FINAL
NOISE STUDY REPORT

For

US 301 (SR 43) Project Development and Environment (PD&E) Study
From Falkenburg Road to Causeway Boulevard
WPI SEG. NO.: 421140-6
Hillsborough County

August 2008

Prepared for:

Hillsborough County

In Cooperation With

Florida Department of Transportation – District 7

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EXECUTIVE SUMMARY

The following Noise Study Report was prepared as part of a State Environmental Impact Report (SEIR) for the widening of US Highway 301 in Hillsborough County from Falkenburg Road to East Causeway Boulevard. The project involves widening to the outside of the existing 4-lane divided rural section to a 6-lane divided rural section for the nearly 3,850-foot-long segment. The 2030 Build Alternative along with the 2030 No-Build Alternative was studied to determine traffic noise level changes.

Development along the east side of the road consists of commercial and industrial facilities. Along the west side of the road, the southern portion is undeveloped lands and the northern area is comprised of multi-family residential, which is the only noise sensitive area within the study limits. A total of 121 noise sensitive receivers were identified through the entire corridor, all of which are comprised within the Windermere Apartment complex.

A traffic noise analysis was performed in the exterior areas of frequent human use. The noise increases for the sensitive areas that are nearest US Highway 301 ranged from 2.5 to 3.4 dBA, which yields sound levels that range from 56.3 to 65.1 dBA. As such, exterior noise sensitive receivers are not expected to approach or exceed the Florida Department of Transportation (FDOT) Noise Abatement Criteria (NAC).

Noting that the Windermere Apartments are not equipped with open balconies, an interior noise analysis was performed to further assess the potential for traffic noise level changes. Receivers were modeled at the buildings and the sound levels were adjusted using a noise reduction method defined by the Department of Housing and Urban Development (HUD). The type of construction used for the apartment buildings produces a noise reduction of 26 dBA for walls with windows. Per the FDOT NAC, interior noise levels at 51 dBA or above are considered affected. None of the interior levels were predicted to exceed 51 dBA, indicating that the roadway improvements will not generate noise level changes that warrant abatement consideration.

1.0 INTRODUCTION

Maintenance and/or improvement of the level of service (LOS) for US Highway 301 between Falkenburg Road and Causeway Boulevard is required by Hillsborough County as part of the proposed developments. The project is located in an urbanized area of Hillsborough County and the existing roadway section currently operates at an unacceptable LOS along this stretch of US Highway 301. This roadway improvement will increase the capacity of US Highway 301 for the planned and approved developments in southern Hillsborough County. Additionally, the project will provide Hillsborough County with a consistent roadway cross section that will match the existing cross sections of US Highway 301 north of Causeway Boulevard and south of Falkenburg Road.

US Highway 301 is considered a commercial truck route and the addition of residential traffic would further decrease the existing LOS. The project will help alleviate some conflicts between truck traffic and new residential traffic by the addition of travel lanes.

A Project Location map is provided as *Figure 1-1*.

1.1 Existing Facility

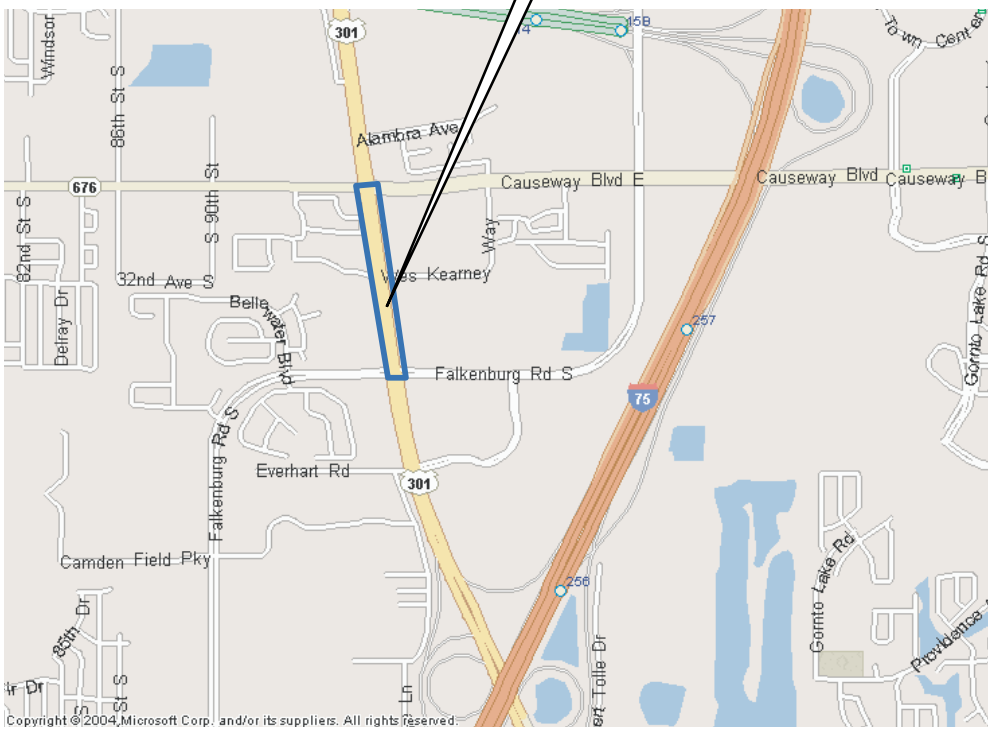
Within the limits of the project study, US Highway 301 is a rural, four-lane, divided, minor arterial that extends due north for approximately 3,850 feet from just south of the Falkenburg Road intersection and ends just north of the Causeway Boulevard intersection (see *Figures 1-2* and *1-3*).

The study includes an analysis of widening US Highway 301 from the Falkenburg Road intersection to the Causeway Boulevard intersection.

1.2 Proposed Improvements

The US Highway 301 improvements are being reviewed as a rural, six-lane divided facility through the extents of the project limits with the necessary transitions at either end. The right-of-way width that is being analyzed ranges from 200 to 249 feet with no additional acquisition.

The current land use along the corridor consists of multi-family residential and commercial. The southern half of the corridor is flanked by undisturbed lands. The Hillsborough County Land Use map of the study area is illustrated in *Figures 1-4* and *1-5*.



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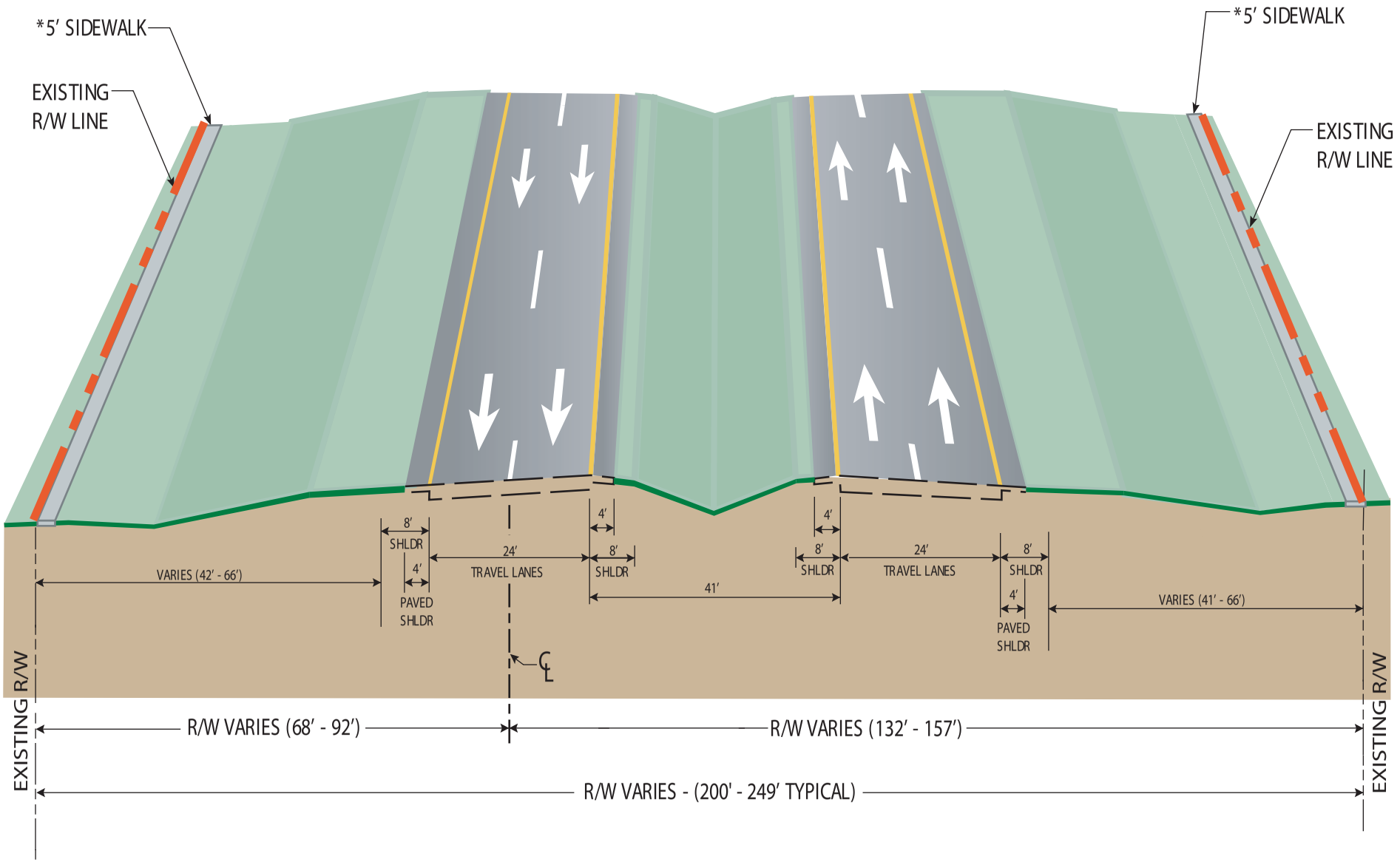
PROJECT LOCATION MAP

US 301 Falkenburg Road to Causeway Blvd.
WPI Seg. No. 421140-6
Hillsborough County

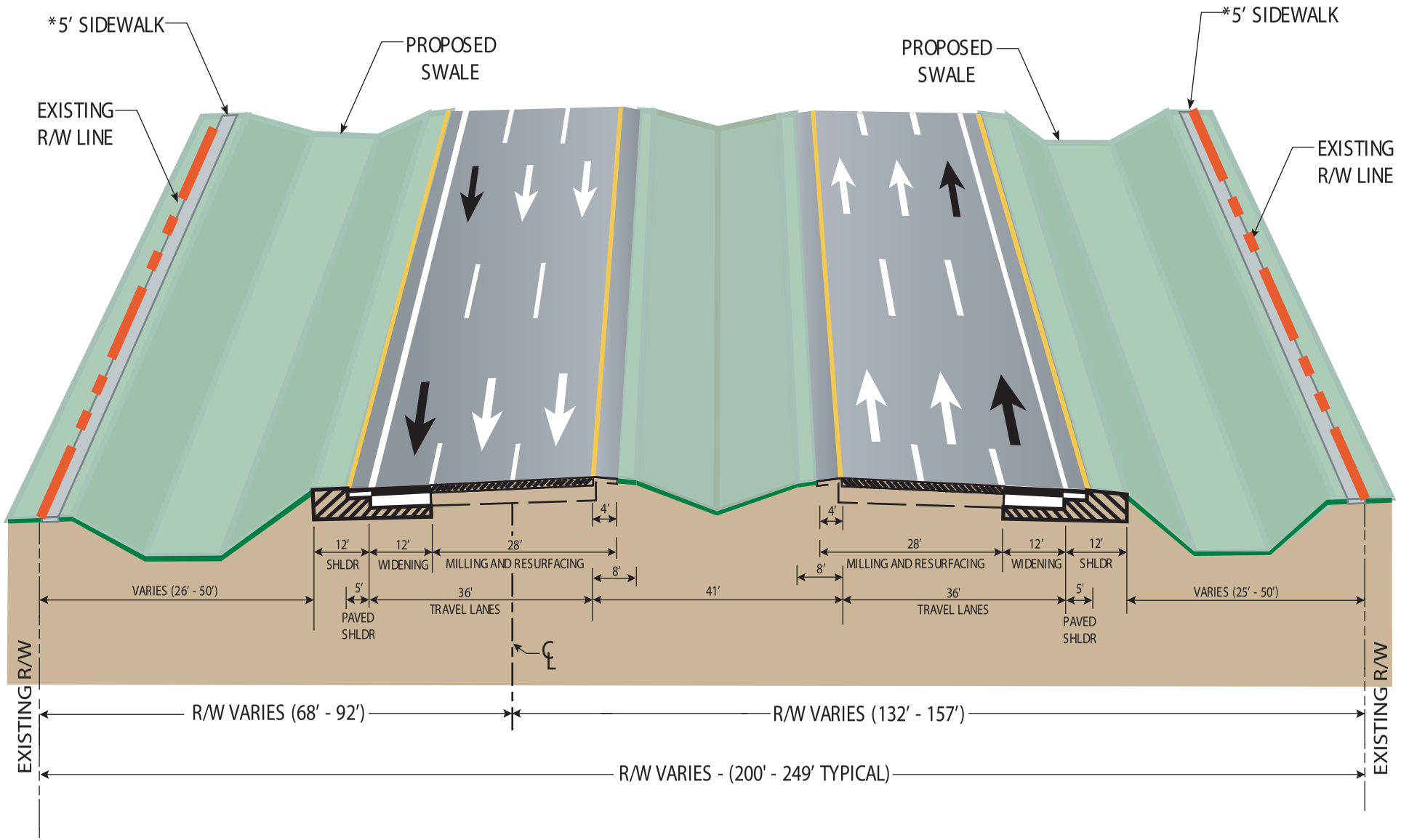
SCALE:	PROJ. NO.:	DATE:	FIGURE:
NTS	048805007	April 2008	1-1



* Existing sidewalk is from
Wes Kearney Way to Causeway Blvd.

EXISTING TYPICAL SECTION (4 TO 6 LANES)
US 301 (SR 43)
FROM FALKENBURG RD TO CAUSEWAY BLVD
WPI Seg. No. 421140-6

FIGURE 1-2



* Proposed sidewalk from Falkenburg Rd. to Wes Kearney Way

LEGEND

EXISTING ROADWAY

PROPOSED ROADWAY

PROPOSED TYPICAL SECTION (4 TO 6 LANES)
US 301 (SR 43)
FROM FALKENBURG RD TO CAUSEWAY BLVD

WPI Seg. No. 421140-6

FIGURE 1-3

HILLSBOROUGH COUNTY ZONING

PD Zoning District Designation
Zoning District
Designated Historic Resource
Significant Wildlife Habitat
Surface Water Protection Area
Wellhead Protection Areas
Zone 1
Zone 2
Potable Water Well Buffer

29-20-31

Figure 1-4

Hillsborough County Land Use Map

US 301 Falkenburg Road to Causeway Blvd.

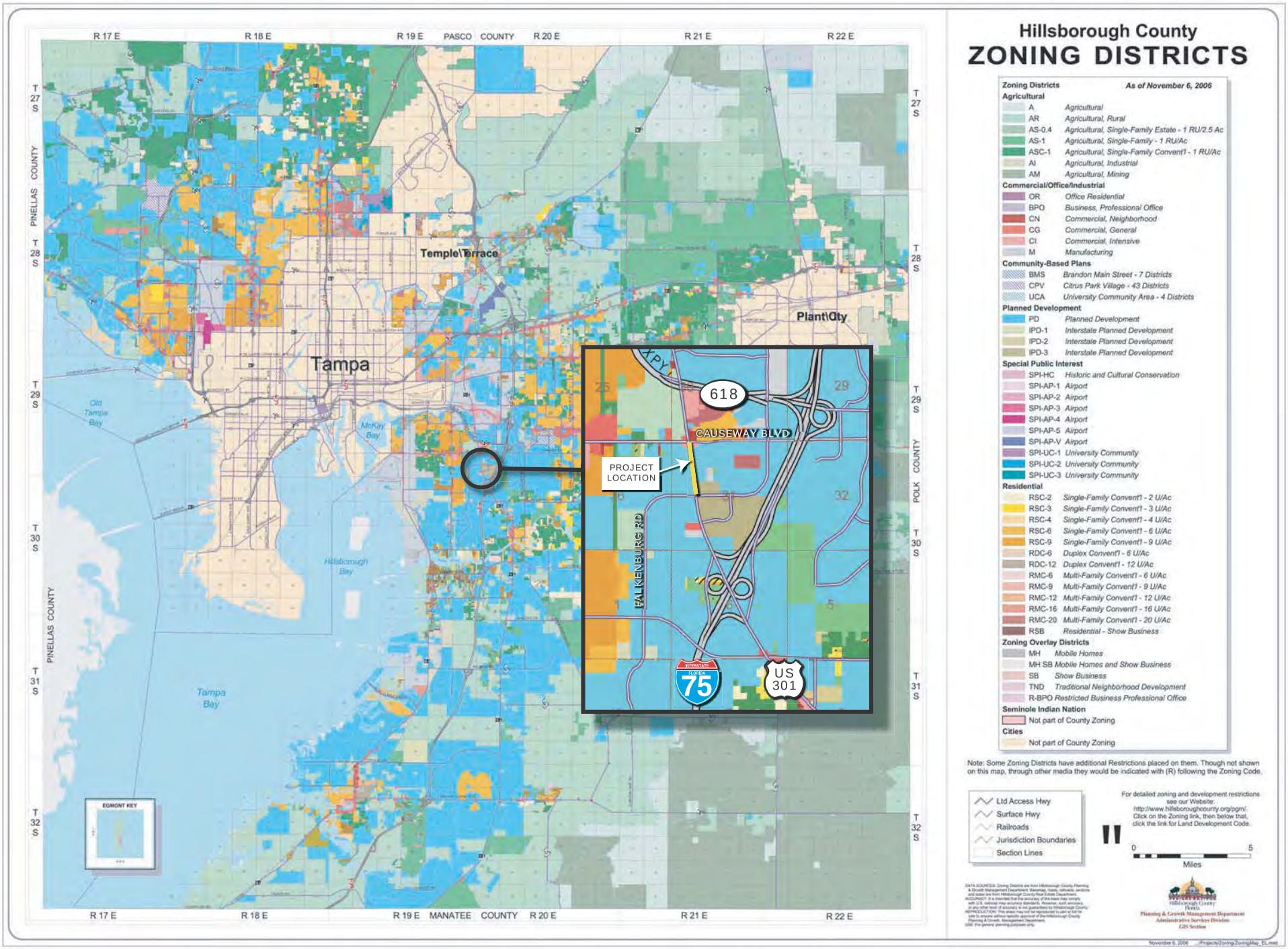
WPI Seg. No. 421140-6

Hillsborough County Florida
Planning & Growth Management Department
Administrative Services Division

N. T. S.

N
W
E
S

Zoning: February 24, 2006
Aerial Photography: January, 2004



US 301 Falkenburg Road to Causeway Blvd.
WPI Seg. No. 421140-6
Hillsborough County

Figure 1-5
Project Area Land Use Map

2.0 TRAFFIC NOISE ANALYSIS

2.1 Noise Sensitive Areas

The traffic noise analysis for this project was conducted in accordance with Florida Statute 335.17, and Chapter 17 of the *Florida Department of Transportation (FDOT) PD&E Manual*, Part 2. The analysis included the following tasks:

- Identifying existing land use and noise sensitive areas.
- Collecting field measurements of existing noise levels to validate computer model (TNM 2.5).
- Establishing the existing topography, terrain features, and condition development within the model.
- Running the TNM model for the existing and proposed conditions, and comparing the TNM results with the noise abatement criteria.
- Examining and evaluating noise abatement measures.
- Evaluating barrier effectiveness using the TNM computer model should abatement be necessary.

The FDOT has five categories of activity for use in noise-level analyses. Maximum noise-level thresholds have been established for four of these activities. These maximum thresholds, or criteria levels, represent the upper limit of acceptable traffic noise-level conditions. The levels are presented in *Table 2-1* and apply only to noise-sensitive sites and areas of regular human use where lowered noise levels are desirable.

TABLE 2-1 NOISE ABATEMENT CRITERIA

Hourly A-Weighted Sound Levels (dBA)

Category	Abatement Level (L_{Aeq}) (FHWA)	(FDOT)	Description
A	57	56 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B	67	66 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals
C	72	71 (Exterior)	Developed lands, properties, or activities not included in Category A or B above
D	---	---	Undeveloped lands
E	52	51 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: FDOT PD&E Manual, Part 2, Chapter 17 (Based on Table 1 of 23CFR Part 772)

The Federal Highway Administration (FHWA) requires that noise abatement measures be considered when levels approach or exceed the Noise Abatement Criteria (NAC). FDOT defines the word "approach" to mean within 1 dBA of the appropriate FHWA NAC. Therefore, the FDOT upper limit of acceptable noise levels is set at 66 dBA for Activity Category B, which is represented in *Table 2-1*.

Noise sensitive receptors for this study were identified as multi-family residences located along the northwest area of the study corridor. Within the eastern limits of the Windermere Apartment complex, 121 individual units were identified as potential noise sensitive receptors. When units were located at the same relative offset from the roadway, they were grouped together. In other words, one computer modeled receiver may be representative of a number of individual noise sensitive locations. Based on the manner in which these receivers were situated in relation to the corridor, 4 receivers were included in the TNM computer model to represent the exterior areas and 21 receivers were used to model the interior locations of the first, second, and third floors. *Figures 2-1A* and *2-1B* illustrate the locations of the modeled noise sensitive receivers.

2.2 Measured Noise Levels

Noise levels in this report are expressed in dBA, LAeq1h. The decibel is often modified by frequency-weighting curves (A, B, C, or D). Vehicle noise levels are commonly modified by the A-weighting curve, which emphasizes the effect of high frequency noise and reduces the effect of low frequency noise.

This curve correlates well with human response to noise, particularly in describing annoyances caused by traffic and aircraft noise. Sound levels utilizing the A-weighting curve are expressed in dBA. Sound pressure levels in this report are referred to as Leq (h).

The hourly Leq, or equivalent sound level, is the equivalent steady-state sound level, which in an hour contains the same acoustic energy as the time-varying sound level during the same time period. In other words, the fluctuating sound levels of traffic noise are represented in terms of a steady noise level with the same energy content.

A field study was conducted on November 17, 2006 to establish ambient noise conditions. The field monitoring was performed at three different locations along the project limits. The noise level monitoring was conducted using a calibrated Norsonic Integrating-Averaging Sound Level Meter, type 118 (Serial #31360), in accordance with the FHWA guidelines contained in *Measurement of Highway Related Noise*, *1996*. The A-weighted frequency was used to determine ambient noise levels. *Table 2-2* displays the ambient reading for each field-monitoring site. See *Figures 2-1A* and *2-1B* for the locations of the field monitoring sites.

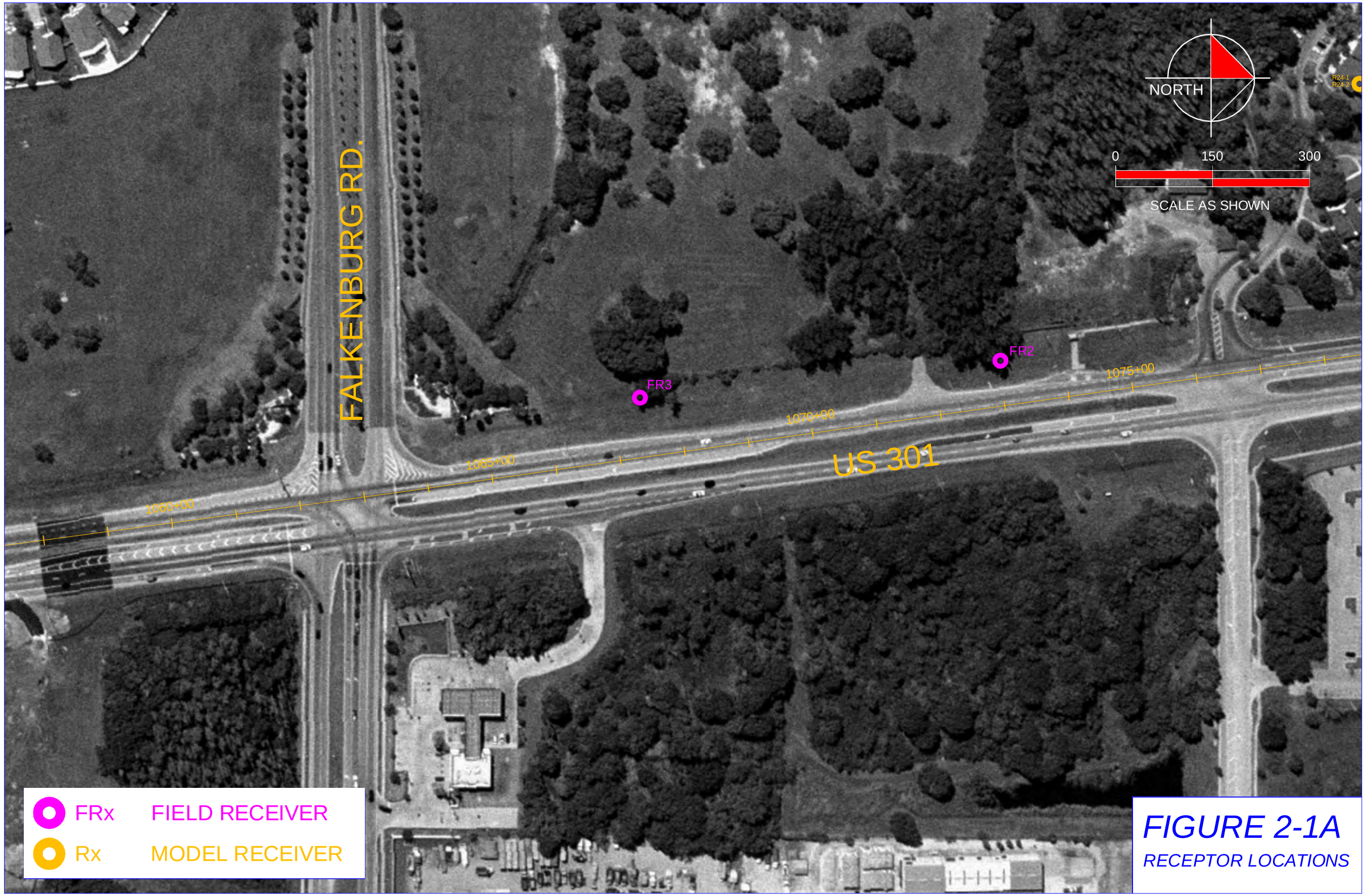


FIGURE 2-1A
RECEPTOR LOCATIONS


Windermere Apartments
NORTH
0
150
300
SCALE AS SHOWN
R1
R2
R3
R4
R6-1
R6-2
R6-3
R8-1
R8-2
R8-3
R9-1
R9-2
R9-3
R10-1
R10-2
R10-3
R11-1
R11-2
R11-3
R12-1
R12-2
R12-3
R13-1
R13-2
R13-3
R14-1
R14-2
R14-3
R15-1
R15-2
R15-3
R16-1
R16-2
R16-3
R17-1
R17-2
R17-3
R17A-1
R17A-2
R17A-3
R17B-1
R17B-2
R17B-3
R18-1
R18-2
R18-3
R19-1
R19-2
R19-3
R20-1
R20-2
R20-3
R21-1
R21-2
R21-3
R22-1
R22-2
R22-3
R23-1
R23-2
R23-3
R24-1
R24-2
R25-1
R25-2
R25-3
1075+00
1080+00
1085+00
1090+00
1095+00
US 301
FR1
EAST CAUSEWAY BLVD.
Legacy Park
Receivers R1 through R4 were analyzed as exterior locations of frequent human use. Receivers R5 through R25 were analyzed as interior receivers, with the respective floor level indicated with 1, 2 or 3.
FRx FIELD RECEIVER
Rx MODEL RECEIVER
FIGURE 2-1B
RECEPTOR LOCATIONS

TABLE 2-2 FIELD STUDY AMBIENT SOUND LEVELS		
Monitoring Location		**Ambient Sound Level (dBA)**
FR 1 (STA 1084+54, 130'RT)	AM	67.9
	PM	66.6
FR 2 (STA 1073+04, 70'LT)	AM	67.9
	PM	69.3
FR 3 (STA 1067+43, 92'LT)	AM	66.4
	PM	67.0

To determine whether computer predicted noise levels are representative of actual ambient (existing) noise levels along the US Highway 301 corridor, the applicable field readings are compared to computer predicted levels utilizing similar input data to replicate the field conditions. Three monitoring sites were used for comparison.

The FHWA TNM 2.5 Traffic Noise Prediction Model was used to generate all computer modeled noise levels. The TNM program estimates the acoustic intensity impacting a noise sensitive site from a noise source (i.e., roadway). Model-defined noise levels are affected by the characteristics of the source-to-receiver path, including the effects of structures, ground surface type, and topography. Input parameters obtained at applicable monitoring sites for the TNM models included information such as number of cars, medium trucks, and heavy trucks; traffic speeds; community noises; general topographic data; and existing physical features (i.e., walls, berms, water bodies, etc.). *Table 2-3* presents the hourly traffic data obtained during the field investigation.

TABLE 2-3 FIELD TRAFFIC DATA US 301 TRAFFIC VOLUMES (HOURLY)				
Monitoring Location	**Autos (NB/SB)**	**Medium Trucks (NB/SB)**	**Heavy Trucks (NB/SB)**	**Average Measured Speed(mph)**
FR 1 (STA 1084+54, 130′RT)				
AM	1758/870	42/60	48/36	35
PM	852/1620	42/6	56/12	35
FR 2 (STA 1073+04, 70′LT)				
AM	1686/678	6/78	24/108	40
PM	828/1860	78/48	30/36	40
FR 3 (STA 1067+43, 92′LT)				
AM	1248/744	12/84	56/66	40
PM	894/2214	36/24	60/36	40

The TNM model was validated by comparing the field-measured levels to the computer-modeled levels. If the field measurements and computer model predictions are within 3 dBA, the model is considered to be within an acceptable range of accuracy. As shown in *Table 2-4*, the noise levels are within the acceptable 3-dBA tolerance range at the three monitoring sites.

TABLE 2-4 FIELD VERSUS COMPUTER VALIDATION LEVELS (dBA)				
Receptor ID/Site Location		**Field Measurements**	**Computer Model Prediction**	**Difference**
FR 1 (STA 1084+54, 130'RT)	AM	67.9	70.6	2.7
	PM	66.6	69.4	2.8
FR 2 (STA 1073+04, 70'LT)	AM	67.9	67.8	-0.1
	PM	69.3	67.2	-0.7
FR 3 (STA 1067+43, 92'LT)	AM	66.4	66.6	0.2
	PM	67.0	67.0	0.0

2.3 Predicted Noise Levels

The models that were prepared for this noise study included the 2007 Existing Condition, a 2030 No-Build Condition, and the 2030 Build Condition. Topographic survey, field investigation and aerial photometrics (1″=100′) were utilized to produce an accurate model of the existing and future input parameters. Future and existing traffic for the roadways within the project corridor were obtained from the *Traffic Technical Memorandum*. Noise levels are directly correlated to the volume, type, and speed of the vehicles. Therefore, the peak directional volumes were used to capture a worst-case scenario, along with a posted speed of 50 miles per hour.

The traffic volume projection factors utilized for the Existing Condition are: K_{30}=9.41%; D_{30}=55.29%; T_{24}=8.99%. The traffic volume projection factors utilized for the 2030 No-Build and 2030 Build Conditions are: K_{30}=9.37%; D_{30}=56.14%; T_{24}=8.51%. Projected traffic volumes from the traffic memorandum were compared to the FDOT criteria for Level of Service C (LOS C) for the respective facilities. In instances where the projected traffic volumes were shown to exceed the LOS C volumes specified in the *2002 FDOT Quality/Level of Service Handbook*, the FDOT-specified LOS C volumes were utilized. This method of determining modeled traffic ensures that the facility is carrying the maximum volume of vehicles at the highest rate of flow, thus creating a worst-case scenario for traffic noise. P.M. design hour traffic volumes used for the existing, no-build and proposed scenarios are included in *Table 2-5*. Volumes shown in italics are based on the demand traffic, wherein the other volumes were obtained from the LOS C tables.

TABLE 2-5 P.M. PEAK-HOUR TRAFFIC VOLUMES				
Roadway Segment	**Condition**	**Autos**	**Medium Trucks**	**Heavy Trucks**
NB US 301 -South of Falkenburg Rd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
SB US 301 -South of Falkenburg Rd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
NB US 301 -North of Falkenburg Rd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
SB US 301 -North of Falkenburg Rd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
NB US 301 -North of Causeway Blvd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
SB US 301 -North of Causeway Blvd.	Existing	1104	45	85
	No-Build	1104	45	85
	Proposed	1713	70	132
EB Falkenburg Rd. - West of US 301	Existing	*475*	*19*	*37*
	No-Build	*767*	*31*	*59*
	Proposed	*767*	*31*	*59*
WB Falkenburg Rd. - West of US 301	Existing	*475*	*19*	*37*
	No-Build	*767*	*31*	*59*
	Proposed	*767*	*31*	*59*
EB Falkenburg Rd. - East of US 301	Existing	*513*	*21*	*40*
	No-Build	*829*	*34*	*64*
	Proposed	*829*	*34*	*64*
WB Falkenburg Rd. - East of US 301	Existing	*513*	*21*	*40*
	No-Build	*829*	*34*	*64*
	Proposed	*829*	*34*	*64*
EB Causeway Blvd. - West of US 301	Existing	*983*	*41*	*76*
	No-Build	1475	61	114
	Proposed	1475	61	114
WB Causeway Blvd. - West of US 301	Existing	*983*	*41*	*76*
	No-Build	1475	61	114
	Proposed	1475	61	114
EB Causeway Blvd. - East of US 301	Existing	*1182*	*49*	*92*
	No-Build	*1910*	*79*	*148*
	Proposed	*1910*	*79*	*148*
WB Causeway Blvd. - East of US 301	Existing	*1182*	*49*	*92*
	No-Build	*1910*	*79*	*148*
	Proposed	*1910*	*79*	*148*

Supplementary to the receiver locations illustrated in *Figures 2-1A* and *2-1B*, *Table 2-6* identifies the location of each receiver by station and offset, referenced to the baseline of the project study. *Table 2-6* also provides the number of dwelling units represented by each individual modeled receiver along with the modeled noise levels associated with each scenario.

TABLE 2-6 PREDICTED TRAFFIC NOISE LEVELS

Receiver Number	Station/Offset	Dwelling Units	Exist. L_{eq}	2030 No-Build L_{eq}	Increase Over Exist.	2030 Build L_{eq}	Increase Over Exist.
R1*	1084+24, 225'LT	18	56.1	56.8	0.7	58.8	2.7
R2*	1084+22, 321'LT	24	53.8	54.1	0.3	56.3	2.5
R3	1081+47, 221'LT	24	61.7	61.7	0	65.1	3.4
R4	1079+51, 245'LT	0	60.2	60.3	0.1	63.5	3.3
R5-1	1085+90, 406'LT	2	34.7	35.6	0.9	36.7	2
R6-1	1085+77, 453'LT	2	22.7	23.5	0.8	24.7	2
R7-1	1085+38, 400'LT	1	33.2	34.2	1	35.4	2.2
R8-1	1084+99, 421'LT	1	26.2	26.9	0.7	28.3	2.1
R9-1	1085+19, 351'LT	1	32.3	33.1	0.8	34.5	2.2
R10-1	1084+74, 369'LT	1	25.1	25.3	0.2	27.4	2.3
R11-1	1084+85, 269'LT	2	34.2	34.8	0.6	36.8	2.6
R12-1	1084+40, 282'LT	2	29.5	29.7	0.2	32.1	2.6
R13-1	1084+79, 211'LT	2	34.6	35.2	0.6	37.4	2.8
R14-1*	1084+77, 170'LT	1	39.7	40	0.3	42.9	3.2
R15-1	1083+86, 212'LT	2	29.4	29.9	0.5	32.5	3.1
R16-1*	1083+83, 171'LT	2	39.1	39.2	0.1	42.2	3.1
R17-1*	1082+03, 110'LT	2	43	43	0	45.3	2.3
R17A-1*	1081+71, 138'LT	1	39.9	39.9	0	42.9	3
R17B-1*	1082+19, 140'LT	1	39.5	39.6	0.1	42.5	3
R18-1*	1082+21, 202'LT	3	35.5	35.8	0.3	38.7	3.2
R19-1*	1081+70, 201'LT	3	35.9	35.9	0	39.3	3.4
R20-1	1082+29, 390'LT	1	29.7	30	0.3	32.2	2.5
R21-1	1082+04, 401'LT	1	30.3	30.4	0.1	32.9	2.6
R22-1	1082+28, 484'LT	3	27.7	27.7	0	30	2.3
R23-1	1082+57, 473'LT	3	27.4	27.9	0.5	29.5	2.1
R24-1	1079+14, 415'LT	2	31.1	31.3	0.2	33.6	2.5
R25-1	1079+49, 467'LT	4	30.8	31	0.2	33.1	2.3
R5-2	1085+90, 406'LT	2	37.2	37.9	0.7	39.3	2.1
R6-2	1085+77, 453'LT	2	25.5	26.3	0.8	27.6	2.1
R7-2	1085+38, 400'LT	1	36.3	37	0.7	38.3	2
R8-2	1084+99, 421'LT	1	28.9	29.6	0.7	31.2	2.3
R9-2	1085+19, 351'LT	1	37	37.5	0.5	38.9	1.9
R10-2	1084+74, 369'LT	1	28.4	28.7	0.3	30.7	2.3
R11-2	1084+85, 269'LT	2	38.4	38.7	0.3	39.9	1.5
R12-2	1084+40, 282'LT	2	33	33.1	0.1	34.5	1.5
R13-2	1084+79, 211'LT	2	37.9	38.3	0.4	39.3	1.4
R14-2*	1084+77, 170'LT	1	42.7	42.9	0.2	44.4	1.7
R15-2	1083+86, 212'LT	2	33.2	33.7	0.5	34.8	1.6
R16-2*	1083+83, 171'LT	2	42.1	42.3	0.2	43.8	1.7
R17-2*	1082+03, 110'LT	2	44.5	44.6	0.1	46.5	2
R17-2A*	1081+71, 138'LT	1	42.3	42.4	0.1	44.2	1.9
R17-2B*	1082+19, 140'LT	1	42.1	42.2	0.1	44	1.9
R18-2*	1082+21, 202'LT	3	39.3	39.4	0.1	40.8	1.5

TABLE 2-6 PREDICTED TRAFFIC NOISE LEVELS CONTINUED							
Receiver Number	**Station/Offset**	**Dwelling Units**	**Exist. L_{eq}**	**2030 No-Build L_{eq}**	**Increase Over Exist.**	**2030 Build L_{eq}**	**Increase Over Exist.**
R19-2*	1081+70, 201'LT	3	39.6	39.6	0	41	1.4
R20-2	1082+29, 390'LT	1	34.8	34.9	0.1	37.3	2.5
R21-2	1082+04, 401'LT	1	34.1	34.2	0.1	36.8	2.7
R22-2	1082+28, 484'LT	3	30	30.1	0.1	33	3
R23-2	1082+57, 473'LT	3	30.2	30.5	0.3	32.7	2.5
R24-2	1079+14, 415'LT	2	34	34.1	0.1	36.8	2.8
R25-2	1079+49, 467'LT	4	33	33.1	0.1	35.9	2.9
R5-3	1085+90, 406'LT	2	38.7	39.6	0.9	40.3	1.6
R6-3	1085+77, 453'LT	2	26.4	27	0.6	28.1	1.7
R7-3	1085+38, 400'LT	1	38.1	38.9	0.8	39.7	1.6
R8-3	1084+99, 421'LT	1	30.5	31.2	0.7	32.2	1.7
R9-3	1085+19, 351'LT	1	38.5	39.3	0.8	40.1	1.6
R10-3	1084+74, 369'LT	1	29.9	30.1	0.2	31.4	1.5
R11-3	1084+85, 269'LT	2	39.2	39.9	0.7	40.9	1.7
R12-3	1084+40, 282'LT	2	34	34.3	0.3	35.7	1.7
R13-3	1084+79, 211'LT	2	38.4	39.1	0.7	40.3	1.9
R14-3*	1084+77, 170'LT	1	43.1	43.5	0.4	45.1	2
R15-3	1083+86, 212'LT	2	34	34.6	0.6	35.9	1.9
R16-3*	1083+83, 171'LT	2	42.7	42.9	0.2	44.7	2
R17-3*	1082+03, 110'LT	2	44.7	44.7	0	46.7	2
R17-3A*	1081+71, 138'LT	1	42.5	42.6	0.1	44.6	2.1
R17-3B*	1082+19, 140'LT	1	42.8	42.8	0	44.7	1.9
R18-3*	1082+21, 202'LT	3	40	40.2	0.2	41.8	1.8
R19-3*	1081+70, 201'LT	3	39.7	39.7	0	41.7	2
R20-3	1082+29, 390'LT	1	36.7	36.7	0	38	1.3
R21-3	1082+04, 401'LT	1	36.1	36.2	0.1	37.5	1.4
R22-3	1082+28, 484'LT	3	32.3	32.4	0.1	34	1.7
R23-3	1082+57, 473'LT	3	32.4	32.6	0.2	34	1.6
R25-3	1079+49, 467'LT	4	35.3	35.4	0.1	36.8	1.5

*Represents a first row receiver (unshielded)
R5-R25 are interior noise levels. Per HUD, a 26dBA reduction was utilized.

2.4 Noise Level Analysis

As outlined in Chapter 17 of the PD&E Manual, Part 2, a traffic noise-sensitive receptor is considered affected if project-related traffic noise levels approach or exceed the NAC, or if there is a substantial increase from the ambient condition to the proposed condition. A substantial increase is defined as a 15 dBA noise increase over the existing noise level.

The first part of the analysis evaluated exterior areas where frequent human use may occur. These areas are represented by receivers R1 through R4. Receivers R1, R2, and R3 represent areas with playground equipment, grills, or picnic tables, while R4 represents the pool area. The existing condition noise levels within the complex vary with the distance from the roadway. The unshielded areas are approximately 60.2 dBA to 61.7 dBA. The shielded areas that are farther from the roadway and benefited from shielding by other buildings are approximately 53.8 dBA to 56.1 dBA.

For the 2030 Build condition, the predicted noise levels for unshielded receivers ranged from 63.5 dBA to 65.1 dBA. The predicted sound levels for shielded receivers range from 56.3 dBA to 58.8 dBA. As shown in the ambient condition analysis, the higher noise levels occur where

receivers are in close proximity to the US Highway 301 corridor. Referencing the FDOT traffic noise abatement (NAC) criteria, there are no exterior receivers expected to exceed 66 dBA or experience a substantial increase (15 dBA) over the existing sound levels.

Noting that the exterior areas are not expected to approach, meet, or exceed the NAC, an evaluation of the interior noise levels was performed on the buildings that are within 500 feet of US Highway 301. The apartment buildings at Windermere are a standard frame wall construction with a combination of vinyl siding and stucco on the first floor and all vinyl siding on the second and third floors. The windows are double hung standard windows. The units are not equipped with exterior balconies or patios. Photos of the buildings are provided in *Appendix B*.

Consistent with the HUD method of determining interior noise levels, a composite sound level reduction of 26 dB was utilized. The pertinent HUD guidelines and worksheet for determining the composite sound level reduction is included in *Appendix C*. The sound level determination included modeling the receivers at the face of the respective units. The computer predicted noise level was then adjusted using the 26 dB sound reduction as defined by HUD guidelines for interior noise determination.

The interior sound levels in the existing condition for the shielded receivers were all below 40 dBA. For the unshielded receivers, represented by R14 and R16 through R19, the sound levels ranged from 35.5 dBA to 43.0 dBA at the first floor level; 39.3 dBA to 44.5 dBA at the second floor level; and 39.7 dBA to 44.7 dBA at the third floor level.

As shown in *Table 2-5*, for the 2030 No-Build Scenario, since the US Highway 301 roadway capacity is not increasing, there is little increase in traffic volumes. Therefore, the traffic noise levels predicted for this scenario are similar to those in the Existing Condition. The shielded receivers were all below 40 dBA. For the unshielded receivers, the sound levels ranged from 35.8 dBA to 43.0 dBA at the first floor level; 39.4 dBA to 44.6 dBA at the second floor level; and 39.7 dBA to 44.7 dBA at the third floor level. The sound levels for the unshielded receivers amount to increases between 0 and 0.4 dBA.

In the 2030 Build scenario, the shielded receivers were all below 41 dBA. For the unshielded receivers, the sound levels ranged from 38.7 dBA to 45.3 dBA at the first floor level; 40.8 dBA to 46.5 dBA at the second floor level; and 41.7 dBA to 46.7 dBA at the third floor level. The sound levels for the unshielded receivers amount to increases between 1.4 dBA and 3.4 dBA.

The interior evaluation of the traffic noise levels did not identify any receivers that exceed the FDOT NAC for interior noise levels. Therefore, there are no noise abatement considerations associated with this project.

2.5 Noise Contours

As specified in *Table 2-1 Noise Abatement Criteria*, the FHWA considers land uses such as residences, schools, churches, and recreation areas to be incompatible with highway noise at a level of 67 dBA (Category B). To help local planning officials minimize additional noise sensitive sites from being located within an area that experiences traffic noise of this level,

noise level contours were developed for the 2030 Build scenario. These noise contours delineate the distance from the improved roadway's edge of pavement to exterior areas where the traffic noise levels are expected to approach the NAC (within 1 dBA of the NAC) and are depicted in *Figure 2-2*. The contours do not include the effects of any shielding of noise from structures between the receiver and roadway.

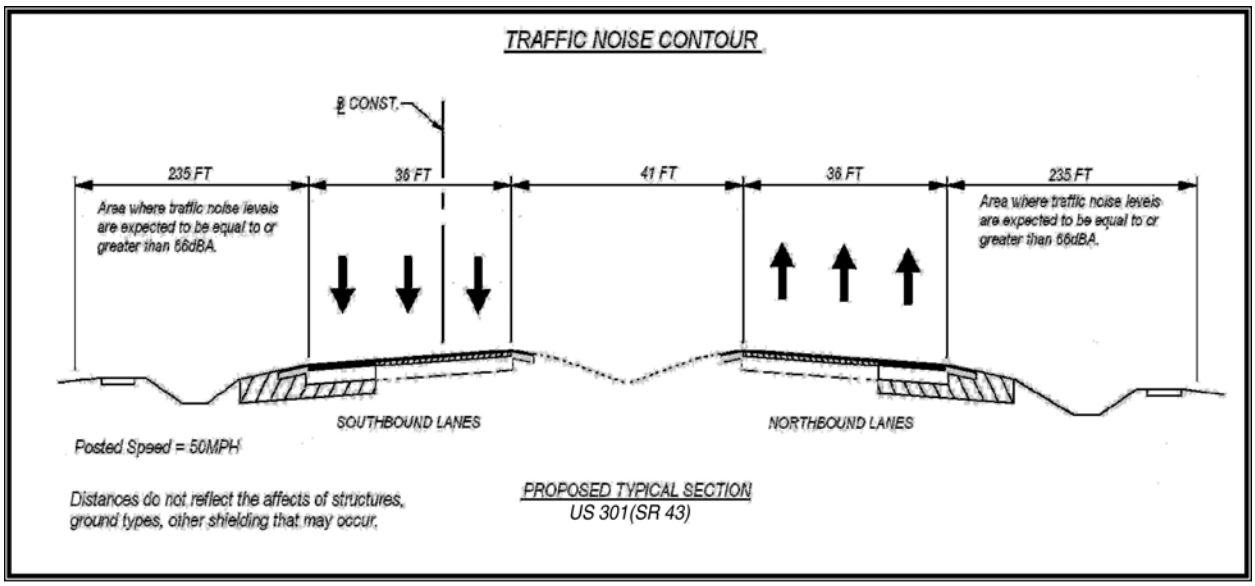


Figure 2-2 Traffic Noise Contour

3.0 CONCLUSION

In summary, the widening of the US Highway 301 corridor is not expected to increase existing noise levels at existing noise sensitive receivers such that they will exceed acceptable limits as defined by the FDOT criteria. For future land development projects along this section of US Highway 301, the noise contour data provided in *Figure 2-2* can assist planning officials in establishing compatible land uses.

4.0 CONSTRUCTION NOISE AND VIBRATION

Although high equipment noise levels are expected during construction, noise level changes due to construction are of short duration. Construction noise could be temporary at any location and should be controlled by adhering to the best management practices.

5.0 COORDINATION WITH LOCAL OFFICIALS

A copy of this report will be provided to Hillsborough County. County planning officials can use the noise contour data in *Figure 2-2* to establish compatible development of currently undeveloped parcels or compatible redevelopment in areas where land use changes.

6.0 REFERENCES

1. Federal Highway Administration's Traffic Noise Model (FHWA TNM) Version 2.5, Feb 2004
2. Florida Department of Transportation Project Development and Environmental Study Manual, Part 2, Chapter 17
3. Section 335.17, Florida Statutes, "State Highway Construction; Means of Noise Abatement"
4. U.S. Department of Housing and Urban Development, "The Noise Guidebook"

Appendix A
Policy on Land Use and Source Control Aspects of Traffic Noise Attenuation (AASHTO 1980)

POLICY ON LAND USE AND SOURCE CONTROL ASPECTS OF TRAFFIC NOISE ATTENUATION

Prepared by
the AASHTO Sub-Committee on Design
Approved by
the AASHTO Policy Committee
March, 1980

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Washington, D.C. 20001
1980

POLICY ON
LAND USE AND SOURCE CONTROL ASPECTS
OF
TRAFFIC NOISE ATTENUATION

Traffic noise attenuation is one of the most important considerations in providing environmental compatibility between a highway and its neighbors. Existing laws and regulations require that noise generated either on new highways or by highway improvements does not exceed certain maximum levels. The maximum noise level peculiar to any given highway segment depends upon the type of adjacent land use activity. Highway improvements adjacent to a noise sensitive area, such as a residential development, must be planned and designed to be quieter than those adjacent to commercial or industrial development. Once the facility is built, however, surrounding land might be rezoned or its use changed. Noise sensitive development, such as homes, then can spring up in areas which are environmentally unsuitable for such activity because of present or anticipated high noise levels. Many times, local government does not require that these new homes be shielded from noise or that developers meet certain construction standards. Either requirement, if carried out, can aid in preventing high ambient or future noise levels from creating a nuisance and environmental problem to the residents.

High volume highways, currently or in the future, may produce undesirable traffic noise levels in noise sensitive areas. Land use adjacent to a highway is the determining factor as to whether traffic noise has or has not, will or will not have an environmental impact on human activity. Continuing need for new housing, increased awareness of traffic noise on the part of the public, migration of people to and from urban and suburban areas, increasing numbers of large trucks, and the tremendous cost to taxpayers to erect noise barriers nationwide, all amplify the need to give full consideration to traffic noise in any land planning activity.

Owners of vacant land and those responsible for land use control should be aware of highway segments where traffic noise levels are high or may be high in the immediate future. They should refrain from creating noise sensitive development in high noise areas or should include noise attenuation measures in the planning and design of any such development, thus greatly reducing future noise related problems.

Controlling human use of presently undeveloped land adjacent to major highways is the key to alleviation of future traffic noise problems, and to resultant help to the greatest number of people that potentially could be affected. Based on an Environmental Protection Agency estimate

in 1977, three times the number of people presently affected by high noise levels could be affected by the year 2000. This amounts to thirty million additional people. It becomes clear that immediate action is needed. Good land use planning can eliminate or reduce the problem for many included in this vast number of citizens.

Local officials either may be unaware of the seriousness of the problem or that they can act to reduce its impact. There are numerous mitigation measures for implementing a good land use program as relates to the traffic noise problem. A few are: establish zones free of noise sensitive human activity, provide zoning which creates ample separation between noise sensitive land uses and major highways, locate land uses compatible with traffic noise adjacent to major highways, and amend subdivision regulations to require that developers provide open space buffers, noise attenuation barriers, proper site design and building location, and/or sound proofing of buildings to alleviate the noise problem. It is important to initiate a program in one community or one county. Once established and successful, it should spread to others.

State highway agencies have a considerable data bank on noise levels collected along major highway segments recently constructed through undeveloped land areas. They also have the ability to predict where traffic noise could be a problem in the future. These data should be made available to local planners and officials, since it serves as basic information needed to implement a land use noise control program. Such information is being made available on highways now being planned. AASHTO recognizes that most local governments have the authority to control land use and recommends that they make full use of this authority to alleviate the noise problem. AASHTO encourages those who develop land near major highways to exercise their responsibility to minimize the effect of vehicle noise.

Local officials can experience some confusion with the various descriptors presently used by the several federal agencies that prescribe noise standards. It is difficult to comprehend the well-meaning but conflicting policies, techniques and criteria in use. AASHTO urges that a consolidation and resolution of these differences be made to enable local officials to deal with the matter more simply and thus arrive at meaningful decisions.

State highway agencies, are urged to provide all available information to local planners and officials and to encourage them to implement sound land use programs for noise control. If, in the opinion of local officials, new or revised state laws are in order, state highway agencies should provide assistance in the formulation for such legislation in the interest of the health and welfare of the State.

Traffic noise should be considered during the review of plats for development adjacent to major highways. If traffic noise is or will be a problem, the developer should be requested to solve the problem as a prerequisite to plat approval. In this manner, noise abatement becomes a design and construction requirement for any new development.

When the source of noise is controlled, benefit accrues to everyone, including people living along local roads. Highway officials have virtually no control over noise emanating from vehicles. Help is needed from vehicle manufacturers, drivers, enforcement agencies, local planners and officials. AASHTO encourages and supports local, state and federal agencies in the effective enforcement of existing and new motor vehicle noise laws. Federal and state lawmakers are the logical persons to regulate vehicle design, giving due consideration to cost-benefit and any possible impacts. Law enforcement agencies, primarily state and local, also must do their part, once effective laws and regulations have been adopted. Though much has been done in this area by the federal and some state governments, much remains to be done. AASHTO encourages and supports further reasonable legislation and enforcement to reduce vehicle noise to minimal practical levels, carefully equated with the costs ultimately borne by the public.

The results of a good land use and source control program for mitigating traffic noise are numerous and of great benefit to all citizens. Many tax dollars can be saved by better means of attenuating noise. The quality of life will be improved. Highways will present a safer, quieter driving environment and most importantly, will be more environmentally compatible with the communities through which they pass.

In summation, the AASHTO encourages and supports every feasible effort to foster compatible land use and source control of noise.

Appendix B
Windermere Apartments Photos

- Back side of building showing absence of balconies, double hung windows, vinyl siding and stucco finish

- Front side of building showing absence of balconies, double hung windows, vinyl siding and stucco finish, and entry way to buildings.

Appendix C
HUD Interior Noise Level Reduction Determination

US 301 Noise-HUD method for interior noise determination

In the TNM model, Receivers R5 through R25 are reflective of exterior noise levels. The Department of Housing and Urban Development's (HUD) *The Noise Guidebook* provides reduction factors that allow for the determination of interior noise levels. The amount of reduction is based on a buildings method of construction. The various construction methods and materials are assigned a certain Sound Transmission Class (STC) to measure the material's ability to reduce sound. HUD explains that "essentially the STC is the difference between the partition where the noise originates and the side where it is received." When used for traffic noise, the respective STCs are adjusted down by 3 dB, whereas an STC of 37 dB would be 34 dB with traffic noise.

The following describes the methods used to determine the sound reduction from the modeled sound levels to the interior sound levels.

The Windermere Apartment construction type used for the analysis was standard Frame Wall with Wood Double Hung windows. The total reduction factor used in the analysis came to 26 dB.

Frame Wall STC = 39dB-3dB=36dB
Window STC = 22dB-3dB=19dB
Composite STC = 26dB

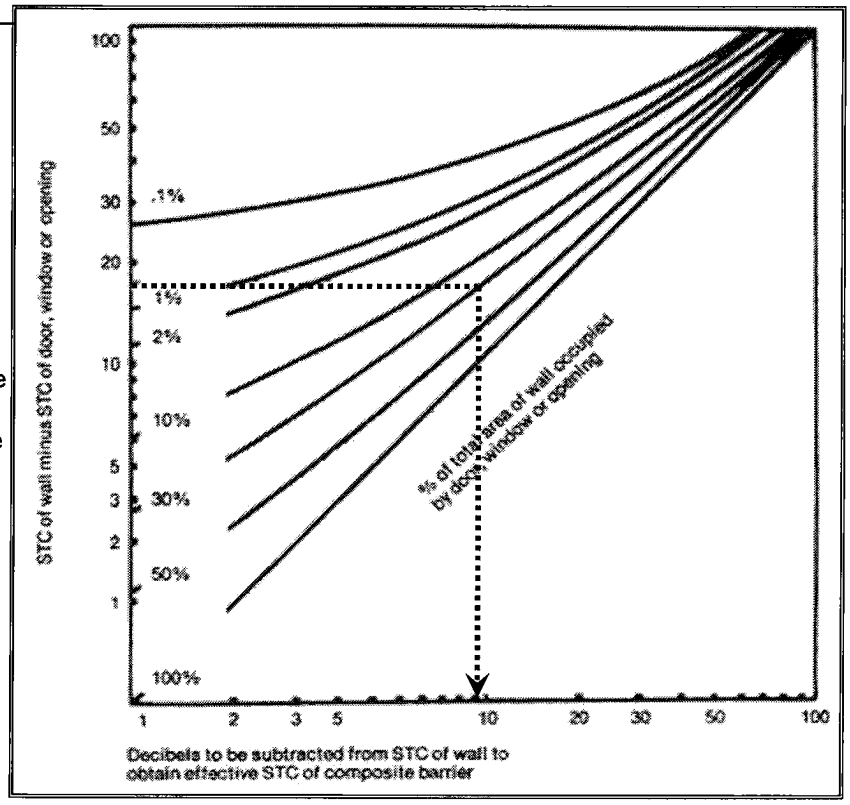
Calculation:

Vertical Axis:
36 - 19 = 17dB

% Window Area:
approx. 30%

Composite STC is derived from taking the Wall STC (36) and subtracting the horizontal axis value of 10. Therefore, the composite STC is 36-10=26dB.

In the model, receivers R5 through R25 were adjusted by 26 dBA, per the above results.The following sheet shows the TNM results along side the adjusted sound levels



Source of Graph: HUD *The Noise Guidebook* , pg 35.

Kimley-Horn and Associates, Inc. 8-Jul-08
Vishal Kakkad TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					Interior	
				LAeq1h		Increase over existing		Type Impact	2007 Existing LAeq1h per HUD (-26 dBA)	2030 Build LAeq1h per HUD (-26 dBA)
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			
			dBA	dBA	dBA	dB	dB		dBA	dBA
R1 ext	21	18	56.1	58.8	66	2.7	15	----	NA	NA
R2 ext	23	24	53.8	56.3	66	2.5	15	----	NA	NA
R3 ext	24	24	61.7	65.1	66	3.4	15	----	NA	NA
R4 ext pool	42	0	60.2	63.5	66	3.3	15	----	NA	NA
5-1 int	45	2	60.7	62.7	66	2	15	----	34.7	36.7
6-1 int	47	2	48.7	50.7	66	2	15	----	22.7	24.7
7-1 int	68	1	59.2	61.4	66	2.2	15	----	33.2	35.4
8-1 int	70	1	52.2	54.3	66	2.1	15	----	26.2	28.3
9-1 int	71	1	58.3	60.5	66	2.2	15	----	32.3	34.5
10-1 int	81	1	51.1	53.4	66	2.3	15	----	25.1	27.4
11-1 int	82	2	60.2	62.8	66	2.6	15	----	34.2	36.8
12-1 int	83	2	55.5	58.1	66	2.6	15	----	29.5	32.1
13-1 int	84	2	60.6	63.4	66	2.8	15	----	34.6	37.4
14-1 int	85	1	65.7	68.9	66	3.2	15	Snd Lvl	39.7	42.9
15-1 int	128	2	55.4	58.5	66	3.1	15	----	29.4	32.5
16-1 int	87	2	65.1	68.2	66	3.1	15	Snd Lvl	39.1	42.2
17-1 int	88	2	69	71.3	66	2.3	15	Snd Lvl	43	45.3
17-1A	139	1	65.9	68.9	66	3	15	Snd Lvl	39.9	42.9
17-1B	140	1	65.5	68.5	66	3	15	Snd Lvl	39.5	42.5
18-1 int	89	3	61.5	64.7	66	3.2	15	----	35.5	38.7
19-1 int	90	3	61.9	65.3	66	3.4	15	----	35.9	39.3
20-1 int	91	1	55.7	58.2	66	2.5	15	----	29.7	32.2
21-1 int	92	1	56.3	58.9	66	2.6	15	----	30.3	32.9
22-1 int	93	3	53.7	56	66	2.3	15	----	27.7	30
23-1 int	94	3	53.4	55.5	66	2.1	15	----	27.4	29.5
24-1 int	95	2	57.1	59.6	66	2.5	15	----	31.1	33.6
25-1 int	96	4	56.8	59.1	66	2.3	15	----	30.8	33.1
5-2 int	97	2	63.2	65.3	66	2.1	15	----	37.2	39.3
6-2 int	98	2	51.5	53.6	66	2.1	15	----	25.5	27.6
7-2 int	99	1	62.3	64.3	66	2	15	----	36.3	38.3
8-2 int	100	1	54.9	57.2	66	2.3	15	----	28.9	31.2
9-2 int	101	1	63	64.9	66	1.9	15	----	37	38.9
10-2 int	102	1	54.4	56.7	66	2.3	15	----	28.4	30.7
11-2 int	103	2	64.4	65.9	66	1.5	15	----	38.4	39.9
12-2 int	104	2	59	60.5	66	1.5	15	----	33	34.5
13-2 int	105	2	63.9	65.3	66	1.4	15	----	37.9	39.3
14-2 int	106	1	68.7	70.4	66	1.7	15	Snd Lvl	42.7	44.4
15-2 int	107	2	59.2	60.8	66	1.6	15	----	33.2	34.8
16-2 int	108	2	68.1	69.8	66	1.7	15	Snd Lvl	42.1	43.8
17-2 int	109	2	70.5	72.5	66	2	15	Snd Lvl	44.5	46.5
17-2A	141	1	68.3	70.2	66	1.9	15	Snd Lvl	42.3	44.2
17-2B	142	1	68.1	70	66	1.9	15	Snd Lvl	42.1	44

Kimley-Horn and Associates, Inc. 8-Jul-08
Vishal Kakkad TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build
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					Interior	
				LAeq1h		Increase over existing		Type Impact	2007 Existing LAeq1h per HUD (-26 dBA)	2030 Build LAeq1h per HUD (-26 dBA)
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			
			dBA	dBA	dBA	dB	dB		dBA	dBA
18-2 int	110	3	65.3	65.3	66	0	15	Snd Lvl	39.3	39.3
19-2 int	111	3	65.6	67	66	1.4	15	Snd Lvl	39.6	41
20-2 int	112	1	60.8	63.3	66	2.5	15	----	34.8	37.3
21-2 int	113	1	60.1	62.8	66	2.7	15	----	34.1	36.8
22-2 int	114	3	56	59	66	3	15	----	30	33
23-2 int	115	3	56.2	58.7	66	2.5	15	----	30.2	32.7
24-2 int	116	2	60	62.8	66	2.8	15	----	34	36.8
25-2 int	117	4	59	61.9	66	2.9	15	----	33	35.9
5-3 int	118	2	64.7	66.3	66	1.6	15	Snd Lvl	38.7	40.3
6-3 int	119	2	52.4	54.1	66	1.7	15	----	26.4	28.1
7-3 int	120	1	64.1	65.7	66	1.6	15	----	38.1	39.7
8-3 int	121	1	56.5	58.2	66	1.7	15	----	30.5	32.2
9-3 int	122	1	64.5	66.1	66	1.6	15	Snd Lvl	38.5	40.1
10-3 int	123	1	55.9	57.4	66	1.5	15	----	29.9	31.4
11-3 int	124	2	65.2	66.9	66	1.7	15	Snd Lvl	39.2	40.9
12-3 int	125	2	60	61.7	66	1.7	15	----	34	35.7
13-3 int	126	2	64.4	66.3	66	1.9	15	Snd Lvl	38.4	40.3
14-3 int	127	1	69.1	71.1	66	2	15	Snd Lvl	43.1	45.1
15-3 int	129	2	60	61.9	66	1.9	15	----	34	35.9
16-3 int	130	2	68.7	70.7	66	2	15	Snd Lvl	42.7	44.7
17-3 int	131	2	70.7	72.7	66	2	15	Snd Lvl	44.7	46.7
17-3A	143	1	68.5	70.6	66	2.1	15	Snd Lvl	42.5	44.6
17-3B	151	1	68.8	70.7	66	1.9	15	Snd Lvl	42.8	44.7
18-3 int	132	3	66	67.8	66	1.8	15	Snd Lvl	40	41.8
19-3 int	133	3	65.7	67.7	66	2	15	Snd Lvl	39.7	41.7
20-3 int	134	1	62.7	64	66	1.3	15	----	36.7	38
21-3 int	135	1	62.1	63.5	66	1.4	15	----	36.1	37.5
22-3 int	136	3	58.3	60	66	1.7	15	----	32.3	34
23-3 int	137	3	58.4	60	66	1.6	15	----	32.4	34
25-3 int	138	4	61.3	62.8	66	1.5	15	----	35.3	36.8

Appendix D
TNM Input/Output Files

2007 Existing Condition

Input Files:

Roadway
Traffic Volumes
Receivers
Barriers
Ground Zones
Tree Zones

Output Files:

Sound Level Results

Kimley-Horn and Associates, Inc.					8 July 2008							
Vishal Kakkad					TNM 2.5							
INPUT: ROADWAYS							Average pavement type shall be used unless					
PROJECT/CONTRACT:	US 301 SEIR						a State highway agency substantiates the use					
RUN:	2007 Existing						of a different type with the approval of FHWA					
Roadway		Points										
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment		
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?	
	ft			ft	ft	ft		mph	%			
NB US 301-S. of Falk	24.0	point1	1	3,236.5	-280.3	0.00				Average		
		point2	2	3,117.6	598.0	0.00						
NB US 301-Btwn Falk & Causeway	24.0	point3	3	3,117.6	598.0	0.00	Signal	0.00	100	Average		
		point4	4	2,741.2	3,240.5	0.00						
NB US 301-N. of Causeway	24.0	point9	9	2,741.2	3,240.5	0.00	Signal	0.00	100	Average		
		point11	11	2,627.0	4,033.3	0.00						
SB US 301-N. of Causeway	24.0	point12	12	2,568.0	4,024.6	0.00				Average		
		point13	13	2,658.3	3,399.4	0.00						
SB US 301-Btwn Falk & Causeway	24.0	point15	15	2,658.3	3,399.4	0.00	Signal	0.00	100	Average		
		point19	19	3,034.6	765.9	0.00						
SB US 301-S. of Falk	24.0	point21	21	3,034.6	765.9	0.00	Signal	0.00	100	Average		
		point22	22	3,178.9	-299.9	0.00						
EB FALK-W. of US 301	24.0	point23	23	2,036.4	634.3	0.00				Average		
		point24	24	3,009.2	653.7	0.00						
EB FALK-E. of US 301	24.0	point26	26	3,140.2	652.0	0.00	Signal	0.00	100	Average		
		point27	27	4,248.6	637.9	0.00						
WB FALK-E. of US 301	24.0	point28	28	4,239.0	710.5	0.00				Average		
		point29	29	3,146.0	715.1	0.00						
WB FALK-W. of US 301	24.0	point30	30	3,002.9	724.4	0.00	Signal	0.00	100	Average		
		point31	31	2,949.1	729.1	0.00				Average		
		point32	32	2,047.0	706.7	0.00						
EB CAUSEWAY-E. of US 301	36.0	point33	33	2,761.0	3,300.0	0.00	Signal	0.00	100	Average		
		point34	34	2,788.7	3,299.3	0.00				Average		
		point35	35	3,305.8	3,278.5	0.00				Average		
		point36	36	3,526.9	3,284.0	0.00				Average		

		point37	37	3,768.7	3,305.9	0.00					
WB CAUSEWAY-E. of US 301	36.0	point38	38	3,760.6	3,368.2	0.00				Average	
		point39	39	3,533.6	3,342.8	0.00				Average	
		point50	50	3,302.8	3,334.0	0.00				Average	
		point40	40	2,789.3	3,331.4	0.00					
EB CAUSEWAY-W. of US 301	12.0	point43	43	1,673.9	3,304.9	0.00				Average	
		point44	44	2,602.9	3,303.1	0.00					
WB CAUSEWAY-W. of US 301	12.0	point45	45	2,638.8	3,331.9	0.00	Signal	0.00	100	Average	
		point49	49	1,671.3	3,327.8	0.00					

Kimley-Horn and Associates, Inc.				**8 July 2008**								
Vishal Kakkad				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**US 301 SEIR**											
RUN:	**2007 Existing**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB US 301-S. of Falk	point1	1	1104	50	45	50	85	50	0	0	0	0
	point2	2										
NB US 301-Btwn Falk & Causeway	point3	3	1104	50	45	50	85	50	0	0	0	0
	point4	4										
NB US 301-N. of Causeway	point9	9	1104	50	45	50	85	50	0	0	0	0
	point11	11										
SB US 301-N. of Causeway	point12	12	1104	50	45	50	85	50	0	0	0	0
	point13	13										
SB US 301-Btwn Falk & Causeway	point15	15	1104	50	45	50	85	50	0	0	0	0
	point19	19										
SB US 301-S. of Falk	point21	21	1104	50	45	50	85	50	0	0	0	0
	point22	22										
EB FALK-W. of US 301	point23	23	475	50	19	50	37	50	0	0	0	0
	point24	24										
EB FALK-E. of US 301	point26	26	513	50	21	50	40	50	0	0	0	0
	point27	27										
WB FALK-E. of US 301	point28	28	513	50	21	50	40	50	0	0	0	0
	point29	29										
WB FALK-W. of US 301	point30	30	475	50	19	50	37	50	0	0	0	0
	point31	31	475	50	19	50	37	50	0	0	0	0
	point32	32										
EB CAUSEWAY-E. of US 301	point33	33	1182	50	49	50	92	50	0	0	0	0
	point34	34	1182	50	49	50	92	50	0	0	0	0

	point35	35	1182	50	49	50	92	50	0	0	0	0
	point36	36	1182	50	49	50	92	50	0	0	0	0
	point37	37										
WB CAUSEWAY-E. of US 301	point38	38	1182	50	49	50	92	50	0	0	0	0
	point39	39	1182	50	49	50	92	50	0	0	0	0
	point50	50	1182	50	49	50	92	50	0	0	0	0
	point40	40										
EB CAUSEWAY-W. of US 301	point43	43	983	50	41	50	76	50	0	0	0	0
	point44	44										
WB CAUSEWAY-W. of US 301	point45	45	983	50	41	50	76	50	0	0	0	0
	point49	49										

Kimley-Horn and Associates, Inc.						8 July 2008					
Vishal Kakkad						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	US 301 SEIR										
RUN:	2007 Existing										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 ext	1	18	2,518.2	2,784.4	0.00	5.00	56.10	66	15.0	0.0	Y
R2 ext	2	24	2,423.3	2,768.0	0.00	5.00	53.80	66	15.0	0.0	Y
R3 ext	3	24	2,561.6	2,510.6	0.00	5.00	61.70	66	15.0	0.0	Y
R4 ext pool	10	0	2,566.4	2,313.3	0.00	5.00	60.20	66	15.0	0.0	Y
5-1 int	12	2	2,316.3	2,922.4	0.00	5.00	60.70	66	15.0	0.0	Y
6-1 int	13	2	2,271.2	2,903.6	0.00	5.00	48.70	66	15.0	0.0	Y
7-1 int	14	1	2,329.9	2,871.8	0.00	5.00	59.20	66	15.0	0.0	Y
8-1 int	15	1	2,314.2	2,830.2	0.00	5.00	52.20	66	15.0	0.0	Y
9-1 int	16	1	2,381.0	2,860.6	0.00	5.00	58.30	66	15.0	0.0	Y
10-1 int	17	1	2,369.7	2,813.5	0.00	5.00	51.10	66	15.0	0.0	Y
11-1 int	18	2	2,467.2	2,838.1	0.00	5.00	60.20	66	15.0	0.0	Y
12-1 int	19	2	2,460.1	2,792.5	0.00	5.00	55.50	66	15.0	0.0	Y
13-1 int	20	2	2,525.1	2,840.2	0.00	5.00	60.60	66	15.0	0.0	Y
14-1 int	21	1	2,566.1	2,844.0	0.00	5.00	65.70	66	15.0	0.0	Y
15-1 int	22	2	2,536.9	2,747.9	0.00	5.00	55.40	66	15.0	0.0	Y
16-1 int	23	2	2,578.3	2,751.2	0.00	5.00	65.10	66	15.0	0.0	Y
17-1 int	24	2	2,664.0	2,581.9	0.00	5.00	69.00	66	15.0	0.0	Y
18-1 int	25	3	2,570.5	2,586.3	0.00	5.00	61.50	66	15.0	0.0	Y
19-1 int	26	3	2,578.7	2,535.8	0.00	5.00	61.90	66	15.0	0.0	Y
20-1 int	27	1	2,383.0	2,567.8	0.00	5.00	55.70	66	15.0	0.0	Y
21-1 int	28	1	2,376.0	2,541.1	0.00	5.00	56.30	66	15.0	0.0	Y
22-1 int	29	3	2,289.9	2,552.9	0.00	5.00	53.70	66	15.0	0.0	Y

23-1 int	30	3	2,296.9	2,583.9	0.00	5.00	53.40	66	15.0	0.0	Y
24-1 int	31	2	2,403.0	2,251.9	0.00	5.00	57.10	66	15.0	0.0	Y
25-1 int	32	4	2,346.4	2,279.8	0.00	5.00	56.80	66	15.0	0.0	Y
5-2 int	33	2	2,316.3	2,922.4	0.00	15.00	63.20	66	15.0	0.0	Y
6-2 int	34	2	2,271.2	2,903.6	0.00	15.00	51.50	66	15.0	0.0	Y
7-2 int	35	1	2,329.9	2,871.8	0.00	15.00	62.30	66	15.0	0.0	Y
8-2 int	36	1	2,314.2	2,830.2	0.00	15.00	54.90	66	15.0	0.0	Y
9-2 int	37	1	2,381.0	2,860.6	0.00	15.00	63.00	66	15.0	0.0	Y
10-2 int	38	1	2,369.7	2,813.5	0.00	15.00	54.40	66	15.0	0.0	Y
11-2 int	39	2	2,467.2	2,838.1	0.00	15.00	64.40	66	15.0	0.0	Y
12-2 int	40	2	2,460.1	2,792.5	0.00	15.00	59.00	66	15.0	0.0	Y
13-2 int	41	2	2,525.1	2,840.2	0.00	15.00	63.90	66	15.0	0.0	Y
14-2 int	43	1	2,566.1	2,844.0	0.00	15.00	68.70	66	15.0	0.0	Y
15-2 int	44	2	2,536.9	2,747.9	0.00	15.00	59.20	66	15.0	0.0	Y
16-2 int	45	2	2,578.3	2,751.2	0.00	15.00	68.10	66	15.0	0.0	Y
17-2 int	46	2	2,664.0	2,581.9	0.00	15.00	70.50	66	15.0	0.0	Y
18-2 int	47	3	2,570.5	2,586.3	0.00	15.00	65.30	66	15.0	0.0	Y
19-2 int	48	3	2,578.7	2,535.8	0.00	15.00	65.60	66	15.0	0.0	Y
20-2 int	49	1	2,383.0	2,567.8	0.00	15.00	60.80	66	15.0	0.0	Y
21-2 int	50	1	2,376.0	2,541.1	0.00	15.00	60.10	66	15.0	0.0	Y
22-2 int	51	3	2,289.9	2,552.9	0.00	15.00	56.00	66	15.0	0.0	Y
23-2 int	52	3	2,296.9	2,583.9	0.00	15.00	56.20	66	15.0	0.0	Y
24-2 int	53	2	2,403.0	2,251.9	0.00	15.00	60.00	66	15.0	0.0	Y
25-2 int	54	4	2,346.4	2,279.8	0.00	15.00	59.00	66	15.0	0.0	Y
5-3 int	55	2	2,316.3	2,922.4	0.00	25.00	64.70	66	15.0	0.0	Y
6-3 int	56	2	2,271.2	2,903.6	0.00	25.00	52.40	66	15.0	0.0	Y
7-3 int	57	1	2,329.9	2,871.8	0.00	25.00	64.10	66	15.0	0.0	Y
8-3 int	58	1	2,314.2	2,830.2	0.00	25.00	56.50	66	15.0	0.0	Y
9-3 int	59	1	2,381.0	2,860.6	0.00	25.00	64.50	66	15.0	0.0	Y
10-3 int	60	1	2,369.7	2,813.5	0.00	25.00	55.90	66	15.0	0.0	Y
11-3 int	61	2	2,467.2	2,838.1	0.00	25.00	65.20	66	15.0	0.0	Y
12-3 int	62	2	2,460.1	2,792.5	0.00	25.00	60.00	66	15.0	0.0	Y
13-3 int	63	2	2,525.1	2,840.2	0.00	25.00	64.40	66	15.0	0.0	Y
14-3 int	64	1	2,566.1	2,844.0	0.00	25.00	69.10	66	15.0	0.0	Y
15-3 int	65	2	2,536.9	2,747.9	0.00	25.00	60.00	66	15.0	0.0	Y
16-3 int	66	2	2,578.3	2,751.2	0.00	25.00	68.70	66	15.0	0.0	Y

17-3 int	67	2	2,664.0	2,581.9	0.00	25.00	70.70	66	15.0	0.0	Y
18-3 int	68	3	2,570.5	2,586.3	0.00	25.00	66.00	66	15.0	0.0	Y
19-3 int	69	3	2,578.7	2,535.8	0.00	25.00	65.70	66	15.0	0.0	Y
20-3 int	70	1	2,383.0	2,567.8	0.00	25.00	62.70	66	15.0	0.0	Y
21-3 int	71	1	2,376.0	2,541.1	0.00	25.00	62.10	66	15.0	0.0	Y
22-3 int	72	3	2,289.9	2,552.9	0.00	25.00	58.30	66	15.0	0.0	Y
23-3 int	73	3	2,296.9	2,583.9	0.00	25.00	58.40	66	15.0	0.0	Y
25-3 int	74	4	2,346.4	2,279.8	0.00	25.00	61.30	66	15.0	0.0	Y
17-1A	76	1	2,640.4	2,546.1	0.00	5.00	65.90	66	15.0	0.0	Y
17-1B	77	1	2,632.0	2,593.1	0.00	5.00	65.50	66	15.0	0.0	Y
17-2A	78	1	2,640.4	2,546.1	0.00	15.00	68.30	66	15.0	0.0	Y
17-2B	79	1	2,632.0	2,593.1	0.00	15.00	68.10	66	15.0	0.0	Y
17-3A	80	1	2,640.4	2,546.1	0.00	25.00	68.50	66	15.0	0.0	Y
17-3B	81	1	2,632.0	2,593.1	0.00	25.00	68.80	66	15.0	0.0	Y
R1 ext 1											
R2 ext 1											
R3 ext 1											
R4 ext pool 1											
5-1 int 1											
6-1 int 1											
7-1 int 1											
8-1 int 1											
9-1 int 1											
10-1 int 1											
11-1 int 1											
12-1 int 1											
13-1 int 1											
14-1 int 1											
15-1 int 1											
16-1 int 1											
17-1 int 1											
18-1 int 1											
19-1 int 1											
20-1 int 1											
21-1 int 1											
22-1 int 1											

Kimley-Horn and Associates, Inc. 8 July 2008
Vishal Kakkad TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2007 Existing

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-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Apartment Bldg 1	W	0.00	99.99	0.00				0.00	point1	1	2,208.4	3,127.3	0.00	35.00	0.00	0	0		
									point2	2	1,897.5	3,119.1	0.00	35.00					
Apartment Bldg 2	W	0.00	99.99	0.00				0.00	point3	3	2,204.1	3,058.9	0.00	35.00	0.00	0	0		
									point4	4	2,308.9	2,896.2	0.00	35.00					
Apartment Bldg 3	W	0.00	99.99	0.00				0.00	point7	7	2,316.7	2,850.7	0.00	35.00	0.00	0	0		
									point8	8	2,475.1	2,810.1	0.00	35.00					
Apartment Bldg 4	W	0.00	99.99	0.00				0.00	point9	9	2,541.7	2,854.1	0.00	35.00	0.00	0	0		
									point10	10	2,556.9	2,732.4	0.00	35.00					
Apartment Bldg 5	W	0.00	99.99	0.00				0.00	point11	11	2,500.4	2,553.7	0.00	35.00	0.00	0	0		
									point12	12	2,663.0	2,571.4	0.00	35.00					
Apartment Clubhouse	W	0.00	99.99	0.00				0.00	point15	15	2,626.0	2,307.4	0.00	20.00	0.00	0	0		
									point16	16	2,650.7	2,259.7	0.00	20.00	0.00	0	0		
									point17	17	2,596.8	2,218.2	0.00	20.00	0.00	0	0		
									point18	18	2,544.6	2,259.7	0.00	20.00					
Garage 1	W	0.00	99.99	0.00				0.00	point21	21	2,409.8	2,941.4	0.00	12.00	0.00	0	0		
									point22	22	2,520.1	2,930.9	0.00	12.00					
Garage 2	W	0.00	99.99	0.00				0.00	point23	23	2,666.6	2,699.4	0.00	12.00	0.00	0	0		
									point24	24	2,671.7	2,643.7	0.00	12.00					
Apartment Bldg 6	W	0.00	99.99	0.00				0.00	point25	25	2,390.5	2,553.3	0.00	35.00	0.00	0	0		
									point26	26	2,217.1	2,578.2	0.00	35.00					
Garage 3	W	0.00	99.99	0.00				0.00	point27	27	2,414.1	2,605.7	0.00	12.00	0.00	0	0		
									point28	28	2,417.6	2,556.5	0.00	12.00					

Kimley-Horn and Associates, Inc.				**8 July 2008**	
Vishal Kakkad				**TNM 2.5**	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	**US 301 SEIR**				
RUN:	**2007 Existing**				
Ground Zone			**Points**		
Name	**Type**	**Flow**	**No.**	**Coordinates**	
		Resistivity		**X**	**Y**
		cgs rayls		ft	ft
Ground Zone1	Water	20000	1	2,255.0	2,474.3
			2	2,329.5	2,429.8
			3	2,374.9	2,460.6
			4	2,371.5	2,488.0
			5	2,386.9	2,484.6
			6	2,452.9	2,428.9
			7	2,497.4	2,473.5
			8	2,679.0	2,494.9
			9	2,716.7	2,306.5
			10	2,687.5	2,302.3
			11	2,567.6	2,425.5
			12	2,434.9	2,345.1
			13	2,434.9	2,313.4
			14	2,496.6	2,272.3
			15	2,480.3	2,209.8
			16	2,465.7	2,204.7
			17	2,431.5	2,280.9
			18	2,295.3	2,350.2
			19	2,226.8	2,368.2

Kimley-Horn and Associates, Inc.				8 July 2008	
Vishal Kakkad				TNM 2.5	
INPUT: TREE ZONES					
PROJECT/CONTRACT:	US 301 SEIR				
RUN:	2007 Existing				
Tree Zone		Points			
Name	Average	No.	Coordinates (ground)		
	Height		X	Y	Z
	ft		ft	ft	ft
Tree Zone1	20.00	1	2,252.8	2,197.5	0.00
		2	2,414.6	2,062.8	0.00
		3	2,607.8	2,091.9	0.00
		4	2,624.0	2,046.6	0.00
		5	2,480.4	2,004.5	0.00
		6	2,488.0	1,951.7	0.00
		7	2,622.9	1,836.3	0.00
		8	2,573.5	1,749.5	0.00
		9	2,585.5	1,720.2	0.00
		10	2,787.5	1,713.3	0.00
		11	2,801.3	1,494.2	0.00
		12	2,639.1	1,383.8	0.00
		13	2,583.8	1,425.2	0.00
		14	2,538.9	1,646.0	0.00
		15	2,419.8	1,682.2	0.00
		16	2,240.3	1,913.4	0.00

Kimley-Horn and Associates, Inc.
Vishal Kakkad
8 July 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2007 Existing
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 ext	1	18	56.1	56.1	66	0.0	15	----	56.1	0.0	0	0.0
R2 ext	2	24	53.8	53.8	66	0.0	15	----	53.8	0.0	0	0.0
R3 ext	3	24	61.7	61.7	66	0.0	15	----	61.7	0.0	0	0.0
R4 ext pool	10	0	60.2	60.2	66	0.0	15	----	60.2	0.0	0	0.0
5-1 int	12	2	60.7	60.7	66	0.0	15	----	60.7	0.0	0	0.0
6-1 int	13	2	48.7	48.7	66	0.0	15	----	48.7	0.0	0	0.0
7-1 int	14	1	59.2	59.2	66	0.0	15	----	59.2	0.0	0	0.0
8-1 int	15	1	52.2	52.2	66	0.0	15	----	52.2	0.0	0	0.0
9-1 int	16	1	58.3	58.3	66	0.0	15	----	58.3	0.0	0	0.0
10-1 int	17	1	51.1	51.1	66	0.0	15	----	51.1	0.0	0	0.0
11-1 int	18	2	60.2	60.2	66	0.0	15	----	60.2	0.0	0	0.0
12-1 int	19	2	55.5	55.5	66	0.0	15	----	55.5	0.0	0	0.0
13-1 int	20	2	60.6	60.6	66	0.0	15	----	60.6	0.0	0	0.0
14-1 int	21	1	65.7	65.7	66	0.0	15	----	65.7	0.0	0	0.0
15-1 int	22	2	55.4	55.4	66	0.0	15	----	55.4	0.0	0	0.0
16-1 int	23	2	65.1	65.1	66	0.0	15	----	65.1	0.0	0	0.0
17-1 int	24	2	69.0	69.0	66	0.0	15	Snd Lvl	69.0	0.0	0	0.0
18-1 int	25	3	61.5	61.5	66	0.0	15	----	61.5	0.0	0	0.0
19-1 int	26	3	61.9	61.9	66	0.0	15	----	61.9	0.0	0	0.0
20-1 int	27	1	55.7	55.7	66	0.0	15	----	55.7	0.0	0	0.0
21-1 int	28	1	56.3	56.3	66	0.0	15	----	56.3	0.0	0	0.0
22-1 int	29	3	53.7	53.7	66	0.0	15	----	53.7	0.0	0	0.0
23-1 int	30	3	53.4	53.4	66	0.0	15	----	53.4	0.0	0	0.0
24-1 int	31	2	57.1	57.1	66	0.0	15	----	57.1	0.0	0	0.0

25-1 int	32	4	56.8	56.8	66	0.0	15	----	56.8	0.0	0	0.0
5-2 int	33	2	63.2	63.2	66	0.0	15	----	63.2	0.0	0	0.0
6-2 int	34	2	51.5	51.5	66	0.0	15	----	51.5	0.0	0	0.0
7-2 int	35	1	62.3	62.3	66	0.0	15	----	62.3	0.0	0	0.0
8-2 int	36	1	54.9	54.9	66	0.0	15	----	54.9	0.0	0	0.0
9-2 int	37	1	63.0	63.0	66	0.0	15	----	63.0	0.0	0	0.0
10-2 int	38	1	54.4	54.4	66	0.0	15	----	54.4	0.0	0	0.0
11-2 int	39	2	64.4	64.4	66	0.0	15	----	64.4	0.0	0	0.0
12-2 int	40	2	59.0	59.0	66	0.0	15	----	59.0	0.0	0	0.0
13-2 int	41	2	63.9	63.9	66	0.0	15	----	63.9	0.0	0	0.0
14-2 int	43	1	68.7	68.7	66	0.0	15	Snd Lvl	68.7	0.0	0	0.0
15-2 int	44	2	59.2	59.2	66	0.0	15	----	59.2	0.0	0	0.0
16-2 int	45	2	68.1	68.1	66	0.0	15	Snd Lvl	68.1	0.0	0	0.0
17-2 int	46	2	70.5	70.5	66	0.0	15	Snd Lvl	70.5	0.0	0	0.0
18-2 int	47	3	65.3	65.3	66	0.0	15	----	65.3	0.0	0	0.0
19-2 int	48	3	65.6	65.6	66	0.0	15	----	65.6	0.0	0	0.0
20-2 int	49	1	60.8	60.8	66	0.0	15	----	60.8	0.0	0	0.0
21-2 int	50	1	60.1	60.1	66	0.0	15	----	60.1	0.0	0	0.0
22-2 int	51	3	56.0	56.0	66	0.0	15	----	56.0	0.0	0	0.0
23-2 int	52	3	56.2	56.2	66	0.0	15	----	56.2	0.0	0	0.0
24-2 int	53	2	60.0	60.0	66	0.0	15	----	60.0	0.0	0	0.0
25-2 int	54	4	59.0	59.0	66	0.0	15	----	59.0	0.0	0	0.0
5-3 int	55	2	64.7	64.7	66	0.0	15	----	64.7	0.0	0	0.0
6-3 int	56	2	52.4	52.4	66	0.0	15	----	52.4	0.0	0	0.0
7-3 int	57	1	64.1	64.1	66	0.0	15	----	64.1	0.0	0	0.0
8-3 int	58	1	56.5	56.5	66	0.0	15	----	56.5	0.0	0	0.0
9-3 int	59	1	64.5	64.5	66	0.0	15	----	64.5	0.0	0	0.0
10-3 int	60	1	55.9	55.9	66	0.0	15	----	55.9	0.0	0	0.0
11-3 int	61	2	65.2	65.2	66	0.0	15	----	65.2	0.0	0	0.0
12-3 int	62	2	60.0	60.0	66	0.0	15	----	60.0	0.0	0	0.0
13-3 int	63	2	64.4	64.4	66	0.0	15	----	64.4	0.0	0	0.0
14-3 int	64	1	69.1	69.1	66	0.0	15	Snd Lvl	69.1	0.0	0	0.0
15-3 int	65	2	60.0	60.0	66	0.0	15	----	60.0	0.0	0	0.0
16-3 int	66	2	68.7	68.7	66	0.0	15	Snd Lvl	68.7	0.0	0	0.0
17-3 int	67	2	70.7	70.7	66	0.0	15	Snd Lvl	70.7	0.0	0	0.0
18-3 int	68	3	66.0	66.0	66	0.0	15	Snd Lvl	66.0	0.0	0	0.0
19-3 int	69	3	65.7	65.7	66	0.0	15	----	65.7	0.0	0	0.0
20-3 int	70	1	62.7	62.7	66	0.0	15	----	62.7	0.0	0	0.0
21-3 int	71	1	62.1	62.1	66	0.0	15	----	62.1	0.0	0	0.0
22-3 int	72	3	58.3	58.3	66	0.0	15	----	58.3	0.0	0	0.0
23-3 int	73	3	58.4	58.4	66	0.0	15	----	58.4	0.0	0	0.0

25-3 int	74	4	61.3	61.3	66	0.0	15	----	61.3	0.0	0	0.0
17-1A	76	1	65.9	65.9	66	0.0	15	----	65.9	0.0	0	0.0
17-1B	77	1	65.5	65.5	66	0.0	15	----	65.5	0.0	0	0.0
17-2A	78	1	68.3	68.3	66	0.0	15	Snd Lvl	68.3	0.0	0	0.0
17-2B	79	1	68.1	68.1	66	0.0	15	Snd Lvl	68.1	0.0	0	0.0
17-3A	80	1	68.5	68.5	66	0.0	15	Snd Lvl	68.5	0.0	0	0.0
17-3B	81	1	68.8	68.8	66	0.0	15	Snd Lvl	68.8	0.0	0	0.0

Dwelling Units		**# DUs**	**Noise Reduction**		
			Min	**Avg**	**Max**
			dB	**dB**	**dB**
All Selected		193	0.0	0.0	0.0
All Impacted		19	0.0	0.0	0.0
All that meet NR Goal		193	0.0	0.0	0.0

2030 No-Build Condition

Input Files:

Roadway
Traffic Volumes
Receivers
Barriers
Ground Zones
Tree Zones

Output Files:

Sound Level Results

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INPUT: ROADWAYS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 No Build

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
NB US 301-Btwn Falk & Causeway	24.0	point3	3	3,117.6	598.0	0.00	Signal	0.00	100	Average	
		point4	4	2,741.2	3,240.5	0.00					
NB US 301-N. of Causeway	24.0	point9	9	2,741.2	3,240.5	0.00	Signal	0.00	100	Average	
		point11	11	2,627.0	4,033.3	0.00					
SB US 301-N. of Causeway	24.0	point12	12	2,568.0	4,024.6	0.00				Average	
		point13	13	2,658.3	3,399.4	0.00					
SB US 301-Btwn Falk & Causeway	24.0	point15	15	2,658.3	3,399.4	0.00	Signal	0.00	100	Average	
		point19	19	3,034.6	765.9	0.00					
SB US 301-S. of Falk	24.0	point21	21	3,034.6	765.9	0.00	Signal	0.00	100	Average	
		point22	22	3,178.9	-299.9	0.00					
EB FALK-W. of US 301	24.0	point23	23	2,036.4	634.3	0.00				Average	
		point24	24	3,009.2	653.7	0.00					
EB FALK-E. of US 301	24.0	point26	26	3,140.2	652.0	0.00	Signal	0.00	100	Average	
		point27	27	4,248.6	637.9	0.00					
WB FALK-E. of US 301	24.0	point28	28	4,239.0	710.5	0.00				Average	
		point29	29	3,146.0	715.1	0.00					
WB FALK-W. of US 301	24.0	point30	30	3,002.9	724.4	0.00	Signal	0.00	100	Average	
		point31	31	2,949.1	729.1	0.00				Average	
		point32	32	2,047.0	706.7	0.00					
EB CAUSEWAY-E. of US 301	24.0	point33	33	2,761.0	3,300.0	0.00	Signal	0.00	100	Average	
		point34	34	2,788.7	3,299.3	0.00				Average	
		point35	35	3,305.8	3,278.5	0.00				Average	
		point36	36	3,526.9	3,284.0	0.00				Average	
		point37	37	3,768.7	3,305.9	0.00					
WB CAUSEWAY-E. of US 301	24.0	point38	38	3,760.6	3,368.2	0.00				Average	

		point39	39	3,533.6	3,342.8	0.00				Average	
		point50	50	3,302.8	3,334.0	0.00				Average	
		point40	40	2,789.3	3,331.4	0.00					
EB CAUSEWAY-W. of US 301	12.0	point43	43	1,673.9	3,304.9	0.00				Average	
		point44	44	2,602.9	3,303.1	0.00					
WB CAUSEWAY-W. of US 301	12.0	point45	45	2,638.8	3,331.9	0.00	Signal	0.00	100	Average	
		point49	49	1,671.3	3,327.8	0.00					
NB US 301-S. of Falk	24.0	point51	51	3,236.5	-280.3	0.00				Average	
		point52	52	3,117.6	598.0	0.00					

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INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 No Build

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB US 301-Btwn Falk & Causeway	point3	3	1104	50	45	50	85	50	0	0	0	0
	point4	4										
NB US 301-N. of Causeway	point9	9	1104	50	45	50	85	50	0	0	0	0
	point11	11										
SB US 301-N. of Causeway	point12	12	1104	50	45	50	85	50	0	0	0	0
	point13	13										
SB US 301-Btwn Falk & Causeway	point15	15	1104	50	45	50	85	50	0	0	0	0
	point19	19										
SB US 301-S. of Falk	point21	21	1104	50	45	50	85	50	0	0	0	0
	point22	22										
EB FALK-W. of US 301	point23	23	767	50	31	50	59	50	0	0	0	0
	point24	24										
EB FALK-E. of US 301	point26	26	829	50	34	50	64	50	0	0	0	0
	point27	27										
WB FALK-E. of US 301	point28	28	829	50	34	50	64	50	0	0	0	0
	point29	29										
WB FALK-W. of US 301	point30	30	767	50	31	50	59	50	0	0	0	0
	point31	31	767	50	31	50	59	50	0	0	0	0
	point32	32										
EB CAUSEWAY-E. of US 301	point33	33	1910	50	79	50	148	50	0	0	0	0
	point34	34	1910	50	79	50	148	50	0	0	0	0
	point35	35	1910	50	79	50	148	50	0	0	0	0
	point36	36	1910	50	79	50	148	50	0	0	0	0

	point37	37										
WB CAUSEWAY-E. of US 301	point38	38	1910	50	79	50	148	50	0	0	0	0
	point39	39	1910	50	79	50	148	50	0	0	0	0
	point50	50	1910	50	79	50	148	50	0	0	0	0
	point40	40										
EB CAUSEWAY-W. of US 301	point43	43	1475	50	61	50	114	50	0	0	0	0
	point44	44										
WB CAUSEWAY-W. of US 301	point45	45	1475	50	61	50	114	50	0	0	0	0
	point49	49										
NB US 301-S. of Falk	point51	51	1104	50	45	50	85	50	0	0	0	0
	point52	52										

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INPUT: RECEIVERS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 No Build

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 ext	1	18	2,518.2	2,784.4	0.00	5.00	56.10	66	15.0	5.0	Y
R2 ext	2	24	2,423.3	2,768.0	0.00	5.00	53.80	66	15.0	5.0	Y
R3 ext	3	24	2,561.6	2,510.6	0.00	5.00	61.70	66	15.0	5.0	Y
R4 ext pool	10	0	2,566.4	2,313.3	0.00	5.00	60.20	66	15.0	5.0	Y
5-1 int	12	2	2,316.3	2,922.4	0.00	5.00	60.70	66	15.0	5.0	Y
6-1 int	13	2	2,271.2	2,903.6	0.00	5.00	48.70	66	15.0	5.0	Y
7-1 int	14	1	2,329.9	2,871.8	0.00	5.00	59.20	66	15.0	5.0	Y
8-1 int	15	1	2,314.2	2,830.2	0.00	5.00	52.20	66	15.0	5.0	Y
9-1 int	16	1	2,381.0	2,860.6	0.00	5.00	58.30	66	15.0	5.0	Y
10-1 int	17	1	2,369.7	2,813.5	0.00	5.00	51.10	66	15.0	5.0	Y
11-1 int	18	2	2,467.2	2,838.1	0.00	5.00	60.20	66	15.0	5.0	Y
12-1 int	19	2	2,460.1	2,792.5	0.00	5.00	55.50	66	15.0	5.0	Y
13-1 int	20	2	2,525.1	2,840.2	0.00	5.00	60.60	66	15.0	5.0	Y
14-1 int	21	1	2,566.1	2,844.0	0.00	5.00	65.70	66	15.0	5.0	Y
15-1 int	22	2	2,536.9	2,747.9	0.00	5.00	55.40	66	15.0	5.0	Y
16-1 int	23	2	2,578.3	2,751.2	0.00	5.00	65.10	66	15.0	5.0	Y
17-1 int	24	2	2,664.0	2,581.9	0.00	5.00	69.00	66	15.0	5.0	Y
18-1 int	25	3	2,570.5	2,586.3	0.00	5.00	61.50	66	15.0	5.0	Y
19-1 int	26	3	2,578.7	2,535.8	0.00	5.00	61.90	66	15.0	5.0	Y
20-1 int	27	1	2,383.0	2,567.8	0.00	5.00	55.70	66	15.0	5.0	Y
21-1 int	28	1	2,376.0	2,541.1	0.00	5.00	56.30	66	15.0	5.0	Y
22-1 int	29	3	2,289.9	2,552.9	0.00	5.00	53.70	66	15.0	5.0	Y

23-1 int	30	3	2,296.9	2,583.9	0.00	5.00	53.40	66	15.0	5.0	Y
24-1 int	31	2	2,403.0	2,251.9	0.00	5.00	57.10	66	15.0	5.0	Y
25-1 int	32	4	2,346.4	2,279.8	0.00	5.00	56.80	66	15.0	5.0	Y
5-2 int	33	2	2,316.3	2,922.4	0.00	15.00	63.20	66	15.0	5.0	Y
6-2 int	34	2	2,271.2	2,903.6	0.00	15.00	51.50	66	15.0	5.0	Y
7-2 int	35	1	2,329.9	2,871.8	0.00	15.00	62.30	66	15.0	5.0	Y
8-2 int	36	1	2,314.2	2,830.2	0.00	15.00	54.90	66	15.0	5.0	Y
9-2 int	37	1	2,381.0	2,860.6	0.00	15.00	63.00	66	15.0	5.0	Y
10-2 int	38	1	2,369.7	2,813.5	0.00	15.00	54.40	66	15.0	5.0	Y
11-2 int	39	2	2,467.2	2,838.1	0.00	15.00	64.40	66	15.0	5.0	Y
12-2 int	40	2	2,460.1	2,792.5	0.00	15.00	59.00	66	15.0	5.0	Y
13-2 int	41	2	2,525.1	2,840.2	0.00	15.00	63.90	66	15.0	5.0	Y
14-2 int	42	1	2,566.1	2,844.0	0.00	15.00	68.70	66	15.0	5.0	Y
15-2 int	43	2	2,536.9	2,747.9	0.00	15.00	59.20	66	15.0	5.0	Y
16-2 int	44	2	2,578.3	2,751.2	0.00	15.00	68.10	66	15.0	5.0	Y
17-2 int	45	2	2,664.0	2,581.9	0.00	15.00	70.50	66	15.0	5.0	Y
18-2 int	46	3	2,570.5	2,586.3	0.00	15.00	65.30	66	15.0	5.0	Y
19-2 int	47	3	2,578.7	2,535.8	0.00	15.00	65.60	66	15.0	5.0	Y
20-2 int	48	1	2,383.0	2,567.8	0.00	15.00	60.80	66	15.0	5.0	Y
21-2 int	49	1	2,376.0	2,541.1	0.00	15.00	60.10	66	15.0	5.0	Y
22-2 int	50	3	2,289.9	2,552.9	0.00	15.00	56.00	66	15.0	5.0	Y
23-2 int	51	3	2,296.9	2,583.9	0.00	15.00	56.20	66	15.0	5.0	Y
24-2 int	52	2	2,403.0	2,251.9	0.00	15.00	60.00	66	15.0	5.0	Y
25-2 int	53	4	2,346.4	2,279.8	0.00	15.00	59.00	66	15.0	5.0	Y
5-3 int	54	2	2,316.3	2,922.4	0.00	25.00	64.70	66	15.0	5.0	Y
6-3 int	55	2	2,271.2	2,903.6	0.00	25.00	52.40	66	15.0	5.0	Y
7-3 int	56	1	2,329.9	2,871.8	0.00	25.00	64.10	66	15.0	5.0	Y
8-3 int	57	1	2,314.2	2,830.2	0.00	25.00	56.50	66	15.0	5.0	Y
9-3 int	58	1	2,381.0	2,860.6	0.00	25.00	64.50	66	15.0	5.0	Y
10-3 int	59	1	2,369.7	2,813.5	0.00	25.00	55.90	66	15.0	5.0	Y
11-3 int	60	2	2,467.2	2,838.1	0.00	25.00	65.20	66	15.0	5.0	Y
12-3 int	61	2	2,460.1	2,792.5	0.00	25.00	60.00	66	15.0	5.0	Y
13-3 int	62	2	2,525.1	2,840.2	0.00	25.00	64.40	66	15.0	5.0	Y
14-3 int	63	1	2,566.1	2,844.0	0.00	25.00	69.10	66	15.0	5.0	Y
15-3 int	64	2	2,536.9	2,747.9	0.00	25.00	60.00	66	15.0	5.0	Y
16-3 int	65	2	2,578.3	2,751.2	0.00	25.00	68.70	66	15.0	5.0	Y

17-3 int	66	2	2,664.0	2,581.9	0.00	25.00	70.70	66	15.0	5.0	Y
18-3 int	67	3	2,570.5	2,586.3	0.00	25.00	66.00	66	15.0	5.0	Y
19-3 int	74	3	2,578.7	2,535.8	0.00	25.00	65.70	66	15.0	5.0	Y
20-3 int	75	1	2,383.0	2,567.8	0.00	25.00	62.70	66	15.0	5.0	Y
21-3 int	76	1	2,376.0	2,541.1	0.00	25.00	62.10	66	15.0	5.0	Y
22-3 int	77	3	2,289.9	2,552.9	0.00	25.00	58.30	66	15.0	5.0	Y
23-3 int	78	3	2,296.9	2,583.9	0.00	25.00	58.40	66	15.0	5.0	Y
25-3 int	79	4	2,346.4	2,279.8	0.00	25.00	61.30	66	15.0	5.0	Y
Receiver80	80	1	2,640.4	2,546.1	0.00	5.00	65.90	66	15.0	5.0	Y
Receiver81	81	1	2,632.0	2,593.1	0.00	5.00	65.50	66	15.0	5.0	Y
Receiver82	82	1	2,640.4	2,546.1	0.00	15.00	68.30	66	15.0	5.0	Y
Receiver83	83	1	2,632.0	2,593.1	0.00	15.00	68.10	66	15.0	5.0	Y
Receiver84	84	1	2,640.4	2,546.1	0.00	25.00	68.50	66	15.0	5.0	Y
Receiver85	85	1	2,632.0	2,593.1	0.00	25.00	68.80	66	15.0	5.0	Y
R1 ext 1											
R2 ext 1											
R3 ext 1											
R4 ext pool 1											

Kimley-Horn and Associates, Inc.					**8 July 2008**															
Vishal Kakkad					**TNM 2.5**															
INPUT: BARRIERS																				
PROJECT/CONTRACT:	**US 301 SEIR**																			
RUN:	**2030 No Build**																			
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-**	
				Area	**Vol.**			**Length**							**ment**				**tions?**	
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft					
Apartment Bldg 1	W	0.00	99.99	0.00				0.00	point1	1	2,208.4	3,127.3	0.00	35.00	0.00	0	0			
									point2	2	1,897.5	3,119.1	0.00	35.00						
Apartment Bldg 2	W	0.00	99.99	0.00				0.00	point3	3	2,204.1	3,058.9	0.00	35.00	0.00	0	0			
									point4	4	2,308.9	2,896.2	0.00	35.00						
Apartment Bldg 3	W	0.00	99.99	0.00				0.00	point7	7	2,316.7	2,850.7	0.00	35.00	0.00	0	0			
									point8	8	2,475.1	2,810.1	0.00	35.00						
Apartment Bldg 4	W	0.00	99.99	0.00				0.00	point9	9	2,541.7	2,854.1	0.00	35.00	0.00	0	0			
									point10	10	2,556.9	2,732.4	0.00	35.00						
Apartment Bldg 5	W	0.00	99.99	0.00				0.00	point11	11	2,500.4	2,553.7	0.00	35.00	0.00	0	0			
									point12	12	2,663.0	2,571.4	0.00	35.00						
Apartment Clubhouse	W	0.00	99.99	0.00				0.00	point15	15	2,626.0	2,307.4	0.00	20.00	0.00	0	0			
									point16	16	2,650.7	2,259.7	0.00	20.00	0.00	0	0			
									point17	17	2,596.8	2,218.2	0.00	20.00	0.00	0	0			
									point18	18	2,544.6	2,259.7	0.00	20.00						
Garage 1	W	0.00	99.99	0.00				0.00	point21	21	2,409.8	2,941.4	0.00	12.00	0.00	0	0			
									point22	22	2,520.1	2,930.9	0.00	12.00						
Garage 2	W	0.00	99.99	0.00				0.00	point23	23	2,666.6	2,699.4	0.00	12.00	0.00	0	0			
									point24	24	2,671.7	2,643.7	0.00	12.00						
Apartment Bldg 6	W	0.00	99.99	0.00				0.00	point25	25	2,390.5	2,553.3	0.00	35.00	0.00	0	0			
									point26	26	2,217.1	2,578.2	0.00	35.00						
Garage 3	W	0.00	99.99	0.00				0.00	point27	27	2,414.1	2,605.7	0.00	12.00	0.00	0	0			
									point28	28	2,417.6	2,556.5	0.00	12.00						

Kimley-Horn and Associates, Inc.				8 July 2008	
Vishal Kakkad				TNM 2.5	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	US 301 SEIR				
RUN:	2030 No Build				
Ground Zone			Points		
Name	Type	Flow	No.	Coordinates	
		Resistivity		X	Y
		cgs rayls		ft	ft
Ground Zone1	Water	20000	1	2,255.0	2,474.3
			2	2,329.5	2,429.8
			3	2,374.9	2,460.6
			4	2,371.5	2,488.0
			5	2,386.9	2,484.6
			6	2,452.9	2,428.9
			7	2,497.4	2,473.5
			8	2,679.0	2,494.9
			9	2,716.7	2,306.5
			10	2,687.5	2,302.3
			11	2,567.6	2,425.5
			12	2,434.9	2,345.1
			13	2,434.9	2,313.4
			14	2,496.6	2,272.3
			15	2,480.3	2,209.8
			16	2,465.7	2,204.7
			17	2,431.5	2,280.9
			18	2,295.3	2,350.2
			19	2,226.8	2,368.2

Kimley-Horn and Associates, Inc.				8 July 2008	
Vishal Kakkad				TNM 2.5	
INPUT: TREE ZONES					
PROJECT/CONTRACT:	US 301 SEIR				
RUN:	2030 No Build				
Tree Zone		Points			
Name	Average	No.	Coordinates (ground)		
	Height		X	Y	Z
	ft		ft	ft	ft
Tree Zone1	20.00	1	2,252.8	2,197.5	0.00
		2	2,414.6	2,062.8	0.00
		3	2,607.8	2,091.9	0.00
		4	2,624.0	2,046.6	0.00
		5	2,480.4	2,004.5	0.00
		6	2,488.0	1,951.7	0.00
		7	2,622.9	1,836.3	0.00
		8	2,573.5	1,749.5	0.00
		9	2,585.5	1,720.2	0.00
		10	2,787.5	1,713.3	0.00
		11	2,801.3	1,494.2	0.00
		12	2,639.1	1,383.8	0.00
		13	2,583.8	1,425.2	0.00
		14	2,538.9	1,646.0	0.00
		15	2,419.8	1,682.2	0.00
		16	2,240.3	1,913.4	0.00

Kimley-Horn and Associates, Inc.
Vishal Kakkad

8 July 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 No Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 ext	1	18	56.1	56.8	66	0.7	15	----	56.8	0.0	5	-5.0
R2 ext	2	24	53.8	54.1	66	0.3	15	----	54.1	0.0	5	-5.0
R3 ext	3	24	61.7	61.7	66	0.0	15	----	61.7	0.0	5	-5.0
R4 ext pool	10	0	60.2	60.3	66	0.1	15	----	60.3	0.0	5	-5.0
5-1 int	12	2	60.7	61.6	66	0.9	15	----	61.6	0.0	5	-5.0
6-1 int	13	2	48.7	49.5	66	0.8	15	----	49.5	0.0	5	-5.0
7-1 int	14	1	59.2	60.2	66	1.0	15	----	60.2	0.0	5	-5.0
8-1 int	15	1	52.2	52.9	66	0.7	15	----	52.9	0.0	5	-5.0
9-1 int	16	1	58.3	59.1	66	0.8	15	----	59.1	0.0	5	-5.0
10-1 int	17	1	51.1	51.3	66	0.2	15	----	51.3	0.0	5	-5.0
11-1 int	18	2	60.2	60.8	66	0.6	15	----	60.8	0.0	5	-5.0
12-1 int	19	2	55.5	55.7	66	0.2	15	----	55.7	0.0	5	-5.0
13-1 int	20	2	60.6	61.2	66	0.6	15	----	61.2	0.0	5	-5.0
14-1 int	21	1	65.7	66.0	66	0.3	15	Snd Lvl	66.0	0.0	5	-5.0
15-1 int	22	2	55.4	55.9	66	0.5	15	----	55.9	0.0	5	-5.0
16-1 int	23	2	65.1	65.2	66	0.1	15	----	65.2	0.0	5	-5.0
17-1 int	24	2	69.0	69.0	66	0.0	15	Snd Lvl	69.0	0.0	5	-5.0
18-1 int	25	3	61.5	61.8	66	0.3	15	----	61.8	0.0	5	-5.0
19-1 int	26	3	61.9	61.9	66	0.0	15	----	61.9	0.0	5	-5.0
20-1 int	27	1	55.7	56.0	66	0.3	15	----	56.0	0.0	5	-5.0
21-1 int	28	1	56.3	56.4	66	0.1	15	----	56.4	0.0	5	-5.0
22-1 int	29	3	53.7	53.7	66	0.0	15	----	53.7	0.0	5	-5.0
23-1 int	30	3	53.4	53.9	66	0.5	15	----	53.9	0.0	5	-5.0
24-1 int	31	2	57.1	57.3	66	0.2	15	----	57.3	0.0	5	-5.0

25-1 int	32	4	56.8	57.0	66	0.2	15	----	57.0	0.0	5	-5.0
5-2 int	33	2	63.2	63.9	66	0.7	15	----	63.9	0.0	5	-5.0
6-2 int	34	2	51.5	52.3	66	0.8	15	----	52.3	0.0	5	-5.0
7-2 int	35	1	62.3	63.0	66	0.7	15	----	63.0	0.0	5	-5.0
8-2 int	36	1	54.9	55.6	66	0.7	15	----	55.6	0.0	5	-5.0
9-2 int	37	1	63.0	63.5	66	0.5	15	----	63.5	0.0	5	-5.0
10-2 int	38	1	54.4	54.7	66	0.3	15	----	54.7	0.0	5	-5.0
11-2 int	39	2	64.4	64.7	66	0.3	15	----	64.7	0.0	5	-5.0
12-2 int	40	2	59.0	59.1	66	0.1	15	----	59.1	0.0	5	-5.0
13-2 int	41	2	63.9	64.3	66	0.4	15	----	64.3	0.0	5	-5.0
14-2 int	42	1	68.7	68.9	66	0.2	15	Snd Lvl	68.9	0.0	5	-5.0
15-2 int	43	2	59.2	59.7	66	0.5	15	----	59.7	0.0	5	-5.0
16-2 int	44	2	68.1	68.3	66	0.2	15	Snd Lvl	68.3	0.0	5	-5.0
17-2 int	45	2	70.5	70.6	66	0.1	15	Snd Lvl	70.6	0.0	5	-5.0
18-2 int	46	3	65.3	65.4	66	0.1	15	----	65.4	0.0	5	-5.0
19-2 int	47	3	65.6	65.6	66	0.0	15	----	65.6	0.0	5	-5.0
20-2 int	48	1	60.8	60.9	66	0.1	15	----	60.9	0.0	5	-5.0
21-2 int	49	1	60.1	60.2	66	0.1	15	----	60.2	0.0	5	-5.0
22-2 int	50	3	56.0	56.1	66	0.1	15	----	56.1	0.0	5	-5.0
23-2 int	51	3	56.2	56.5	66	0.3	15	----	56.5	0.0	5	-5.0
24-2 int	52	2	60.0	60.1	66	0.1	15	----	60.1	0.0	5	-5.0
25-2 int	53	4	59.0	59.1	66	0.1	15	----	59.1	0.0	5	-5.0
5-3 int	54	2	64.7	65.6	66	0.9	15	----	65.6	0.0	5	-5.0
6-3 int	55	2	52.4	53.0	66	0.6	15	----	53.0	0.0	5	-5.0
7-3 int	56	1	64.1	64.9	66	0.8	15	----	64.9	0.0	5	-5.0
8-3 int	57	1	56.5	57.2	66	0.7	15	----	57.2	0.0	5	-5.0
9-3 int	58	1	64.5	65.3	66	0.8	15	----	65.3	0.0	5	-5.0
10-3 int	59	1	55.9	56.1	66	0.2	15	----	56.1	0.0	5	-5.0
11-3 int	60	2	65.2	65.9	66	0.7	15	----	65.9	0.0	5	-5.0
12-3 int	61	2	60.0	60.3	66	0.3	15	----	60.3	0.0	5	-5.0
13-3 int	62	2	64.4	65.1	66	0.7	15	----	65.1	0.0	5	-5.0
14-3 int	63	1	69.1	69.5	66	0.4	15	Snd Lvl	69.5	0.0	5	-5.0
15-3 int	64	2	60.0	60.6	66	0.6	15	----	60.6	0.0	5	-5.0
16-3 int	65	2	68.7	68.9	66	0.2	15	Snd Lvl	68.9	0.0	5	-5.0
17-3 int	66	2	70.7	70.7	66	0.0	15	Snd Lvl	70.7	0.0	5	-5.0
18-3 int	67	3	66.0	66.2	66	0.2	15	Snd Lvl	66.2	0.0	5	-5.0
19-3 int	74	3	65.7	65.7	66	0.0	15	----	65.7	0.0	5	-5.0
20-3 int	75	1	62.7	62.7	66	0.0	15	----	62.7	0.0	5	-5.0
21-3 int	76	1	62.1	62.2	66	0.1	15	----	62.2	0.0	5	-5.0
22-3 int	77	3	58.3	58.4	66	0.1	15	----	58.4	0.0	5	-5.0
23-3 int	78	3	58.4	58.6	66	0.2	15	----	58.6	0.0	5	-5.0

25-3 int	79	4	61.3	61.4	66	0.1	15	----	61.4	0.0	5	-5.0
Receiver80	80	1	65.9	65.9	66	0.0	15	----	65.9	0.0	5	-5.0
Receiver81	81	1	65.5	65.6	66	0.1	15	----	65.6	0.0	5	-5.0
Receiver82	82	1	68.3	68.4	66	0.1	15	Snd Lvl	68.4	0.0	5	-5.0
Receiver83	83	1	68.1	68.2	66	0.1	15	Snd Lvl	68.2	0.0	5	-5.0
Receiver84	84	1	68.5	68.6	66	0.1	15	Snd Lvl	68.6	0.0	5	-5.0
Receiver85	85	1	68.8	68.8	66	0.0	15	Snd Lvl	68.8	0.0	5	-5.0

Dwelling Units		**# DUs**	**Noise Reduction**		
			Min	**Avg**	**Max**
			dB	**dB**	**dB**
All Selected		193	0.0	0.0	0.0
All Impacted		20	0.0	0.0	0.0
All that meet NR Goal		0	0.0	0.0	0.0

2030 Build Condition

Input Files:

Roadway
Traffic Volumes
Receivers
Barriers
Ground Zones
Tree Zones

Output Files:

Sound Level Results

Kimley-Horn and Associates, Inc.					**8 July 2008**						
Vishal Kakkad					**TNM 2.5**						
INPUT: ROADWAYS							**Average pavement type shall be used unless**				
PROJECT/CONTRACT:	**US 301 SEIR**						**a State highway agency substantiates the use**				
RUN:	**2030 Build**						**of a different type with the approval of FHWA**				
Roadway		**Points**									
Name	**Width**	**Name**	**No.**	**Coordinates (pavement)**			**Flow Control**			**Segment**	
				X	**Y**	**Z**	**Control**	**Speed**	**Percent**	**Pvmt**	**On**
							Device	**Constraint**	**Vehicles**	**Type**	**Struct?**
									Affected		
	ft			ft	ft	ft		mph	%		
NB Cntr US 301-S. of Falk	12.0	point1	1	3,242.4	-279.5	0.00				Average	
		point2	2	3,123.5	598.8	0.00					
NB Cntr US 301-Btwn Falk & Causeway	12.0	point3	3	3,123.5	598.8	0.00	Signal	0.00	100	Average	
		point4	4	2,747.2	3,241.3	0.00					
NB Cntr US 301-N. of Causeway	12.0	point9	9	2,747.2	3,241.3	0.00	Signal	0.00	100	Average	
		point11	11	2,632.9	4,034.1	0.00					
SB Cntr US 301-N. of Causeway	12.0	point12	12	2,562.1	4,023.8	0.00				Average	
		point13	13	2,652.4	3,398.5	0.00					
SB Cntr US 301-Btwn Falk & Causeway	12.0	point15	15	2,652.4	3,398.5	0.00	Signal	0.00	100	Average	
		point19	19	3,028.7	765.1	0.00					
SB Cntr US 301-S. of Falk	12.0	point21	21	3,028.7	765.1	0.00	Signal	0.00	100	Average	
		point22	22	3,173.0	-300.7	0.00					
EB FALK-W. of US 301	24.0	point23	23	2,036.4	634.3	0.00				Average	
		point24	24	3,009.2	653.7	0.00					
EB FALK-E. of US 301	24.0	point26	26	3,140.2	652.0	0.00	Signal	0.00	100	Average	
		point27	27	4,248.6	637.9	0.00					
WB FALK-E. of US 301	24.0	point28	28	4,239.0	710.5	0.00				Average	
		point29	29	3,146.0	715.1	0.00					
WB FALK-W. of US 301	24.0	point30	30	3,002.9	724.4	0.00	Signal	0.00	100	Average	
		point31	31	2,949.1	729.1	0.00				Average	
		point32	32	2,047.0	706.7	0.00					
EB CAUSEWAY-E. of US 301	24.0	point33	33	2,761.0	3,300.0	0.00	Signal	0.00	100	Average	
		point34	34	2,788.7	3,299.3	0.00				Average	
		point35	35	3,305.8	3,278.5	0.00				Average	
		point36	36	3,526.9	3,284.0	0.00				Average	

		point37	37	3,768.7	3,305.9	0.00					
WB CAUSEWAY-E. of US 301	24.0	point38	38	3,760.6	3,368.2	0.00				Average	
		point39	39	3,533.6	3,342.8	0.00				Average	
		point50	50	3,302.8	3,334.0	0.00				Average	
		point40	40	2,789.3	3,331.4	0.00					
EB CAUSEWAY-W. of US 301	12.0	point43	43	1,673.9	3,304.9	0.00				Average	
		point44	44	2,602.9	3,303.1	0.00					
WB CAUSEWAY-W. of US 301	12.0	point45	45	2,638.8	3,331.9	0.00	Signal	0.00	100	Average	
		point49	49	1,671.3	3,327.8	0.00					
SB In US 301-Btwn Falk & Causeway	12.0	point51	51	2,664.3	3,400.2	0.00	Signal	0.00	100	Average	
		point52	52	3,040.6	766.8	0.00					
SB Out US 301-Btwn Falk & Causeway	12.0	point53	53	2,640.5	3,396.8	0.00	Signal	0.00	100	Average	
		point54	54	3,016.8	763.4	0.00					
NB In US 301-Btwn Falk & Causeway	12.0	point55	55	3,111.6	597.1	0.00	Signal	0.00	100	Average	
		point56	56	2,735.3	3,239.6	0.00					
NB Out US 301-Btwn Falk & Causeway	12.0	point57	57	3,135.4	600.5	0.00	Signal	0.00	100	Average	
		point58	58	2,759.1	3,243.0	0.00					
SB Out Cntr US 301-N. of Causeway	12.0	point59	59	2,550.2	4,022.1	0.00				Average	
		point60	60	2,640.5	3,396.8	0.00					
SB In US 301-N. of Causeway	12.0	point61	61	2,574.0	4,025.5	0.00				Average	
		point62	62	2,664.3	3,400.2	0.00					
NB In US 301-N. of Causeway	12.0	point63	63	2,735.3	3,239.6	0.00	Signal	0.00	100	Average	
		point64	64	2,621.0	4,032.4	0.00					
NB Out US 301-N. of Causeway	12.0	point65	65	2,759.1	3,243.0	0.00	Signal	0.00	100	Average	
		point66	66	2,644.8	4,035.8	0.00					
NB In US 301-S. of Falk	12.0	point67	67	3,230.5	-281.1	0.00				Average	
		point68	68	3,111.6	597.2	0.00					
NB Out US 301-S. of Falk	12.0	point69	69	3,254.3	-277.9	0.00				Average	
		point70	70	3,135.4	600.4	0.00					
SB In US 301-S. of Falk	12.0	point71	71	3,040.6	766.7	0.00	Signal	0.00	100	Average	
		point72	72	3,184.9	-299.1	0.00					
SB Out US 301-S. of Falk	12.0	point73	73	3,016.8	763.4	0.00	Signal	0.00	100	Average	
		point74	74	3,161.1	-302.3	0.00					

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INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
NB Cntr US 301-S. of Falk	point1	1	571	50	24	50	44	50	0	0	0	0
	point2	2										
NB Cntr US 301-Btwn Falk & Causeway	point3	3	571	50	24	50	44	50	0	0	0	0
	point4	4										
NB Cntr US 301-N. of Causeway	point9	9	571	50	24	50	44	50	0	0	0	0
	point11	11										
SB Cntr US 301-N. of Causeway	point12	12	571	50	24	50	44	50	0	0	0	0
	point13	13										
SB Cntr US 301-Btwn Falk & Causeway	point15	15	571	50	24	50	44	50	0	0	0	0
	point19	19										
SB Cntr US 301-S. of Falk	point21	21	571	50	24	50	44	50	0	0	0	0
	point22	22										
EB FALK-W. of US 301	point23	23	767	50	31	50	59	50	0	0	0	0
	point24	24										
EB FALK-E. of US 301	point26	26	829	50	34	50	64	50	0	0	0	0
	point27	27										
WB FALK-E. of US 301	point28	28	829	50	34	50	64	50	0	0	0	0
	point29	29										
WB FALK-W. of US 301	point30	30	767	50	31	50	59	50	0	0	0	0
	point31	31	767	50	31	50	59	50	0	0	0	0
	point32	32										
EB CAUSEWAY-E. of US 301	point33	33	1910	50	79	50	148	50	0	0	0	0
	point34	34	1910	50	79	50	148	50	0	0	0	0

	point35	35	1910	50	79	50	148	50	0	0	0	0
	point36	36	1910	50	79	50	148	50	0	0	0	0
	point37	37										
WB CAUSEWAY-E. of US 301	point38	38	1910	50	79	50	148	50	0	0	0	0
	point39	39	2041	50	84	50	158	50	0	0	0	0
	point50	50	2041	50	84	50	158	50	0	0	0	0
	point40	40										
EB CAUSEWAY-W. of US 301	point43	43	1475	50	61	50	114	50	0	0	0	0
	point44	44										
WB CAUSEWAY-W. of US 301	point45	45	1475	50	61	50	114	50	0	0	0	0
	point49	49										
SB In US 301-Btwn Falk & Causeway	point51	51	571	50	24	50	44	50	0	0	0	0
	point52	52										
SB Out US 301-Btwn Falk & Causeway	point53	53	571	50	24	50	44	50	0	0	0	0
	point54	54										
NB In US 301-Btwn Falk & Causeway	point55	55	571	50	24	50	44	50	0	0	0	0
	point56	56										
NB Out US 301-Btwn Falk & Causeway	point57	57	571	50	24	50	44	50	0	0	0	0
	point58	58										
SB Out Cntr US 301-N. of Causeway	point59	59	571	50	24	50	44	50	0	0	0	0
	point60	60										
SB In US 301-N. of Causeway	point61	61	571	50	24	50	44	50	0	0	0	0
	point62	62										
NB In US 301-N. of Causeway	point63	63	571	50	24	50	44	50	0	0	0	0
	point64	64										
NB Out US 301-N. of Causeway	point65	65	571	50	24	50	44	50	0	0	0	0
	point66	66										
NB In US 301-S. of Falk	point67	67	571	50	24	50	44	50	0	0	0	0
	point68	68										
NB Out US 301-S. of Falk	point69	69	571	50	24	50	44	50	0	0	0	0
	point70	70										
SB In US 301-S. of Falk	point71	71	571	50	24	50	44	50	0	0	0	0
	point72	72										
SB Out US 301-S. of Falk	point73	73	571	50	24	50	44	50	0	0	0	0
	point74	74										

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INPUT: RECEIVERS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
R1 ext	21	18	2,518.2	2,784.4	0.00	5.00	56.10	66	15.0	5.0	Y
R2 ext	23	24	2,423.3	2,768.0	0.00	5.00	53.80	66	15.0	5.0	Y
R3 ext	24	24	2,561.6	2,510.6	0.00	5.00	61.70	66	15.0	5.0	Y
R4 ext pool	42	0	2,566.4	2,313.3	0.00	5.00	60.20	66	15.0	5.0	Y
5-1 int	45	2	2,316.3	2,922.4	0.00	5.00	60.70	66	15.0	5.0	Y
6-1 int	47	2	2,271.2	2,903.6	0.00	5.00	48.70	66	15.0	5.0	Y
7-1 int	68	1	2,329.9	2,871.8	0.00	5.00	59.20	66	15.0	5.0	Y
8-1 int	70	1	2,314.2	2,830.2	0.00	5.00	52.20	66	15.0	5.0	Y
9-1 int	71	1	2,381.0	2,860.6	0.00	5.00	58.30	66	15.0	5.0	Y
10-1 int	81	1	2,369.7	2,813.5	0.00	5.00	51.10	66	15.0	5.0	Y
11-1 int	82	2	2,467.2	2,838.1	0.00	5.00	60.20	66	15.0	5.0	Y
12-1 int	83	2	2,460.1	2,792.5	0.00	5.00	55.50	66	15.0	5.0	Y
13-1 int	84	2	2,525.1	2,840.2	0.00	5.00	60.60	66	15.0	5.0	Y
14-1 int	85	1	2,566.1	2,844.0	0.00	5.00	65.70	66	15.0	5.0	Y
15-1 int	128	2	2,536.9	2,747.9	0.00	5.00	55.40	66	15.0	5.0	Y
16-1 int	87	2	2,578.3	2,751.2	0.00	5.00	65.10	66	15.0	5.0	Y
17-1 int	88	2	2,664.0	2,581.9	0.00	5.00	69.00	66	15.0	5.0	Y
18-1 int	89	3	2,570.5	2,586.3	0.00	5.00	61.50	66	15.0	5.0	Y
19-1 int	90	3	2,578.7	2,535.8	0.00	5.00	61.90	66	15.0	5.0	Y
20-1 int	91	1	2,383.0	2,567.8	0.00	5.00	55.70	66	15.0	5.0	Y
21-1 int	92	1	2,376.0	2,541.1	0.00	5.00	56.30	66	15.0	5.0	Y
22-1 int	93	3	2,289.9	2,552.9	0.00	5.00	53.70	66	15.0	5.0	Y

23-1 int	94	3	2,296.9	2,583.9	0.00	5.00	53.40	66	15.0	5.0	Y
24-1 int	95	2	2,403.0	2,251.9	0.00	5.00	57.10	66	15.0	5.0	Y
25-1 int	96	4	2,346.4	2,279.8	0.00	5.00	56.80	66	15.0	5.0	Y
5-2 int	97	2	2,316.3	2,922.4	0.00	15.00	63.20	66	15.0	5.0	Y
6-2 int	98	2	2,271.2	2,903.6	0.00	15.00	51.50	66	15.0	5.0	Y
7-2 int	99	1	2,329.9	2,871.8	0.00	15.00	62.30	66	15.0	5.0	Y
8-2 int	100	1	2,314.2	2,830.2	0.00	15.00	54.90	66	15.0	5.0	Y
9-2 int	101	1	2,381.0	2,860.6	0.00	15.00	63.00	66	15.0	5.0	Y
10-2 int	102	1	2,369.7	2,813.5	0.00	15.00	54.40	66	15.0	5.0	Y
11-2 int	103	2	2,467.2	2,838.1	0.00	15.00	64.40	66	15.0	5.0	Y
12-2 int	104	2	2,460.1	2,792.5	0.00	15.00	59.00	66	15.0	5.0	Y
13-2 int	105	2	2,525.1	2,840.2	0.00	15.00	63.90	66	15.0	5.0	Y
14-2 int	106	1	2,566.1	2,844.0	0.00	15.00	68.70	66	15.0	5.0	Y
15-2 int	107	2	2,536.9	2,747.9	0.00	15.00	59.20	66	15.0	5.0	Y
16-2 int	108	2	2,578.3	2,751.2	0.00	15.00	68.10	66	15.0	5.0	Y
17-2 int	109	2	2,664.0	2,581.9	0.00	15.00	70.50	66	15.0	5.0	Y
18-2 int	110	3	2,570.5	2,586.3	0.00	15.00	65.30	66	15.0	5.0	Y
19-2 int	111	3	2,578.7	2,535.8	0.00	15.00	65.60	66	15.0	5.0	Y
20-2 int	112	1	2,383.0	2,567.8	0.00	15.00	60.80	66	15.0	5.0	Y
21-2 int	113	1	2,376.0	2,541.1	0.00	15.00	60.10	66	15.0	5.0	Y
22-2 int	114	3	2,289.9	2,552.9	0.00	15.00	56.00	66	15.0	5.0	Y
23-2 int	115	3	2,296.9	2,583.9	0.00	15.00	56.20	66	15.0	5.0	Y
24-2 int	116	2	2,403.0	2,251.9	0.00	15.00	60.00	66	15.0	5.0	Y
25-2 int	117	4	2,346.4	2,279.8	0.00	15.00	59.00	66	15.0	5.0	Y
5-3 int	118	2	2,316.3	2,922.4	0.00	25.00	64.70	66	15.0	5.0	Y
6-3 int	119	2	2,271.2	2,903.6	0.00	25.00	52.40	66	15.0	5.0	Y
7-3 int	120	1	2,329.9	2,871.8	0.00	25.00	64.10	66	15.0	5.0	Y
8-3 int	121	1	2,314.2	2,830.2	0.00	25.00	56.50	66	15.0	5.0	Y
9-3 int	122	1	2,381.0	2,860.6	0.00	25.00	64.50	66	15.0	5.0	Y
10-3 int	123	1	2,369.7	2,813.5	0.00	25.00	55.90	66	15.0	5.0	Y
11-3 int	124	2	2,467.2	2,838.1	0.00	25.00	65.20	66	15.0	5.0	Y
12-3 int	125	2	2,460.1	2,792.5	0.00	25.00	60.00	66	15.0	5.0	Y
13-3 int	126	2	2,525.1	2,840.2	0.00	25.00	64.40	66	15.0	5.0	Y
14-3 int	127	1	2,566.1	2,844.0	0.00	25.00	69.10	66	15.0	5.0	Y
15-3 int	129	2	2,536.9	2,747.9	0.00	25.00	60.00	66	15.0	5.0	Y
16-3 int	130	2	2,578.3	2,751.2	0.00	25.00	68.70	66	15.0	5.0	Y

17-3 int	131	2	2,664.0	2,581.9	0.00	25.00	70.70	66	15.0	5.0	Y
18-3 int	132	3	2,570.5	2,586.3	0.00	25.00	66.00	66	15.0	5.0	Y
19-3 int	133	3	2,578.7	2,535.8	0.00	25.00	65.70	66	15.0	5.0	Y
20-3 int	134	1	2,383.0	2,567.8	0.00	25.00	62.70	66	15.0	5.0	Y
21-3 int	135	1	2,376.0	2,541.1	0.00	25.00	62.10	66	15.0	5.0	Y
22-3 int	136	3	2,289.9	2,552.9	0.00	25.00	58.30	66	15.0	5.0	Y
23-3 int	137	3	2,296.9	2,583.9	0.00	25.00	58.40	66	15.0	5.0	Y
25-3 int	138	4	2,346.4	2,279.8	0.00	25.00	61.30	66	15.0	5.0	Y
17-1A	139	1	2,640.4	2,546.1	0.00	5.00	65.90	66	15.0	5.0	Y
17-1B	140	1	2,632.0	2,593.1	0.00	5.00	65.50	66	15.0	5.0	Y
17-2A	141	1	2,640.4	2,546.1	0.00	15.00	68.30	66	15.0	5.0	Y
17-2B	142	1	2,632.0	2,593.1	0.00	15.00	68.10	66	15.0	5.0	Y
17-3A	143	1	2,640.4	2,546.1	0.00	25.00	68.50	66	15.0	5.0	Y
17-3B	151	1	2,632.0	2,593.1	0.00	25.00	68.80	66	15.0	5.0	Y

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INPUT: BARRIERS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build

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-
				Area	Vol.			Length							ment				tions?
		ft	ft	$/sq ft	$/cu yd	ft	ft:ft	$/ft			ft	ft	ft	ft	ft				
Apartment Bldg 1	W	0.00	99.99	0.00				0.00	point1	1	2,208.4	3,127.3	0.00	35.00	0.00	0	0		
									point2	2	1,897.5	3,119.1	0.00	35.00					
Apartment Bldg 2	W	0.00	99.99	0.00				0.00	point3	3	2,204.1	3,058.9	0.00	35.00	0.00	0	0		
									point4	4	2,308.9	2,896.2	0.00	35.00					
Apartment Bldg 3	W	0.00	99.99	0.00				0.00	point7	7	2,316.7	2,850.7	0.00	35.00	0.00	0	0		
									point8	8	2,475.1	2,810.1	0.00	35.00					
Apartment Bldg 4	W	0.00	99.99	0.00				0.00	point9	9	2,541.7	2,854.1	0.00	35.00	0.00	0	0		
									point10	10	2,556.9	2,732.4	0.00	35.00					
Apartment Bldg 5	W	0.00	99.99	0.00				0.00	point11	11	2,500.4	2,553.7	0.00	35.00	0.00	0	0		
									point12	12	2,663.0	2,571.4	0.00	35.00					
Apartment Clubhouse	W	0.00	99.99	0.00				0.00	point15	15	2,626.0	2,307.4	0.00	20.00	0.00	0	0		
									point16	16	2,650.7	2,259.7	0.00	20.00	0.00	0	0		
									point17	17	2,596.8	2,218.2	0.00	20.00	0.00	0	0		
									point18	18	2,544.6	2,259.7	0.00	20.00					
Garage 1	W	0.00	99.99	0.00				0.00	point21	21	2,409.8	2,941.4	0.00	12.00	0.00	0	0		
									point22	22	2,520.1	2,930.9	0.00	12.00					
Garage 2	W	0.00	99.99	0.00				0.00	point23	23	2,666.6	2,699.4	0.00	12.00	0.00	0	0		
									point24	24	2,671.7	2,643.7	0.00	12.00					
Apartment Bldg 6	W	0.00	99.99	0.00				0.00	point66	66	2,390.5	2,553.3	0.00	35.00	0.00	0	0		
									point67	67	2,217.1	2,578.2	0.00	35.00					
Garage 3	W	0.00	99.99	0.00				0.00	point69	69	2,414.1	2,605.7	0.00	12.00	0.00	0	0		
									point70	70	2,417.6	2,556.5	0.00	12.00					

Kimley-Horn and Associates, Inc.				8 July 2008	
Vishal Kakkad				TNM 2.5	
INPUT: GROUND ZONES					
PROJECT/CONTRACT:	US 301 SEIR				
RUN:	2030 Build				
Ground Zone			Points		
Name	Type	Flow	No.	Coordinates	
		Resistivity		X	Y
		cgs rayls		ft	ft
Ground Zone1	Water	20000	1	2,255.0	2,474.3
			2	2,329.5	2,429.8
			3	2,374.9	2,460.6
			4	2,371.5	2,488.0
			5	2,386.9	2,484.6
			6	2,452.9	2,428.9
			7	2,497.4	2,473.5
			8	2,679.0	2,494.9
			9	2,716.7	2,306.5
			10	2,687.5	2,302.3
			11	2,567.6	2,425.5
			12	2,434.9	2,345.1
			13	2,434.9	2,313.4
			14	2,496.6	2,272.3
			15	2,480.3	2,209.8
			16	2,465.7	2,204.7
			17	2,431.5	2,280.9
			18	2,295.3	2,350.2
			19	2,226.8	2,368.2

Kimley-Horn and Associates, Inc.				**8 July 2008**	
Vishal Kakkad				**TNM 2.5**	
INPUT: TREE ZONES					
PROJECT/CONTRACT:	**US 301 SEIR**				
RUN:	**2030 Build**				
Tree Zone		**Points**			
Name	**Average**	**No.**	**Coordinates (ground)**		
	Height		**X**	**Y**	**Z**
	ft		ft	ft	ft
Tree Zone1	20.00	1	2,252.8	2,197.5	0.00
		2	2,414.6	2,062.8	0.00
		3	2,607.8	2,091.9	0.00
		4	2,624.0	2,046.6	0.00
		5	2,480.4	2,004.5	0.00
		6	2,488.0	1,951.7	0.00
		7	2,622.9	1,836.3	0.00
		8	2,573.5	1,749.5	0.00
		9	2,585.5	1,720.2	0.00
		10	2,787.5	1,713.3	0.00
		11	2,801.3	1,494.2	0.00
		12	2,639.1	1,383.8	0.00
		13	2,583.8	1,425.2	0.00
		14	2,538.9	1,646.0	0.00
		15	2,419.8	1,682.2	0.00
		16	2,240.3	1,913.4	0.00

Kimley-Horn and Associates, Inc.
Vishal Kakkad

8 July 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: US 301 SEIR
RUN: 2030 Build
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
R1 ext	21	18	56.1	58.8	66	2.7	15	----	58.8	0.0	5	-5.0
R2 ext	23	24	53.8	56.3	66	2.5	15	----	56.3	0.0	5	-5.0
R3 ext	24	24	61.7	65.1	66	3.4	15	----	65.1	0.0	5	-5.0
R4 ext pool	42	0	60.2	63.5	66	3.3	15	----	63.5	0.0	5	-5.0
5-1 int	45	2	60.7	62.7	66	2.0	15	----	62.7	0.0	5	-5.0
6-1 int	47	2	48.7	50.7	66	2.0	15	----	50.7	0.0	5	-5.0
7-1 int	68	1	59.2	61.4	66	2.2	15	----	61.4	0.0	5	-5.0
8-1 int	70	1	52.2	54.3	66	2.1	15	----	54.3	0.0	5	-5.0
9-1 int	71	1	58.3	60.5	66	2.2	15	----	60.5	0.0	5	-5.0
10-1 int	81	1	51.1	53.4	66	2.3	15	----	53.4	0.0	5	-5.0
11-1 int	82	2	60.2	62.8	66	2.6	15	----	62.8	0.0	5	-5.0
12-1 int	83	2	55.5	58.1	66	2.6	15	----	58.1	0.0	5	-5.0
13-1 int	84	2	60.6	63.4	66	2.8	15	----	63.4	0.0	5	-5.0
14-1 int	85	1	65.7	68.9	66	3.2	15	Snd Lvl	68.9	0.0	5	-5.0
15-1 int	128	2	55.4	58.5	66	3.1	15	----	58.5	0.0	5	-5.0
16-1 int	87	2	65.1	68.2	66	3.1	15	Snd Lvl	68.2	0.0	5	-5.0
17-1 int	88	2	69.0	71.3	66	2.3	15	Snd Lvl	71.3	0.0	5	-5.0
18-1 int	89	3	61.5	64.7	66	3.2	15	----	64.7	0.0	5	-5.0
19-1 int	90	3	61.9	65.3	66	3.4	15	----	65.3	0.0	5	-5.0
20-1 int	91	1	55.7	58.2	66	2.5	15	----	58.2	0.0	5	-5.0
21-1 int	92	1	56.3	58.9	66	2.6	15	----	58.9	0.0	5	-5.0
22-1 int	93	3	53.7	56.0	66	2.3	15	----	56.0	0.0	5	-5.0
23-1 int	94	3	53.4	55.5	66	2.1	15	----	55.5	0.0	5	-5.0
24-1 int	95	2	57.1	59.6	66	2.5	15	----	59.6	0.0	5	-5.0

25-1 int	96	4	56.8	59.1	66	2.3	15	----	59.1	0.0	5	-5.0
5-2 int	97	2	63.2	65.3	66	2.1	15	----	65.3	0.0	5	-5.0
6-2 int	98	2	51.5	53.6	66	2.1	15	----	53.6	0.0	5	-5.0
7-2 int	99	1	62.3	64.3	66	2.0	15	----	64.3	0.0	5	-5.0
8-2 int	100	1	54.9	57.2	66	2.3	15	----	57.2	0.0	5	-5.0
9-2 int	101	1	63.0	64.9	66	1.9	15	----	64.9	0.0	5	-5.0
10-2 int	102	1	54.4	56.7	66	2.3	15	----	56.7	0.0	5	-5.0
11-2 int	103	2	64.4	65.9	66	1.5	15	----	65.9	0.0	5	-5.0
12-2 int	104	2	59.0	60.5	66	1.5	15	----	60.5	0.0	5	-5.0
13-2 int	105	2	63.9	65.3	66	1.4	15	----	65.3	0.0	5	-5.0
14-2 int	106	1	68.7	70.4	66	1.7	15	Snd Lvl	70.4	0.0	5	-5.0
15-2 int	107	2	59.2	60.8	66	1.6	15	----	60.8	0.0	5	-5.0
16-2 int	108	2	68.1	69.8	66	1.7	15	Snd Lvl	69.8	0.0	5	-5.0
17-2 int	109	2	70.5	72.5	66	2.0	15	Snd Lvl	72.5	0.0	5	-5.0
18-2 int	110	3	65.3	66.8	66	1.5	15	Snd Lvl	66.8	0.0	5	-5.0
19-2 int	111	3	65.6	67.0	66	1.4	15	Snd Lvl	67.0	0.0	5	-5.0
20-2 int	112	1	60.8	63.3	66	2.5	15	----	63.3	0.0	5	-5.0
21-2 int	113	1	60.1	62.8	66	2.7	15	----	62.8	0.0	5	-5.0
22-2 int	114	3	56.0	59.0	66	3.0	15	----	59.0	0.0	5	-5.0
23-2 int	115	3	56.2	58.7	66	2.5	15	----	58.7	0.0	5	-5.0
24-2 int	116	2	60.0	62.8	66	2.8	15	----	62.8	0.0	5	-5.0
25-2 int	117	4	59.0	61.9	66	2.9	15	----	61.9	0.0	5	-5.0
5-3 int	118	2	64.7	66.3	66	1.6	15	Snd Lvl	66.3	0.0	5	-5.0
6-3 int	119	2	52.4	54.1	66	1.7	15	----	54.1	0.0	5	-5.0
7-3 int	120	1	64.1	65.7	66	1.6	15	----	65.7	0.0	5	-5.0
8-3 int	121	1	56.5	58.2	66	1.7	15	----	58.2	0.0	5	-5.0
9-3 int	122	1	64.5	66.1	66	1.6	15	Snd Lvl	66.1	0.0	5	-5.0
10-3 int	123	1	55.9	57.4	66	1.5	15	----	57.4	0.0	5	-5.0
11-3 int	124	2	65.2	66.9	66	1.7	15	Snd Lvl	66.9	0.0	5	-5.0
12-3 int	125	2	60.0	61.7	66	1.7	15	----	61.7	0.0	5	-5.0
13-3 int	126	2	64.4	66.3	66	1.9	15	Snd Lvl	66.3	0.0	5	-5.0
14-3 int	127	1	69.1	71.1	66	2.0	15	Snd Lvl	71.1	0.0	5	-5.0
15-3 int	129	2	60.0	61.9	66	1.9	15	----	61.9	0.0	5	-5.0
16-3 int	130	2	68.7	70.7	66	2.0	15	Snd Lvl	70.7	0.0	5	-5.0
17-3 int	131	2	70.7	72.7	66	2.0	15	Snd Lvl	72.7	0.0	5	-5.0
18-3 int	132	3	66.0	67.8	66	1.8	15	Snd Lvl	67.8	0.0	5	-5.0
19-3 int	133	3	65.7	67.7	66	2.0	15	Snd Lvl	67.7	0.0	5	-5.0
20-3 int	134	1	62.7	64.0	66	1.3	15	----	64.0	0.0	5	-5.0
21-3 int	135	1	62.1	63.5	66	1.4	15	----	63.5	0.0	5	-5.0
22-3 int	136	3	58.3	60.0	66	1.7	15	----	60.0	0.0	5	-5.0
23-3 int	137	3	58.4	60.0	66	1.6	15	----	60.0	0.0	5	-5.0

25-3 int	138	4	61.3	62.8	66	1.5	15	----	62.8	0.0	5	-5.0
17-1A	139	1	65.9	68.9	66	3.0	15	Snd Lvl	68.9	0.0	5	-5.0
17-1B	140	1	65.5	68.5	66	3.0	15	Snd Lvl	68.5	0.0	5	-5.0
17-2A	141	1	68.3	70.2	66	1.9	15	Snd Lvl	70.2	0.0	5	-5.0
17-2B	142	1	68.1	70.0	66	1.9	15	Snd Lvl	70.0	0.0	5	-5.0
17-3A	143	1	68.5	70.6	66	2.1	15	Snd Lvl	70.6	0.0	5	-5.0
17-3B	151	1	68.8	70.7	66	1.9	15	Snd Lvl	70.7	0.0	5	-5.0

Dwelling Units		**# DUs**	**Noise Reduction**		
			Min	**Avg**	**Max**
			dB	**dB**	**dB**
All Selected		193	0.0	0.0	0.0
All Impacted		40	0.0	0.0	0.0
All that meet NR Goal		0	0.0	0.0	0.0