Appendix D

Noise Calculations

Construction Source Noise Prediction Model: Harvest in Tracy

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	5,916	50.0
Residence 1	50	91.5
Residence 2	450	72.4

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Dump Truck	84	1
Dozer	85	1
Excavator	85	1
Backhoe	80	1
Front End Loader	80	1
Scraper	85	1

Ground Type	HARD
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Dump Truck	84.0
Dozer	85.0
Excavator	85.0
Backhoe	80.0
Front End Loader	80.0
Scraper	85.0
Combined Predicted Noise Level (L_{eq} dBA at 50 feet)	
	91.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Traffic Noise Spreadsheet Calculator

Project: **Harvest in Tracy (Operational Noise, Roads)**

Number	Segment Description and Location Name	Existing Conditions	Existing + Project Conditions	Δ Existing – Existing + Project	
Summary of Net Changes					
1	Henley Parkway between Grant Line Road and Bridle Creek Circle	54.4	55.7	1.3	
2	Henley Parkway between W Giovanna Lane and Lowell Avenue	51.1	51.5	0.4	
3	Grant Line Road between Byron Road and Lammers Road	61.5	61.5	0.0	
4	Grant Line Road between Naglee Road and I-205 WB ramps	64.3	64.4	0.1	
5	Grant Line Road between Orchard Parkway and Corral Hollow Road	63.1	63.2	0.1	
6	Corral Hollow Road between W Kavanagh Avenue and Grant Line Road	57.9	57.9	0.0	
7	Corral Hollow Road between Lowell Avenue and Fieldview Drive	64.2	64.2	0.1	
8	Lowell Avenue between Corral Hollow Road and Promenade Circle	56.4	56.4	0.0	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing)

Project: Harvest in Tracy (Operational Noise, Roads)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

Number	Segment Description and Location: Name	From	To	ADT	Speed (mph)	Distance to Directional Centerline, (feet)$_4$: Near	Far	Traffic Distribution Characteristics: % Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)$_{5,6,7}$	Distance to Contour, (feet)$_3$: 70 dBA	65 dBA	60 dBA	55 dBA
Input														**Output**				
Existing Conditions																		
1	Henley Parkway	Grant Line Road	Bridle Creek Circle	4,185	35	88	112	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	54.4	9	20	42	91
2	Henley Parkway	W Giovanna Lane	Lowell Avenue	2,725	30	80	120	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.1	5	12	25	54
3	Grant Line Road	Byron Road	Lammers Road	14,915	40	90	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.5	27	58	125	270
4	Grant Line Road	Naglee Road	I-205 WB ramps	24,295	40	70	130	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.3	40	86	184	397
5	Grant Line Road	Orchard Parkway	Corral Hollow Road	19,360	40	75	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.1	33	72	155	334
6	Corral Hollow Road	W Kavanagh Avenue	Grant Line Road	8,420	35	75	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.9	15	32	70	151
7	Corral Hollow Road	Lowell Avenue	Fieldview Drive	23,510	40	70	130	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.2	39	84	180	389
8	Lowell Avenue	Corral Hollow Road	Promenade Circle	9,225	30	80	120	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.4	12	26	57	122

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing + Project)

Project: Harvest in Tracy (Operational Noise, Roads)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

		Segment Description and Location		Input										Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA)[5,6,7]	70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																		
1	Henley Parkway between Grant Line Road and Bridle Creek Circle			5,610	35	88	112	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	55.7	11	24	51	111
2	Henley Parkway between W Giovanna Lane and Lowell Avenue			2,995	30	80	120	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.5	6	12	27	58
3	Grant Line Road between Byron Road and Lammers Road			15,045	40	90	110	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.5	27	58	126	271
4	Grant Line Road between Naglee Road and I-205 WB ramps			24,965	40	70	130	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.4	40	87	188	405
5	Grant Line Road between Orchard Parkway and Corral Hollow Road			19,800	40	75	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	63.2	34	73	157	339
6	Corral Hollow Road between W Kavanagh Avenue and Grant Line Road			8,450	35	75	125	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.9	15	33	70	151
7	Corral Hollow Road between Lowell Avenue and Fieldview Drive			23,805	40	70	130	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	64.2	39	84	182	392
8	Lowell Avenue between Corral Hollow Road and Promenade Circle			9,240	30	80	120	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.4	12	26	57	122

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Harvest in Tracy (Operational Noise, I-205)**

Number	Segment Description and Location Name	Existing Conditions	Existing + Project Conditions	Δ Existing – Existing + Project	
Summary of Net Changes					
1	I-205: 11th Street to Grant Line Road (Eastbound and Westbound)	77.8	77.8	0.0	
2	I-205: Grant Line Road to Tracy Boulevard (Eastbound and Westbound)	78.1	78.2	0.0	

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing)

Project: Harvest in Tracy (Operational Noise, I-205)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

		Segment Description and Location		Input										Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics							Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)[5,6,7]	70 dBA	65 dBA	60 dBA	55 dBA
Existing Conditions																		
1	I-205: 11th Street to Grant Line Road (Eastbound and Westbound)			90,990	65	50	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	77.8	286	615	1326	2856
2	I-205: Grant Line Road to Tracy Boulevard (Eastbound and Westbound)			99,216	65	50	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	78.1	303	652	1404	3025

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing + Project)

Project: Harvest in Tracy (Operational Noise, I-205)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

		Segment Description and Location		Input										Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA)[5,6,7]	70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																		
1	I-205: 11th Street to Grant Line Road (Eastbound and Westbound)			91,240	65	50	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	77.8	286	616	1328	2861
2	I-205: Grant Line Road to Tracy Boulevard (Eastbound and Westbound)			99,315	65	50	150	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	78.2	303	652	1405	3027

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing + Project)

Project: Harvest in Tracy (Land Use Compatibility, Henley Parkway)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

		Segment Description and Location		Input										Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						Ldn	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																		
1	Henley Parkway between Grant Line Road and Bridle Creek Circle			5,610	35	38	62	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.6	11	25	53	114
2	Henley Parkway between W Giovanna Lane and Lowell Avenue			2,995	30	80	120	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.5	6	12	27	58

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator (Existing + Project)

Project: Harvest in Tracy (Land Use Compatibility, I-205)

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: ADT
Traffic K-Factor:

			Input										Output				
		Segment Description and Location				Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics					Ldn at Property Line, (dBA)[5,6,7]	Distance to Contour, (feet)[3]			
Number	Name	From / To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																	
1	I-205: 11th Street to Grant Line Road (Eastbound and Westbound)		91,240	65	110	215	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	73.2	253	545	1173	2528
2	I-205: Grant Line Road to Tracy Boulevard (Eastbound and Westbound)		99,315	65	110	215	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	73.6	268	576	1242	2675

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Distance Propagation Calculations for Stationary Sources of Ground Vibration: Harvest in Tracy

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.

— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
Trucks	86	@	25	77.0	@	50
Large Dozer	87	@	25	78.0	@	50

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
Trucks	0.076	@	25	0.027	@	50
Large Dozer	0.089	@	25	0.031	@	50

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 12-11 of FTA 2006. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Sources:

Federal Transit Association (FTA). 2006 (May). Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06. Washington, D.C. Available: <http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf>. Accessed: September 24, 2010.