - LAeq	1.8 dB						
# Overloads	0						
Overload Duration	0.0 s						

Statistics

LAS5.00 75.5 dB
 LAS10.00 73.5 dB
 LAS33.30 69.6 dB
 LAS50.00 68.6 dB
 LAS66.60 67.4 dB
 LAS90.00 65.1 dB

Project: Onni-Olympic Hill Project
Date: April 3, 2017
Analyst: Elise Lorenzana

Sensitive Receptor	Distance to Construction (feet)	Construction Noise at 50 feet with Mufflers			
		Ground Clearing	Grading/ Excavation	Foundations	Structural
		82	86	77	83
1	80	77.9	81.9	72.9	78.9
2	90	76.9	80.9	71.9	77.9
3	150	72.5	76.5	67.5	73.5
4	220	69.1	73.1	64.1	70.1
5	250	68.0	72.0	63.0	69.0
6	330	65.6	69.6	60.6	66.6

Noise Levels with Mitigation Measures			
Sensitive Receptor	Distance to Construction (feet)	Exterior Noise Level	Noise Level with Mitigation *
1	80	81.9	76.9
2	90	80.9	75.9
3	150	76.5	71.5
4	220	73.1	68.1
5	250	72.0	67.0
6	330	69.6	64.6

* Mitigation with noise control measures would reduce noise by approximately 5-dBA

Calculations of estimated noise levels were based on Federal Transit Administration, Transit Noise and Vibration Impact Assessment, Final Report, May 2006.

Project: Onni-Olympic Hill Project
Date: April 3, 2017
Analyst: Elise Lorenzana

Sensitive Receptor	Construction Equipment	Distance to Construction (feet)	Vibration Level (VdB) at 25 Feet	Maximum Vibration Levels during Construction *
1	Large bulldozer	80	87	71.85
1	Caisson drilling	80	87	71.85
1	Loaded trucks	80	86	70.85
1	Jackhammer	80	79	63.85
1	Small Bulldozer	80	58	42.85
2	Large bulldozer	90	87	70.31
2	Caisson drilling	90	87	70.31
2	Loaded trucks	90	86	69.31
2	Jackhammer	90	79	62.31
2	Small Bulldozer	90	58	41.31
3	Large bulldozer	150	87	63.66
3	Caisson drilling	150	87	63.66
3	Loaded trucks	150	86	62.66
3	Jackhammer	150	79	55.66
3	Small Bulldozer	150	58	34.66
4	Large bulldozer	220	87	58.67
4	Caisson drilling	220	87	58.67
4	Loaded trucks	220	86	57.67
4	Jackhammer	220	79	50.67
4	Small Bulldozer	220	58	29.67
5	Large bulldozer	250	87	57.00
5	Caisson drilling	250	87	57.00
5	Loaded trucks	250	86	56.00
5	Jackhammer	250	79	49.00
5	Small Bulldozer	250	58	28.00
6	Large bulldozer	330	87	53.38
6	Caisson drilling	330	87	53.38
6	Loaded trucks	330	86	52.38
6	Jackhammer	330	79	45.38
6	Small Bulldozer	330	58	24.38

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

* It should be noted that the peak vibration levels at the nearby sensitive receptors during project construction represents the highest composite vibration level that would be generated periodically during a worst-case construction activity and does not represent continuous vibration levels occurring throughout the construction day or period.

Potential Construction Vibration Calculations

Buildings		Distance to Construction (feet)	PPV at 25 Feet (Inches/Second)	Maximum Vibration Levels during Construction
Mayan Theater	Large bulldozer	1	0.089	3.070
	Caisson drilling	1	0.089	3.070
	Loaded trucks	1	0.076	2.621
	Small Bulldozer	1	0.003	0.103
214-216 W. Olympic Blvd.	Large bulldozer	15	0.089	0.156
	Caisson drilling	15	0.089	0.156
	Loaded trucks	15	0.076	0.133
	Small Bulldozer	15	0.003	0.005
1023-1039 S. Broadway	Large bulldozer	15	0.089	0.156
	Caisson drilling	15	0.089	0.156
	Loaded trucks	15	0.076	0.133
	Small Bulldozer	15	0.003	0.005



OFF-SITE TRAFFIC NOISE LEVELS PEAK HOUR AND CNEL

Project Name: Olympic and Hill
Analyst: Shane Parker
Date: 6/21/17

Background Information

Model Description: FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels.
 Analysis Scenario(s): (1)Existing, (2)Existing with Project, (3)Future without project, and (4)Future with Project
 Source of Traffic Volumes: Olympic & Hill Project Draft Transportation Impact Analysis
 Community Noise Descriptor: L_{dn} : _____ CNEL: X

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Traffic Noise Levels

Analysis Condition		Land Use	Lanes	Median Width	Peak Hour Volume	ADT Volume ¹	Design Speed (mph)	Dist. from Center to Receptor ²	Alpha Factor	Barrier Attn. dB(A)	Vehicle Mix		Peak Hour L_{eq} dB(A)	24-Hour dB(A) CNEL
Roadway Name	Roadway Segment										Medium Trucks	Heavy Trucks		
Existing (2017) Traffic Volumes														
1	Hill Street													
	Between Olympic Blvd. and 11th Street		4	0	1,588	15,880	35	70	0	0	1.8%	0.7%	66.2	65.4
2	Hill Street													
	Between 11th Street and 12th Street		4	0	1,506	15,060	35	70	0	0	1.8%	0.7%	66.0	65.2
3	Hill Street													
	Between Olympic Blvd and 9th Street		4	0	1,566	15,660	35	70	0	0	1.8%	0.7%	66.1	65.4
4	Olympic Boulevard													
	Between Olive Street and Hill Street		5	0	1,801	18,010	35	70	0	0	1.8%	0.7%	66.9	66.1
5	Olympic Boulevard													
	Between Hill Street and Broadway		5	0	1,730	17,300	35	70	0	0	1.8%	0.7%	66.7	65.9
6	11th Street													
	Between Olive Street and Hill Street		3	0	661	6,610	35	70	0	0	1.8%	0.7%	62.3	61.5
7	11th Street													
	Between Hill Street and Broadway		3	0	707	7,070	35	60	0	0	1.8%	0.7%	63.3	62.5
Existing (2017) Plus Project Traffic Volumes														
1	Hill Street													
	Between Olympic Blvd. and 11th Street		4	0	1,744	17,440	35	70	0	0	1.8%	0.7%	66.6	65.8
2	Hill Street													
	Between 11th Street and 12th Street		4	0	1,569	15,690	35	70	0	0	1.8%	0.7%	66.1	65.4
3	Hill Street													
	Between Olympic Blvd and 9th Street		4	0	1,622	16,220	35	70	0	0	1.8%	0.7%	66.3	65.5
4	Olympic Boulevard													
	Between Olive Street and Hill Street		5	0	1,858	18,580	35	70	0	0	1.8%	0.7%	67.0	66.2
5	Olympic Boulevard													
	Between Hill Street and Broadway		5	0	1,814	18,140	35	70	0	0	1.8%	0.7%	66.9	66.1
6	11th Street													
	Between Olive Street and Hill Street		3	0	667	6,670	35	70	0	0	1.8%	0.7%	62.3	61.6
7	11th Street													
	Between Hill Street and Broadway		3	0	703	7,030	35	60	0	0	1.8%	0.7%	63.3	62.5
Future Without Project (2022) Traffic Volumes														
1	Hill Street													
	Between Olympic Blvd. and 11th Street		4	0	2,099	20,990	35	70	0	0	1.8%	0.7%	67.4	66.6
2	Hill Street													
	Between 11th Street and 12th Street		4	0	2,011	20,110	35	70	0	0	1.8%	0.7%	67.2	66.5
3	Hill Street													
	Between Olympic Blvd and 9th Street		4	0	2,251	22,510	35	70	0	0	1.8%	0.7%	67.7	66.9
4	Olympic Boulevard													
	Between Olive Street and Hill Street		5	0	2,362	23,620	35	70	0	0	1.8%	0.7%	68.0	67.3
5	Olympic Boulevard													
	Between Hill Street and Broadway		5	0	2,285	22,850	35	70	0	0	1.8%	0.7%	67.9	67.1
6	11th Street													
	Between Olive Street and Hill Street		3	0	755	7,550	35	70	0	0	1.8%	0.7%	62.9	62.1
7	11th Street													
	Between Hill Street and Broadway		3	0	813	8,130	35	60	0	0	1.8%	0.7%	63.9	63.1
Future With Project (2022) Traffic Volumes														
1	Hill Street													
	Between Olympic Blvd. and 11th Street		4	0	2,255	22,550	35	70	0	0	1.8%	0.7%	67.7	67.0
2	Hill Street													
	Between 11th Street and 12th Street		4	0	2,074	20,740	35	70	0	0	1.8%	0.7%	67.4	66.6
3	Hill Street													
	Between Olympic Blvd and 9th Street		4	0	2,306	23,060	35	70	0	0	1.8%	0.7%	67.8	67.1
4	Olympic Boulevard													
	Between Olive Street and Hill Street		5	0	2,419	24,190	35	70	0	0	1.8%	0.7%	68.1	67.4
5	Olympic Boulevard													
	Between Hill Street and Broadway		5	0	2,373	23,730	35	70	0	0	1.8%	0.7%	68.1	67.3
6	11th Street													
	Between Olive Street and Hill Street		3	0	768	7,680	35	70	0	0	1.8%	0.7%	63.0	62.2
7	11th Street													
	Between Hill Street and Broadway		3	0	844	8,440	35	60	0	0	1.8%	0.7%	64.1	63.3

Existing Baseline (2017) without Project
Traffic Volumes - AM Peak Hour

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic
EXISTING (A.M.)

		98	395	62		
		<	v	>		
SB:	538					
NB:	514	74	^	Int. 1	^	58
	1,052	786	>	total volume	<	591
		92	v	2,688	v	51
		<	^	>		
		31	410	40	481	

INT 8: Hill Street and 11th Street
EXISTING (A.M.)

		64	448	0	512	
		<	v	>		
		0	^	Int. 2	^	33
		0	>	total volume	<	142
		0	v	1,220	v	18
		<	^	>		
		34	481	0	515	

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street
EXISTING (A.M.)

		64	448	0		
		<	v	>		
SB:	466					
NB:	531	0	^	Int. 2	^	33
	997	0	>	total volume	<	142
		0	v	1,220	v	18
		<	^	>		
		34	481	0		

INT 9: Hill Street and 12th Street
EXISTING (A.M.)

		0	413	59		
		<	v	>		
		32	^	Int. 2	^	0
		225	>	total volume	<	0
		29	v	1,355	v	0
		<	^	>		
		0	499	98		

3. Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th
EXISTING (A.M.)

		0	496	134		
		<	v	>		
SB:	565					
NB:	542	67	^	Int. 2	^	0
	1,107	924	>	total volume	<	0
		69	v	2,220	v	0
		<	^	>		
		0	456	74		

INT 7: Hill St and Olympic
EXISTING (A.M.)

		98	395	62		
		<	v	>		
		74	^	Int. 1	^	58
		786	>	total volume	<	591
		92	v	2,688	v	51
		<	^	>		
		31	410	40	481	

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive
EXISTING (A.M.)

		0	0	0		
		<	v	>		
EB:	984					
WB:	744	122	^	Int. 1	^	56
	1,728	915	>	total volume	<	688
		0	v	2,722	v	0
		<	^	>	744	
		116	756	69		

INT 7: Hill St and Olympic
EXISTING (A.M.)

		98	395	62		
		<	v	>		
		74	^	Int. 1	^	58
		786	>	total volume	<	591
		92	v	2,688	v	51
		<	^	>		
		31	410	40		

5. Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic
EXISTING (A.M.)

		98	395	62		
		<	v	>		
EB:	888					
WB:	700	74	^	Int. 1	^	58
	1,588	786	>	total volume	<	591
		92	v	2,688	v	51
		<	^	>	700	
		31	410	40		

INT 11: Olympic Blvd and Broadway
EXISTING (A.M.)

		0	100	240		
		<	v	>		
		60	^	Int. 2	^	44
		777	>	total volume	<	536
		50	v	2,539	v	44
		<	^	>		
		33	606	49		

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street
EXISTING (A.M.)

		0	0	0		
		<	v	>		
EB:	0					
WB:	240	0	^	Int. 1	^	57
	240	0	>	total volume	<	154
		0	v	1,206	v	0
		<	^	>	211	
		108	887	0		

INT 8: Hill Street and 11th Street
EXISTING (A.M.)

		64	448	0		
		<	v	>		
		0	^	Int. 2	^	33
		0	>	total volume	<	142
		0	v	1,220	v	18
		<	^	>		
		34	481	0		

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street
EXISTING (A.M.)

		64	448	0		
		<	v	>		
EB:	0					
WB:	206	0	^	Int. 2	^	33
	206	0	>	total volume	<	142
		0	v	1,220	v	18
		<	^	>	193	
		34	481	0		

INT 12: Broadway and 11th Street
EXISTING (A.M.)

		28	305	0		
		<	v	>		
		0	^	Int. 2	^	12
		0	>	total volume	<	126
		0	v	1,214	v	40
		<	^	>		
		52	651	0		

**Existing Baseline (2017) Without Project
Traffic Volumes - PM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

		INT 7: Hill St and Olympic <u>EXISTING (P.M.)</u>					
		149	841	37			
		v					
SB:	965						
NB:	623	80	Int. 1		84		
	1,588	627	total volume		829		
		53	3,387		71		
		^					
		39	499	78			616

		INT 8: Hill Street and 11th Street <u>EXISTING (P.M.)</u>					
		93	860	0			953
		0	Int. 2		96		
		0	total volume		527		
		0	2,217		73		
		^					
		41	527	0			568

2. Hill Street BT 11th St and 12th St.

		INT 8: Hill Street and 11th Street <u>EXISTING (P.M.)</u>					
		93	860	0			953
SB:	933						
NB:	573	0	Int. 2		96		
	1,506	0	total volume		527		
		0	2,217		73		
		^					
		41	527	0			568

		INT 9: Hill Street and 12th Street <u>EXISTING (P.M.)</u>					
		0	897	53			
		45	Int. 2		0		
		143	total volume		0		
		42	1,787		0		
		^					
		0	528	79			

3. Hill Street BT Olympic and 9th Street

		INT 6: Hill Street and 9th <u>EXISTING (P.M.)</u>					
		0	820	107			
SB:	903						
NB:	663	63	Int. 2		0		
	1,566	1,113	total volume		0		
		83	2,826		0		
		^					
		0	559	81			

		INT 7: Hill St and Olympic <u>EXISTING (P.M.)</u>					
		149	841	37			
		80	Int. 1		84		
		627	total volume		829		
		53	3,387		71		
		^					
		39	499	78			616

4. Olympic Blvd BT Olive and Hill Street

		INT 3: Olympic and Olive <u>EXISTING (P.M.)</u>					
		0	0	0			
EB:	770						
WB:	1,031	108	Int. 1		51		
	1,801	711	total volume		980		
		0	2,885		0		
		^					
		121	855	59			1,031

		INT 7: Hill St and Olympic <u>EXISTING (P.M.)</u>					
		149	841	37			
		80	Int. 1		84		
		627	total volume		829		
		53	3,387		71		
		^					
		39	499	78			616

5. Olympic Blvd BT Hill and Broadway

		INT 7: Hill St and Olympic <u>EXISTING (P.M.)</u>					
		149	841	37			
EB:	746						
WB:	984	80	Int. 1		84		
	1,730	627	total volume		829		
		53	3,387		71		
		^					
		39	499	78			984

		INT 11: Olympic Blvd and Broadway <u>EXISTING (P.M.)</u>					
		0	100	507			
		70	Int. 2		64		
		595	total volume		817		
		81	2,997		85		
		^					
	746	41	552	85			

6. 11th Street BT Olive and Hill Street

		INT 4: Olive and 11th Street <u>EXISTING (P.M.)</u>					
		0	0	0			
EB:	0						
WB:	661	0	Int. 1		135		
	661	0	total volume		525		
		0	1,671		0		
		^					
		137	874	0			660

		INT 8: Hill Street and 11th Street <u>EXISTING (P.M.)</u>					
		93	860	0			953
		0	Int. 2		96		
		0	total volume		527		
		0	2,217		73		
		^					
		41	527	0			568

7. 11th Street BT Hill and Broadway

		INT 8: Hill Street and 11th Street <u>EXISTING (P.M.)</u>					
		93	860	0			953
EB:	0						
WB:	707	0	Int. 2		96		
	707	0	total volume		527		
		0	2,217		73		
		^					
		41	527	0			568

		INT 12: Broadway and 11th Street <u>EXISTING (P.M.)</u>					
		79	607	0			
		0	Int. 2		28		
		0	total volume		548		
		0	2,065		83		
		^					
		80	640	0			

Existing (2017) Plus Project
Traffic Volumes - AM Peak Hour

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic

		98	402	64	
		<	v	>	
SB:	566				
NB:	530	74	Int. 1	68	
	1,096	788	total volume	599	
		101	2,836	63	
		<	^	>	
		58	439	82	579

INT 8: Hill Street and 11th Street

		79	484	0	563
		<	v	>	
		0	Int. 2	37	
		0	total volume	152	
		0	1,299	20	
		<	^	>	
		34	493	0	527

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street

		79	484	0	563
		<	v	>	
SB:	504				
NB:	542	0	Int. 2	37	
	1,046	0	total volume	152	
		0	1,299	20	
		<	^	>	
		34	493	0	527

INT 9: Hill Street and 12th Street

		0	442	68	
		<	v	>	
		36	Int. 2	0	
		225	total volume	0	
		29	1,404	0	
		<	^	>	
		0	506	98	

3. Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th

		0	502	134	
		<	v	>	
SB:	574				
NB:	581	67	Int. 2	0	
	1,155	924	total volume	0	
		72	2,268	0	
		<	^	>	
		0	491	78	

INT 7: Hill St and Olympic

		98	402	64	
		<	v	>	
		74	Int. 1	68	
		788	total volume	599	
		101	2,836	63	
		<	^	>	
		58	439	82	579

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive

		0	0	0	
		<	v	>	
EB:	994				
WB:	778	122	Int. 1	71	
	1,772	924	total volume	707	
		0	2,766	0	
		<	^	>	
		116	756	70	778

INT 7: Hill St and Olympic

		98	402	64	
		<	v	>	
		74	Int. 1	68	
		788	total volume	599	
		101	2,836	63	
		<	^	>	
		58	439	82	579

5. Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic

		98	402	64	
		<	v	>	
EB:	956				
WB:	0	74	Int. 1	68	
	956	788	total volume	599	
		101	2,836	63	
		<	^	>	
		58	439	82	579

INT 11: Olympic Blvd and Broadway

		0	103	240	
		<	v	>	
		74	Int. 2	44	
		811	total volume	543	
		71	2,618	44	
		<	^	>	
	956	33	606	49	

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street

		0	0	0	
		<	v	>	
EB:	0				
WB:	265	0	Int. 1	57	
	265	0	total volume	179	
		0	1,232	0	
		<	^	>	
		108	888	0	236

INT 8: Hill Street and 11th Street

		79	484	0	563
		<	v	>	
		0	Int. 2	37	
		0	total volume	152	
		0	1,299	20	
		<	^	>	
		34	493	0	527

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street

		79	484	0	563
		<	v	>	
EB:	0				
WB:	224	0	Int. 2	37	
	224	0	total volume	152	
		0	1,299	20	
		<	^	>	
		34	493	0	527

INT 12: Broadway and 11th Street

		40	315	0	
		<	v	>	
		0	Int. 2	12	
		0	total volume	130	
		0	1,242	40	
		<	^	>	
		54	651	0	

**Existing (2017) Plus Project
Traffic Volumes - PM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

		INT 7: Hill St and Olympic				INT 8: Hill Street and 11th Street			
SB:	1,062	149	866	46		101	879	0	980
NB:	682	<	v	>	<	<	v	>	
	1,744	80	Int. 1	89	0	Int. 2		112	
		634	total volume	833	0	total volume		532	
		86	3,564	110	0	2,302		74	
		<	^	>	<	<	^	>	
		54	515	102	671	34	570	0	604

2. Hill Street BT 11th St and 12th St.

		INT 8: Hill Street and 11th Street				INT 9: Hill Street and 12th Street			
SB:	953	101	879	0	980	0	913	58	
NB:	616	<	v	>		<	v	>	
	1,569	0	Int. 2	112	0	Int. 2		0	
		0	total volume	532	0	total volume		0	
		0	2,302	74	0	1,851		0	
		<	^	>		<	^	>	
		34	570	0	604	0	555	79	

3. Hill Street BT Olympic and 9th Street

		INT 6: Hill Street and 9th				INT 7: Hill St and Olympic			
SB:	938	0	844	107		149	866	46	
NB:	684	<	v	>		<	v	>	
	1,622	63	Int. 2	0	80	Int. 1		89	
		1,113	total volume	0	634	total volume		833	
		94	2,882	0	86	3,564		110	
		<	^	>		<	^	>	
		0	578	83	671	54	515	102	671

4. Olympic Blvd BT Olive and Hill Street

		INT 3: Olympic and Olive				INT 7: Hill St and Olympic			
EB:	809	0	0	0		149	866	46	
WB:	1,049	<	v	>		<	v	>	
	1,858	108	Int. 1	59	80	Int. 1		89	
		745	total volume	990	634	total volume		833	
		0	2,942	0	86	3,564		110	
		<	^	>		<	^	>	
		121	855	64	1,049	54	515	102	671

5. Olympic Blvd BT Hill and Broadway

		INT 7: Hill St and Olympic				INT 11: Olympic Blvd and Broadway			
EB:	782	149	866	46		0	111	507	
WB:	1,032	<	v	>		<	v	>	
	1,814	80	Int. 1	89	77	Int. 2		64	
		634	total volume	833	613	total volume		844	
		86	3,564	110	92	3,071		85	
		<	^	>		<	^	>	
		54	515	102	1,032	782	41	552	85

6. 11th Street BT Olive and Hill Street

		INT 4: Olive and 11th Street				INT 8: Hill Street and 11th Street			
EB:	0	0	0	0		101	879	0	980
WB:	667	<	v	>		<	v	>	
	667	0	Int. 1	135	0	Int. 2		112	
		0	total volume	539	0	total volume		532	
		0	1,690	0	0	2,302		74	
		<	^	>		<	^	>	
		137	879	0	674	34	570	0	604

7. 11th Street BT Hill and Broadway

		INT 8: Hill Street and 11th Street				INT 12: Broadway and 11th Street			
EB:	0	101	879	0	980	85	612	0	
WB:	703	<	v	>		<	v	>	
	703	0	Int. 2	112	0	Int. 2		28	
		0	total volume	532	0	total volume		564	
		0	2,302	74	0	2,077		83	
		<	^	>		<	^	>	
		34	570	0	604	54	651	0	

**Future (2022) Without Project
Traffic Volumes - AM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic

			136	571	67	
			<	v	>	
SB:	736			Int. 1		78
NB:	690	83	^		^	773
	1,426	936	>	total volume	<	66
		99	v	2,688	v	66
			<	^	>	
			41	559	51	651

INT 8: Hill Street and 11th Street

			90	618	0	708
			<	v	>	
				Int. 2		52
		0	^		^	268
		0	>	total volume	<	27
		0	v	1,220	v	27
			<	^	>	
			56	634	0	690

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street

			90	618	0	708
			<	v	>	
				Int. 2		52
SB:	660	0	^		^	268
NB:	690	0	>	total volume	<	27
	1,350	0	v	1,220	v	27
			<	^	>	
			56	634	0	690

INT 9: Hill Street and 12th Street

			0	581	79	660
			<	v	>	
				Int. 2		0
		46	^		^	0
		274	>	total volume	<	0
		38	v	1,355	v	0
			<	^	>	
			0	630	116	

3.Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th

			0	658	152	810
			<	v	>	
				Int. 2		0
SB:	774	83	^		^	0
NB:	763	1,357	>	total volume	<	0
	1,537	81	v	2,220	v	0
			<	^	>	
			0	638	125	763

INT 7: Hill St and Olympic

			136	571	67	774
			<	v	>	
				Int. 1		78
		83	^		^	773
		936	>	total volume	<	66
		99	v	2,688	v	66
			<	^	>	
			41	559	51	651

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive

			0	0	0	
			<	v	>	
				Int. 1		83
EB:	1,152	148	^		^	893
WB:	1,118	1,073	>	total volume	<	0
	2,270	0	v	2,722	v	0
			<	^	>	976
			214	1,080	79	

INT 7: Hill St and Olympic

			136	571	67	
			<	v	>	
				Int. 1		78
		83	^		^	773
		936	>	total volume	<	66
		99	v	2,688	v	66
			<	^	>	
		1,118				
			41	559	51	481

5.Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic

			136	571	67	
			<	v	>	
				Int. 1		78
EB:	1,078	83	^		^	773
WB:	917	936	>	total volume	<	66
	1,995	99	v	2,688	v	66
			<	^	>	917
			41	559	51	

INT 11: Olympic Blvd and Broadway

			0	110	325	
			<	v	>	
				Int. 2		53
		79	^		^	711
		940	>	total volume	<	53
		59	v	2,539	v	53
			<	^	>	
		1,078				
			39	749	61	

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street

			0	0	0	
			<	v	>	
				Int. 1		66
EB:	0	0	^		^	319
WB:	414	0	>	total volume	<	0
	414	0	v	1,206	v	0
			<	^	>	385
			131	1,299	0	

INT 8: Hill Street and 11th Street

			90	618	0	
			<	v	>	
				Int. 2		52
		0	^		^	268
		0	>	total volume	<	27
		0	v	1,220	v	27
			<	^	>	
			56	634	0	

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street

			90	618	0	
			<	v	>	
				Int. 2		52
EB:	0	0	^		^	268
WB:	360	0	>	total volume	<	27
	360	0	v	1,220	v	27
			<	^	>	347
			56	634	0	

INT 12: Broadway and 11th Street

			30	404	0	
			<	v	>	
				Int. 2		19
		0	^		^	230
		0	>	total volume	<	51
		0	v	1,214	v	51
			<	^	>	
			100	790	0	

**Future (2022) Without Project
Traffic Volumes - PM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic

			179	1,065	43		
			<	v	>		
SB:	1,227			Int. 1			
NB:	872	108	^		^	133	
	2,099	849	>	total volume	<	1,079	
		70	v	2,688	v	92	
			<	^	>		
				51	723	89	863

INT 8: Hill Street and 11th Street

			121	1,093	0		1,214
			<	v	>		
		0	^	Int. 2	^	127	
		0	>	total volume	<	581	
		0	v	1,220	v	95	
			<	^	>		
				53	745	0	798

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street

			121	1,093	0		
			<	v	>		
SB:	1,188			Int. 2			
NB:	823	0	^		^	127	
	2,011	0	>	total volume	<	581	
		0	v	1,220	v	95	
			<	^	>		
				53	745	0	798

INT 9: Hill Street and 12th Street

			0	1,098	78		1,176
			<	v	>		
		82	^	Int. 2	^	0	
		255	>	total volume	<	0	
		59	v	1,355	v	0	
			<	^	>		
				0	741	94	

3. Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th

			0	1,098	119		
			<	v	>		
SB:	1,287			Int. 2			
NB:	964	93	^		^	0	
	2,251	1,597	>	total volume	<	0	
		109	v	2,220	v	0	
			<	^	>		
				0	760	122	882

INT 7: Hill St and Olympic

			179	1,065	43		1,287
			<	v	>		
		108	^	Int. 1	^	133	
		849	>	total volume	<	1,079	
		70	v	2,688	v	92	
			<	^	>		
				51	723	89	481

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive

			0	0	0		
			<	v	>		
EB:	1,037			Int. 1			
WB:	1,325	170	^		^	116	
	2,362	961	>	total volume	<	1,209	
		0	v	2,722	v	0	
			<	^	>		1,325
				219	1,236	76	

INT 7: Hill St and Olympic

			179	1,065	43		
			<	v	>		
		108	^	Int. 1	^	133	
		849	>	total volume	<	1,079	
		70	v	2,688	v	92	
			<	^	>		
				51	723	89	

5. Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic

			179	1,065	43		
			<	v	>		
EB:	981			Int. 1			
WB:	1,304	108	^		^	133	
	2,285	849	>	total volume	<	1,079	
		70	v	2,688	v	92	
			<	^	>		1,304
				51	723	89	

INT 11: Olympic Blvd and Broadway

			0	126	669		
			<	v	>		
		82	^	Int. 2	^	76	
		803	>	total volume	<	1,098	
		88	v	2,539	v	102	
			<	^	>		
				61	726	106	

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street

			0	0	0		
			<	v	>		
EB:	0			Int. 1			
WB:	755	0	^		^	144	
	755	0	>	total volume	<	609	
		0	v	1,206	v	0	
			<	^	>		753
				167	1,348	0	

INT 8: Hill Street and 11th Street

			121	1,093	0		
			<	v	>		
		0	^	Int. 2	^	127	
		0	>	total volume	<	581	
		0	v	1,220	v	95	
			<	^	>		
				53	745	0	

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street

			121	1,093	0		
			<	v	>		
EB:	0			Int. 2			
WB:	813	0	^		^	127	
	813	0	>	total volume	<	581	
		0	v	1,220	v	95	
			<	^	>		803
				53	745	0	

INT 12: Broadway and 11th Street

			87	785	0		
			<	v	>		
		0	^	Int. 2	^	30	
		0	>	total volume	<	578	
		0	v	1,214	v	104	
			<	^	>		
				148	829	0	

**Future (2022) With Project
Traffic Volumes - AM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic

			136	578	69		
			<	v	>		
SB:	764			Int. 1			88
NB:	749	83	^		^		781
	1,513	938	>	total volume	<		78
		108	v	2,688	v		
			<	^	>		
			68	588	93		749

INT 8: Hill Street and 11th Street

			105	654	0		759
			<	v	>		
		0	^	Int. 2	^		56
		0	>	total volume	<		278
		0	v	1,220	v		29
			<	^	>		
			56	646	0		

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street

			105	654	0		
			<	v	>		
SB:	698			Int. 2			56
NB:	702	0	^		^		278
	1,400	0	>	total volume	<		29
		0	v	1,220	v		
			<	^	>		
			56	646	0		702

INT 9: Hill Street and 12th Street

			0	610	88		698
			<	v	>		
		50	^	Int. 2	^		0
		274	>	total volume	<		0
		38	v	1,355	v		0
			<	^	>		
			0	637	116		

3. Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th

			0	664	152		
			<	v	>		
SB:	783			Int. 2			0
NB:	802	83	^		^		0
	1,585	1,357	>	total volume	<		0
		84	v	2,220	v		0
			<	^	>		
			0	673	129		802

INT 7: Hill St and Olympic

			136	578	69		783
			<	v	>		
		83	^	Int. 1	^		88
		938	>	total volume	<		781
		108	v	2,688	v		78
			<	^	>		
			68	588	93		

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive

			0	0	0		
			<	v	>		
EB:	1,162			Int. 1			98
WB:	1,010	148	^		^		912
	2,172	1,082	>	total volume	<		0
		0	v	2,722	v		1,010
			<	^	>		
			214	1,080	80		

INT 7: Hill St and Olympic

			136	578	69		
			<	v	>		
		83	^	Int. 1	^		88
		938	>	total volume	<		781
		108	v	2,688	v		78
			<	^	>		
			68	588	93		

5. Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic

			136	578	69		
			<	v	>		
EB:	1,147			Int. 1			88
WB:	947	83	^		^		781
	2,094	938	>	total volume	<		78
		108	v	2,688	v		947
			<	^	>		
			68	588	93		

INT 11: Olympic Blvd and Broadway

			0	113	325		
			<	v	>		
		93	^	Int. 2	^		53
		974	>	total volume	<		718
		80	v	2,539	v		53
			<	^	>		
			39	749	61		

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street

			0	0	0		
			<	v	>		
EB:	0			Int. 1			66
WB:	439	0	^		^		344
	439	0	>	total volume	<		0
		0	v	1,206	v		410
			<	^	>		
			131	1,300	0		

INT 8: Hill Street and 11th Street

			105	654	0		
			<	v	>		
		0	^	Int. 2	^		56
		0	>	total volume	<		278
		0	v	1,220	v		29
			<	^	>		
			56	646	0		

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street

			105	654	0		
			<	v	>		
EB:	0			Int. 2			56
WB:	378	0	^		^		278
	378	0	>	total volume	<		29
		0	v	1,220	v		363
			<	^	>		
			56	646	0		

INT 12: Broadway and 11th Street

			42	414	0		
			<	v	>		
		0	^	Int. 2	^		19
		0	>	total volume	<		234
		0	v	1,214	v		51
			<	^	>		
			102	790	0		

**Future (2022) With Project
Traffic Volumes - PM Peak Hour**

Street: Roadway Segment

7. Hill Street BT Olympic and 11th Street

INT 7: Hill St and Olympic

		179	1,090	52	
		<	v	>	
SB:	1,324				
NB:	931				
	2,255				
		108	Int. 1	138	
		856	total volume	1,083	
		103	2,688	131	
		<	^	>	
		66	739	113	918

INT 8: Hill Street and 11th Street

		129	1,112	0	1,241
		<	v	>	
		0	Int. 2	143	
		0	total volume	586	
		0	1,220	96	
		<	^	>	
		53	788	0	

2. Hill Street BT 11th St and 12th St.

INT 8: Hill Street and 11th Street

		129	1,112	0	
		<	v	>	
SB:	1,208				
NB:	866				
	2,074				
		0	Int. 2	143	
		0	total volume	586	
		0	1,220	96	
		<	^	>	
		53	788	0	841

INT 9: Hill Street and 12th Street

		0	1,114	83	1,197
		<	v	>	
		98	Int. 2	0	
		255	total volume	0	
		59	1,355	0	
		<	^	>	
		0	768	94	

3. Hill Street BT Olympic and 9th Street

INT 6: Hill Street and 9th

		0	1,122	119	
		<	v	>	
SB:	1,321				
NB:	985				
	2,306				
		93	Int. 2	0	
		1,597	total volume	0	
		120	2,220	0	
		<	^	>	
		0	779	124	903

INT 7: Hill St and Olympic

		179	1,090	52	1,321
		<	v	>	
		108	Int. 1	138	
		856	total volume	1,083	
		103	2,688	131	
		<	^	>	
		66	739	113	

4. Olympic Blvd BT Olive and Hill Street

INT 3: Olympic and Olive

		0	0	0	
		<	v	>	
EB:	1,076				
WB:	1,343				
	2,419				
		170	Int. 1	124	
		995	total volume	1,219	
		0	2,722	0	
		<	^	>	
		219	1,236	81	1,343

INT 7: Hill St and Olympic

		179	1,090	52	
		<	v	>	
		108	Int. 1	138	
		856	total volume	1,083	
		103	2,688	131	
		<	^	>	
		66	739	113	

5. Olympic Blvd BT Hill and Broadway

INT 7: Hill St and Olympic

		179	1,090	52	
		<	v	>	
EB:	1,021				
WB:	1,352				
	2,373				
		108	Int. 1	138	
		856	total volume	1,083	
		103	2,688	131	
		<	^	>	
		66	739	113	1,352

INT 11: Olympic Blvd and Broadway

		0	137	669	
		<	v	>	
		89	Int. 2	76	
		821	total volume	1,125	
		99	2,539	102	
		<	^	>	
		61	726	106	

6. 11th Street BT Olive and Hill Street

INT 4: Olive and 11th Street

		0	0	0	
		<	v	>	
EB:	0				
WB:	768				
	768				
		0	Int. 1	144	
		0	total volume	623	
		0	1,206	0	
		<	^	>	
		167	1,353	0	767

INT 8: Hill Street and 11th Street

		129	1,112	0	
		<	v	>	
		0	Int. 2	143	
		0	total volume	586	
		0	1,220	96	
		<	^	>	
		53	788	0	

7. 11th Street BT Hill and Broadway

INT 8: Hill Street and 11th Street

		129	1,112	0	
		<	v	>	
EB:	0				
WB:	844				
	844				
		0	Int. 2	143	
		0	total volume	586	
		0	1,220	96	
		<	^	>	
		53	788	0	825

INT 12: Broadway and 11th Street

		93	790	0	
		<	v	>	
		0	Int. 2	30	
		0	total volume	594	
		0	1,214	104	
		<	^	>	
		157	829	0	



Stationary Mechanical Equipment Noise Worksheets

Project: Onni- Olympic and Hill Project
Date: January 25, 2018
Analyst: Elise Lorenzana

Sensitive Receptor	Distance to HVAC	HVAC Mechanical Noise		
		Reference Level	Building Attenuation	Noise Level at Receptor
		71		
1	713	47.91	0	47.91
2	715	47.90	0	47.90
3	725	47.78	0	47.78
4	742	39.83	0	39.83
3	752	47.46	-5	42.46
4	782	39.23	-5	34.23

Distances from Rooftop HVAC to Sensitive Receptors

	Distance (x)	Height (y)	Distance
R1	80	709	713
R2	90	709	715
R3	150	709	725
R4	220	709	742
R5	250	709	752
R6	330	709	782

Receptor	Ambient Noise	HVAC Noise Level	Ambient + HVAC Noise
1	73.2	47.91	73.21
2	73.2	47.90	73.21
3	70.6	47.78	70.62
4	73.2	39.83	73.20
5	73.2	42.46	73.20
6	71	34.23	71.00

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, Final Report, May 2006.



Project: Onni - Olympic and Hill Project
Date: January 25, 2018
Re: Crowd Noise Estimates

	50% Male	50% Female	50% of people	Total people
N1:Total	50	50	100	200
N2:5th Level Amenity	50	50	100	200

SPL(Total) = SPL(1) + 10*log(N)	Male	Female	Noise Level
SPL(1)	65	62	
SPL(N1): Total	81.99	78.99	83.75
SPL(N2): 5th Level	81.99	78.99	83.75

Adding Sound Pressure Levels of Male and Female

$$SPL(N1) = 10 \log_{10} (10^{SPL(N1\text{male})/10} + 10^{SPL(N1\text{female})/10})$$

SPL(N1): Avg 83.7540487

$$SPL(N2) = 10 \log_{10} (10^{SPL(N2\text{male})/10} + 10^{SPL(N2\text{female})/10})$$

SPL(N2): Avg 83.7540487

R1 Noise Levels	Distance	Noise Level	Noise Level@ Source	w/ Attenuation
5th Level	80	83.75	79.67	68.67
R2 Noise Levels	Distance	Noise Level	Noise Level@ Source	w/ Attenuation
5th Level	90	83.75	78.65	67.65
R3 Noise Levels	Distance	Noise Level	Noise Level@ Source	w/ Attenuation
5th Level	150	83.75	74.21	63.21
R4 Noise Levels	Distance	Noise Level	Noise Level@ Source	w/ Attenuation
5th Level	220	83.75	70.88	54.88
R5 Noise Levels	Distance	Noise Level	Noise Level@ Source	w/ Attenuation
5th Level	250	83.75	69.77	53.77
R6 Noise Levels	Distance	Noise Level	Noise Level	w/ Attenuation
5th Level	330	83.75	67.36	51.36

Distances from Amenity Deck to Sensitive Receptors

	Dist. (x)	Attenuation
R1	80	11 (glass+tower attenuation)
R2	90	11 (glass+tower attenuation)
R3	150	11 (glass attenuation)
R4	220	16 (building+glass attenuation)
R5	250	16 (building+glass attenuation)
R6	330	16 (building+glass attenuation)

Note: formulas provided by Caltrans Technical Noise Supplement (September 2013)



Composite Noise Levels for Proposed Project

Project: Onni- Olympic and Hill Project

Date: January 25, 2018

Analyst: Elise Lorenzana

Receptor	Ambient	5th Level Amenity Deck	HVAC Equipment	Composite Noise Level	Ambient + Composite	Increase
1	73.2	68.67	47.91	68.71	74.52	1.32
2	73.2	67.65	47.9	67.70	74.28	1.08
3	70.6	63.21	47.78	63.33	71.35	0.75
4	73.2	54.88	39.83	55.01	73.27	0.07
5	73.2	53.77	42.46	54.08	73.25	0.05
6	71	51.36	34.23	51.44	71.05	0.05

Note: formulas provided by Caltrans Technical Noise Supplement (September 2013): adding Sound Pressure Levels