



LSC TRANSPORTATION CONSULTANTS, INC.
2504 East Pikes Peak Avenue, Suite 304
Colorado Springs, CO 80909
(719) 633-2868
FAX (719) 633-5430
E-mail: lsc@lsctrans.com
Website: <http://www.lsctrans.com>

May 12, 2020

Mr. Peter Martz
4 Site Investments, LLC
P.O. Box 50223
Colorado Springs, CO 80949

RE: Grandview Reserve
Noise Impact Study
El Paso County, Colorado
LSC #184841

Dear Mr. Martz:

In response to your request, LSC Transportation Consultants, Inc. has completed a detailed analysis of the noise impacts of US Highway (US) 24 on the residential areas within the proposed Grandview Reserve development. The site is located west of US 24 in the vicinity of the future intersection of Rex Road in El Paso County, Colorado. LSC has completed an evaluation of the noise exposure for submittal to El Paso County and the Colorado Department of Transportation in accordance with the Federal Highway Administration (FHWA) requirements.

LSC used the software program Traffic Noise Model Version 2.5, developed by FHWA, to predict the noise levels at nine key locations on the east side of the development adjacent to US 24. An elevation of five feet was assumed for the height of each receiver. The receiver locations are shown in Figure 1.

The input data for the noise predictions included traffic volumes, roadway geometry, topographic elevations, and the locations of the receivers. The analysis was completed using the projected 2040 afternoon peak-hour traffic volumes taken from the *Grandview Reserve Master Traffic Impact Analysis* by LSC dated April 17, 2020. The roadway geometry assumes the future condition of US 24 with two through lanes in each direction as identified in the *Colorado Department of Transportation US 24 Planning and Environmental Linkages Study Final Corridor Conditions Report* dated December 2016. The noise analysis inputs and outputs are attached.

The results of the noise prediction were compared to the noise abatement criteria contained in Exhibit 1 of the *Colorado Department of Transportation Noise Analysis and Abatement Guidelines* dated January 15, 2015. The proposed residential areas would be considered Category "B" land uses. The threshold for exterior noise level for Category B is 66 decibels Leq(h). The results of the

noise prediction show that in the year 2040, receivers 1, 2, and 3 located on the east boundary of Parcel K would have predicted noise levels which would exceed this threshold. If a six-and-a-half-foot high noise barrier were constructed at the location shown on Figure 1, these noise receiver locations are predicted to be below the threshold. This noise barrier could be a wall, a berm, or a combination of the two. If a wall is constructed, it should be made of a rigid material with a density of at least 4 pounds per square foot and should have no gaps.

Receivers 4 through 9 located on the east boundary of Parcels L, M, and N have predicted noise levels that would **not** exceed 66 decibels Leq(h) and therefore noise mitigation would not be required adjacent to these parcels.

* * * * *

Please contact me if you have any questions or need further assistance.

Respectfully submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

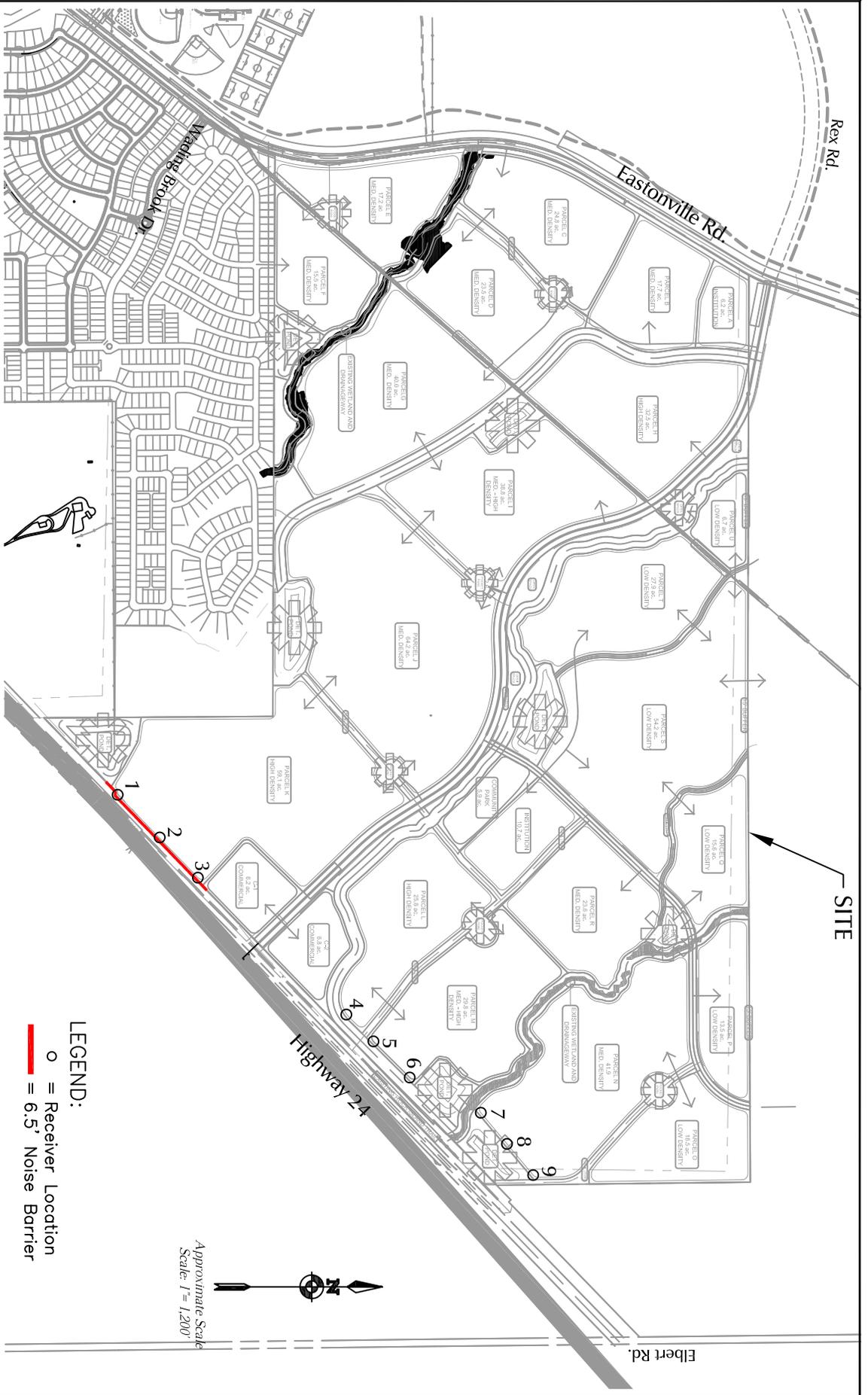
By: Kirstin D. Ferrin, P.E.
Senior Transportation Engineer

KDF:jas

Enclosures: Figure 1
Noise Analysis Inputs/Outputs

Figure 1





LEGEND:
 ○ = Receiver Location
 — = 6.5' Noise Barrier

Approximate Scale
 Scale: 1" = 1,200'

Figure 1

Noise Analysis Data

Grandview Reserve Noise Analysis (LSC #184841)



Noise Analysis Inputs/Outputs



RESULTS: SOUND LEVELS

Grandview Reserve

LSC Transportation Consultants, Inc KDF										12 May 2020 TNM 2.5 Calculated with TNM 2.5			
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		Grandview Reserve											
RUN:		2040 PM Peak Hour											
BARRIER DESIGN:		INPUT HEIGHTS								Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.			
ATMOSPHERICS:		68 deg F, 50% RH											
Receiver													
Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing		With Barrier					
						Calculated	Crit'n	Type Impact	Calculated LAeq1h	Noise Reduction		Calculated minus Goal	
							Sub'l Inc			Calculated	Goal	Goal	
			dB	dB	dB	dB	dB		dB	dB	dB	dB	
Receiver1	1	1	0.0	68.2	66	68.2	10	Snd Lvl	66.0	2.2	8	-5.8	
Receiver2	2	1	0.0	68.9	66	68.9	10	Snd Lvl	64.6	4.3	8	-3.7	
Receiver3	3	1	0.0	69.2	66	69.2	10	Snd Lvl	65.5	3.7	8	-4.3	
Receiver4	4	1	0.0	62.0	66	62.0	10	----	62.0	0.0	8	-8.0	
Receiver5	5	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0	
Receiver6	6	1	0.0	61.5	66	61.5	10	----	61.5	0.0	8	-8.0	
Receiver7	7	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0	
Receiver8	8	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0	
Receiver9	9	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		9	0.0	1.1	4.3								
All Impacted		3	2.2	3.4	4.3								
All that meet NR Goal		0	0.0	0.0	0.0								

INPUT: TRAFFIC FOR LAeq1h Volumes

Grandview Reserve

LSC Transportation Consultants, Inc				12 May 2020									
KDF				TNM 2.5									
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:		Grandview Reserve											
RUN:		2040 PM Peak Hour											
Roadway		Points											
Name		Name		No.		Segment							
						Autos		MTrucks		HTrucks		Buses	
						V S		V S		V S		V S	
						veh/hr mph		veh/hr mph		veh/hr mph		veh/hr mph	
US 24 EB Southwest of Rex Rd		point1		1		2119 65		42 65		62 65		0 0	
		point3		3		2119 65		42 65		62 65		0 0	
		point4		4		2119 65		42 65		62 65		0 0	
		point5		5		2119 65		42 65		62 65		0 0	
		point6		6		2119 65		42 65		62 65		0 0	
		point7		7		2119 65		42 65		62 65		0 0	
		point8		8		2119 65		42 65		62 65		0 0	
		point9		9		2119 65		42 65		62 65		0 0	
		point10		10		2119 65		42 65		62 65		0 0	
		point11		11		2119 65		42 65		62 65		0 0	
		point12		12		2119 65		42 65		62 65		0 0	
		point13		13		2119 65		42 65		62 65		0 0	
		point14		14		2119 65		42 65		62 65		0 0	
		point15		15		2119 65		42 65		62 65		0 0	
		point16		16		2119 65		42 65		62 65		0 0	
		point17		17		2119 65		42 65		62 65		0 0	
		point2		2									
US 24 EB Northeast of Rex Rd		point18		18		1136 65		23 65		33 65		0 0	
		point20		20		1136 65		23 65		33 65		0 0	
		point21		21		1136 65		23 65		33 65		0 0	
		point22		22		1136 65		23 65		33 65		0 0	
		point23		23		1136 65		23 65		33 65		0 0	
		point24		24		1136 65		23 65		33 65		0 0	

INPUT: TRAFFIC FOR LAeq1h Volumes

Grandview Reserve

	point25	25	1136	65	23	65	33	65	0	0	0	0
	point26	26	1136	65	23	65	33	65	0	0	0	0
	point27	27	1136	65	23	65	33	65	0	0	0	0
	point28	28	1136	65	23	65	33	65	0	0	0	0
	point29	29	1136	65	23	65	33	65	0	0	0	0
	point30	30	1136	65	23	65	33	65	0	0	0	0
	point19	19										
US 24 WB Northeast of Rex Rd	point31	31	1086	65	22	65	32	65	0	0	0	0
	point33	33	1086	65	22	65	32	65	0	0	0	0
	point34	34	1086	65	22	65	32	65	0	0	0	0
	point35	35	1086	65	22	65	32	65	0	0	0	0
	point36	36	1086	65	22	65	32	65	0	0	0	0
	point37	37	1086	65	22	65	32	65	0	0	0	0
	point38	38	1086	65	22	65	32	65	0	0	0	0
	point39	39	1086	65	22	65	32	65	0	0	0	0
	point40	40	1086	65	22	65	32	65	0	0	0	0
	point41	41	1086	65	22	65	32	65	0	0	0	0
	point42	42	1086	65	22	65	32	65	0	0	0	0
	point43	43	1086	65	22	65	32	65	0	0	0	0
	point32	32										
US 24 WB Southwest of Rex Rd	point44	44	1665	65	33	65	49	65	0	0	0	0
	point47	47	1665	65	33	65	49	65	0	0	0	0
	point48	48	1665	65	33	65	49	65	0	0	0	0
	point49	49	1665	65	33	65	49	65	0	0	0	0
	point50	50	1665	65	33	65	49	65	0	0	0	0
	point51	51	1665	65	33	65	49	65	0	0	0	0
	point52	52	1665	65	33	65	49	65	0	0	0	0
	point53	53	1665	65	33	65	49	65	0	0	0	0
	point54	54	1665	65	33	65	49	65	0	0	0	0
	point55	55	1665	65	33	65	49	65	0	0	0	0
	point56	56	1665	65	33	65	49	65	0	0	0	0
	point57	57	1665	65	33	65	49	65	0	0	0	0
	point58	58	1665	65	33	0	49	65	0	0	0	0
	point59	59	1665	65	33	65	49	65	0	0	0	0
	point60	60	1665	65	33	65	49	65	0	0	0	0
	point61	61	1665	65	33	65	49	65	0	0	0	0

INPUT: ROADWAYS

Grandview Reserve

		point27	27	3,272,296.8	1,419,642.6	6,865.00				Average
		point28	28	3,272,393.0	1,419,735.8	6,864.00				Average
		point29	29	3,272,914.8	1,420,241.0	6,864.00				Average
		point30	30	3,273,166.5	1,420,484.6	6,865.00				Average
		point19	19	3,274,763.8	1,422,030.8	6,871.00				
US 24 WB Northeast of Rex Rd	24.0	point31	31	3,274,722.0	1,422,073.9	6,871.00				Average
		point33	33	3,273,171.8	1,420,573.2	6,865.00				Average
		point34	34	3,272,886.5	1,420,297.0	6,864.00				Average
		point35	35	3,272,349.8	1,419,777.6	6,864.00				Average
		point36	36	3,272,255.5	1,419,686.1	6,865.00				Average
		point37	37	3,272,183.0	1,419,616.0	6,866.00				Average
		point38	38	3,272,118.5	1,419,553.6	6,867.00				Average
		point39	39	3,272,069.5	1,419,506.2	6,868.00				Average
		point40	40	3,272,007.8	1,419,446.4	6,869.00				Average
		point41	41	3,271,915.2	1,419,356.8	6,870.00				Average
		point42	42	3,271,872.0	1,419,315.0	6,870.00				Average
		point43	43	3,271,739.5	1,419,186.6	6,869.00				Average
		point32	32	3,271,505.2	1,418,960.0	6,869.00				
US 24 WB Southwest of Rex Rd	24.0	point44	44	3,271,496.8	1,418,951.8	6,869.00	Signal	0.00	50	Average
		point47	47	3,271,313.2	1,418,774.1	6,869.00				Average
		point48	48	3,271,214.2	1,418,678.2	6,870.00				Average
		point49	49	3,271,118.0	1,418,585.1	6,871.00				Average
		point50	50	3,271,017.5	1,418,487.8	6,872.00				Average
		point51	51	3,270,883.8	1,418,358.2	6,873.00				Average
		point52	52	3,270,814.5	1,418,291.4	6,874.00				Average
		point53	53	3,270,806.5	1,418,283.4	6,874.00				Average
		point54	54	3,270,727.2	1,418,207.1	6,875.00				Average
		point55	55	3,270,642.0	1,418,124.1	6,876.00				Average
		point56	56	3,270,513.0	1,417,999.5	6,877.00				Average
		point57	57	3,270,406.0	1,417,895.9	6,877.00				Average
		point58	58	3,270,226.5	1,417,722.1	6,876.00				Average
		point59	59	3,269,950.8	1,417,455.1	6,875.00				Average
		point60	60	3,269,900.2	1,417,406.2	6,875.00				Average
		point61	61	3,269,492.8	1,417,011.8	6,876.00				Average
		point45	45	3,269,333.0	1,416,857.1	6,876.00				

INPUT: BARRIERS

Grandview Reserve

LSC Transportation Consultants, Inc	12 May 2020
KDF	TNM 2.5

INPUT: BARRIERS

PROJECT/CONTRACT: Grandview Reserve
 RUN: 2040 PM Peak Hour

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	\$ per	\$ per	Top	Run:Rise	\$ per			X	Y	Z	at	Seg	Ht	Perturbs	On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft			ft	ft	ft	ft	ft				tions?
Barrier1	W	0.00	99.99	0.00				0.00	point1	1	3,270,064.2	1,417,766.8	6,875.00	6.50	6.50	1	1		
									point3	3	3,270,085.0	1,417,787.0	6,876.00	6.50	6.50	1	1		
									point4	4	3,270,145.0	1,417,845.1	6,876.00	6.50	6.50	1	1		
									point5	5	3,270,181.2	1,417,845.1	6,876.00	6.50	6.50	1	1		
									point6	6	3,270,243.8	1,417,905.9	6,876.00	6.50	6.50	1	1		
									point7	7	3,270,328.2	1,417,987.8	6,876.00	6.50	6.50	1	1		
									point8	8	3,270,424.5	1,418,080.8	6,876.00	6.50	6.50	1	1		
									point9	9	3,270,473.0	1,418,127.8	6,875.00	6.50	6.50	1	1		
									point10	10	3,270,533.0	1,418,185.9	6,875.00	6.50	6.50	1	1		
									point11	11	3,270,555.5	1,418,207.4	6,876.00	6.50	6.50	1	1		
									point12	12	3,270,634.0	1,418,283.8	6,876.00	6.50	6.50	1	1		
									point13	13	3,270,664.5	1,418,313.0	6,875.00	6.50	6.50	1	1		
									point14	14	3,270,700.8	1,418,348.2	6,874.00	6.50	6.50	1	1		
									point15	15	3,270,753.2	1,418,399.0	6,873.00	6.50	6.50	1	1		
									point16	16	3,270,807.2	1,418,451.4	6,872.00	6.50	6.50	1	1		
									point17	17	3,270,844.5	1,418,487.2	6,871.00	6.50	6.50	1	1		
									point18	18	3,270,892.8	1,418,534.1	6,871.00	6.50	6.50	1	1		
									point19	19	3,270,915.2	1,418,555.8	6,872.00	6.50	6.50	1	1		
									point2	2	3,270,971.0	1,418,609.8	6,873.00	6.50					