

# **FINAL NOISE STUDY REPORT**

## **STATE ROAD 52 PD&E STUDY FROM I-75 (SR 93) to E. of EMMAUS CEMETERY ROAD**

Pasco Work Order Number: C 3623.00  
WPI Segment Number: 408827 1

Prepared for:



**Pasco County Engineering Services Department**

June 2005

**In cooperation with the Florida Department of Transportation**

FINAL

NOISE STUDY REPORT  
STATE ROAD 52 PD&E STUDY  
FROM I-75 (SR 93) to E. of EMMAUS CEMETERY ROAD  
IN PASCO COUNTY, FLORIDA

Pasco Work Order Number: C 3623.00  
WPI Segment Number: 408827 1

Prepared for:

**Pasco County Engineering Services Department**

Prepared by:

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June 2005

## **EXECUTIVE SUMMARY**

Pasco County in cooperation with the Florida Department of Transportation (FDOT) has conducted a study to evaluate and document possible traffic noise level changes that might result from the proposed improvements to State Road 52 (SR 52) from Interstate 75 (I-75) to the east of Emmaus Cemetery Road, a distance of 1.9 miles. The plans call for widening SR 52 from a two lane undivided roadway to a six lane divided urban roadway.

This Noise Study Report was prepared in accordance with the FDOT Project Development and Environment (PD&E) Manual, Part 2, Chapter 17 (October 6, 2003). Prediction of all traffic noise levels was performed using the Federal Highway Administration's (FHWA's) computer model, Traffic Noise Model (TNM) Version 2.5.

The objectives of the noise study were to identify noise sensitive sites adjacent to the project corridor, to evaluate future traffic noise levels at these sites with and without the improvements, and to evaluate the need and effectiveness of noise abatement measures. Additional objectives include the evaluation of construction noise and the identification of future noise level contours adjacent to the project corridor.

Predicted noise levels for the Build Alternatives were calculated and compared to the No-Build Alternative and to the existing condition noise levels at all of the noise sensitive sites identified as part of the field review. None of the evaluated sites are predicted to experience a substantial increase (i.e., an increase of 15 or more decibels above the existing noise level as a direct result of the Build Alternative). A single noise sensitive site will experience noise levels that will approach or exceed the FHWA Noise Abatement Criteria (NAC) under the Build Alternative while no sites currently approach or exceed the NAC. Likewise, the NAC is not expected to be approached or exceeded under the Future No-Build Alternative.

The site that will approach or exceed the NAC is a single family residence north of SR 52. Abatement alternatives were evaluated for this location. This included traffic management techniques, alignment modifications, property acquisition, land use controls, and noise barriers.

A noise barrier was evaluated for the single residence predicted to be affected by the proposed improvements. The results of the analysis indicate that Barrier 1 would not provide the minimum required reduction in traffic noise at a cost below the cost reasonable criteria.

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## **1.0 INTRODUCTION**

Pasco County in cooperation with the Florida Department of Transportation (FDOT) has conducted a study to evaluate and document possible traffic noise level changes that might result from the proposed improvements to State Road 52 (SR 52) from Interstate 75 (I-75) to the east of Emmaus Cemetery Road, a distance of 1.9 miles. Figure 1 indicates the limits of the proposed project.

This Noise Study Report (NSR) was prepared in accordance with the FDOT Project Development and Environment (PD&E) Manual, Part 2, Chapter 17 (October 6, 2003). All noise levels described in this report are expressed in A-weighted decibels (dBA) in terms of one-hour equivalent steady-state sound level – LAeq1h.

### **1.1 Purpose**

The objectives of the noise study are to identify noise sensitive sites adjacent to the project corridor, to evaluate future traffic noise levels at these sites with and without the improvements, and to evaluate the need and effectiveness of noise abatement measures. Additional objectives include the evaluation of construction noise and the identification of future noise level contours adjacent to the project corridor.

### **1.2 Project Description**

The proposed project involves the widening of SR 52 from a two-lane undivided highway to a six-lane divided urban highway from the intersection of SR 52 and I-75 eastward a distance of 1.9 miles in Pasco County.

## **2.0 PROPOSED IMPROVEMENTS**

This study will evaluate the traffic noise associated with the existing roadway, the proposed roadway (Build Alternative), and the future No-Build Alternative. Figure 2 illustrates the proposed typical section for SR 52 as a six-lane divided facility. The roadway would include three 12 foot travel lanes in each direction with a raised 22 foot median. A four (4) foot bike lane is proposed for each direction along with a five (5) foot sidewalk in each direction. At the eastern end of the project the proposed six-lane roadway would taper back to a two-lane undivided rural typical section. It is anticipated that most widening would take place to the south of the existing roadway.

## **3.0 TRAFFIC NOISE ANALYSIS**

The noise levels presented in this report are expressed in A-weighted decibels (dBA). This scale most closely approximates the response characteristics of the human ear to low level sound. All noise levels are reported as LAeq1h. The term LAeq1h is defined as the level (A-weighted) equivalent steady-state sound level which in a 1-hour period contains the same acoustic energy as the time-varying sound level during the same 1-hour period.

All predicted noise levels were produced using the FHWA computer prediction model for highway traffic noise – Traffic Noise Model (TNM) Version 2.5, April 14, 2004. TNM propagates sound energy, in one-third octave bands, between highways and nearby receivers, taking into account the intervening ground's acoustical characteristics, topography, and rows of buildings.





<p>STATE ROAD 52 PD&amp;E STUDY FROM I-75 (SR 93) TO EAST OF EMMAUS CEMETERY ROAD PASCO WORK ORDER NO. C3623.00 WPI SEGMENT NO. 408827 1</p>	<p>NOT TO SCALE</p>	<p>FIGURE 1 PROJECT LOCATION MAP</p>
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### 3.1 Noise Abatement Criteria

To evaluate traffic noise, the FHWA has established Noise Abatement Criteria (NAC). As shown in Table 1, the NAC vary according to land use activity and traffic noise sensitivity.

When predicted traffic noise levels “approach” or exceed the NAC, or when predicted traffic noise levels increase substantially from existing levels, Florida Statute 335.17 requires that noise abatement measures be consistent with 23 CFR 772. The FDOT defines the word “approach” as within 1 dBA of the NAC, and a substantial increase occurs if noise levels are predicted to increase by 15 dBA or more as a direct result of the transportation improvement project.

**Table 1: FHWA Noise Abatement Criteria**

Activity Category	Description	$L_{Aeq1h}$ *
A	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.	57 (Exterior)
B	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.	67 (Exterior)
C	Developed lands, properties or activities not included in Categories A or B above.	72 (Exterior)
D	Undeveloped lands.	N/A
E	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.	52 (Interior)
Source: Code of Federal Regulations, Title 23, Part 772		
* $L_{Aeq1h}$ - values that contain the same amount of acoustic energy as a time varying A-weighted sound level over a period of one hour.		

### 3.2 Noise Sensitive Sites

A noise sensitive site is any property (owner occupied, rented or leased) where frequent exterior human use occurs and where a lowered noise level would be of benefit. A field evaluation of the project area revealed 12 potentially noise sensitive receivers within the project corridor. All receivers are located north of SR 52 and all but two of the receiver sites are residential in nature. The exceptions are the San Antonio Community Church, located east of Emmaus Cemetery Road and the Piney Grove Missionary Baptist Church located to the west of Emmaus Cemetery Road. Table 2 lists the location and description of each noise sensitive site. The location of these sites is shown on Figure 3. All abutting property south of SR 52 is currently undeveloped, agricultural, or industrial in nature and is not considered sensitive to traffic noise. The Pasco County Comprehensive Plan (Figure 4) shows this corridor as being a mixed use or residential classification for the year 2015. Future development that may be built adjacent to the south of SR 52 will be responsible for the provision of noise abatement if the development is permitted after the date of public knowledge, which for this project will be the date that the State Environmental Impact Report (SEIR) is approved by FDOT. Noise contours associated with the proposed improvement project are included in this report and can be used by local government and developers to assist in considering the potential for traffic noise effects on future development.

**Table 2: Noise Sensitive Receivers**

Noise Sensitive Receiver	Property Address	Land Use
1	31427 State Road 52, San Antonio, FL 33576	Single Family Residence
2	31345 State Road 52, San Antonio, FL 33576	Single Family Residence
3	31315 State Road 52, San Antonio, FL 33576	Single Family Residence
4	31331 State Road 52, San Antonio, FL 33576	Single Family Residence
5	31251 State Road 52, San Antonio, FL 33576	Religious Facility
6	31221 State Road 52, San Antonio, FL 33576	Single Family Residence
7	31157 State Road 52, San Antonio, FL 33576	Single Family Residence
8	116542 Emmaus Cemetery Road, San Antonio, FL 33576	Single Family Residence
9	11638 Emmaus Cemetery Road, San Antonio, FL 33576	Single Family Residence
10	11637 Emmaus Cemetery Road, San Antonio, FL 33576	Single Family Residence
11	31027 State Road 52, San Antonio, FL 33576	Religious Facility
12	31005 State Road 52, San Antonio, FL 33576	Single Family Residence
Source: Environmental Science Associates, Inc., 2004		

### 3.3 Noise Model

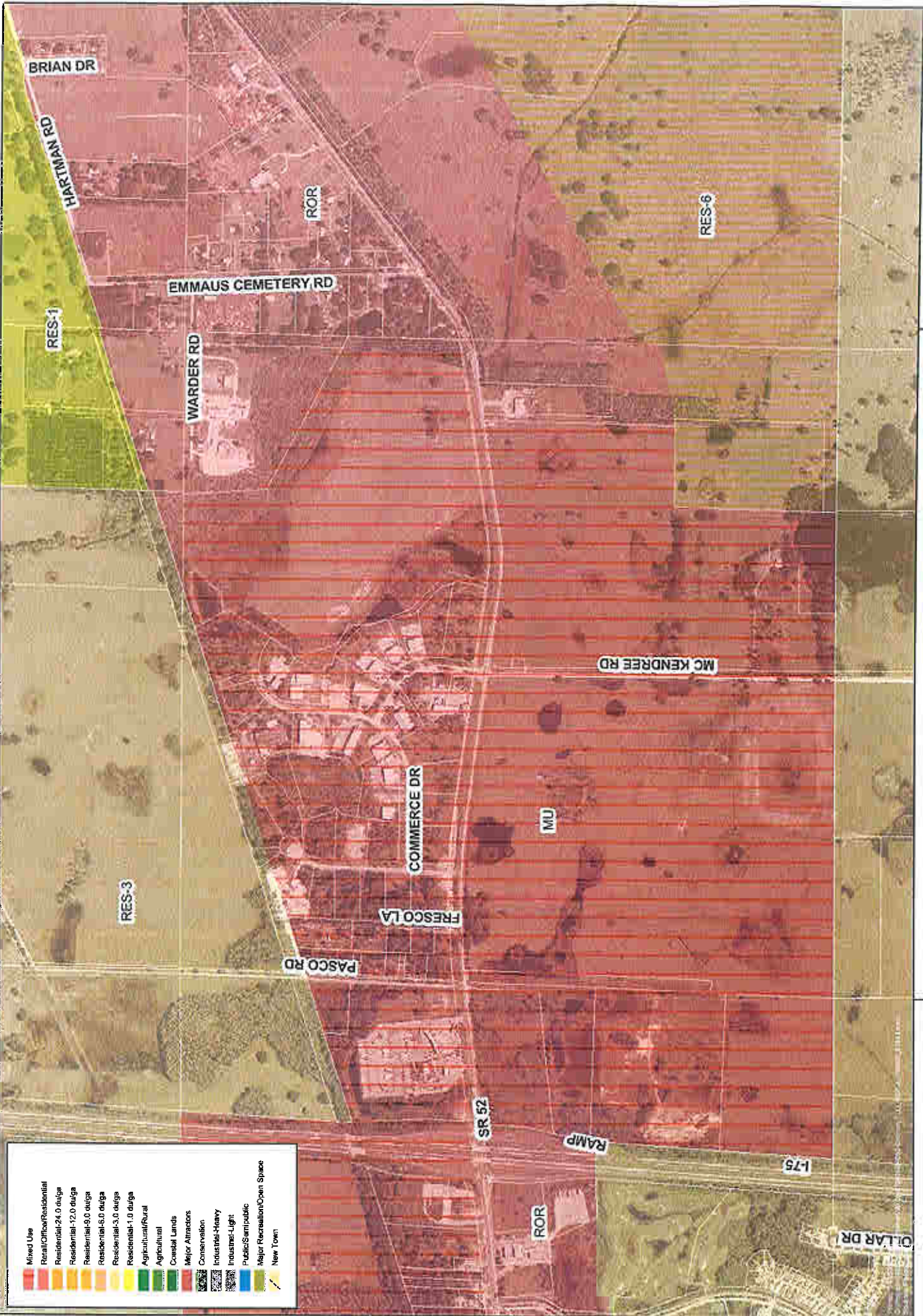
Input parameters necessary to run TNM 2.5 include: detailed roadway geometry, receiver locations, propagation characteristics, shielding, and traffic data. The propagation path between the noise sensitive sites and SR 52 is generally considered to be an acoustically "soft" site. This means that the intervening ground surface is mostly grass or low vegetation. The preliminary design concepts were used to develop roadway geometry along with the plans available for the existing roadway. The roadway geometry and receiver locations were evaluated in the field and mapped using plan sheets and recent aerial photography.

### 3.4 Traffic Data

Traffic noise level predictions are made for the traffic characteristics that yield the worst hourly traffic noise on a regular basis. Generally, the worst hourly traffic volume is the peak-hour level of service (LOS) C or demand LOS, whichever is less. The design year for this project is 2030.

Table 3 contains the data used in the prediction of traffic noise for this project for all reasonable alternatives. A Peak-hour factor (K) of 9.32% was used along with a directional (D) factor of 56.84% and a truck factor (T) of 2.08% for medium trucks, 1.57% for heavy trucks, and 0.36% for buses. From a traffic perspective the project was broken up into three segments. From west to east, the first segment extended from I-75 to McKendree. The second segment extended from McKendree to Clinton and the third segment extended from Clinton to east of Emmaus Cemetery Road.





STATE ROAD 52 PD&E STUDY  
FROM I-75 (SR 93) TO EAST OF  
EMMAUS CEMETERY ROAD  
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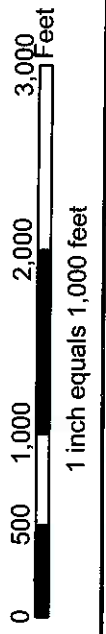


FIGURE 4  
FUTURE LAND USE MAP

**Table 3: Traffic Data for SR 52**

Segment	Alternative	Direction Of Flow	Traffic Volume by Vehicle Type				Speed (mph)
			Cars	Medium Trucks(a)	Heavy Trucks(b)	Buses (c)	
I-75 to McKendree	Existing (2004)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	No-Build (2030)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	Future Build (2030)	Off-Peak	1730	28	37	6	50
		Peak	2278	37	49	9	50
McKendree to Clinton	Existing (2004)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	No-Build (2030)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	Future Build (2030)	Off-Peak	1266	21	27	5	50
		Peak	1668	27	36	6	50
Clinton to E. of Emmaus	Existing (2004)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	No-Build (2030)	Off-Peak	506	8	11	2	45
		Peak	666	11	14	2	45
	Future Build (2030)	Off-Peak	672	11	15	3	50
		Peak	885	14	19	3	50

Source: SR 52 SEIR Traffic Analysis Report, Wilson Miller, Inc., 2004

(a) Medium truck – all cargo vehicles having 2 axles and 6 tires.

(b) Heavy truck – all cargo vehicles having 3 or more axles.

(c) Bus – all vehicles having 2 or 3 axles carrying 9 or more passengers.

### 3.5 Measured Noise Levels

To validate the computer noise model, field measurements were taken at locations within the project area which are representative of noise sensitive areas within the study limits. Field measurements were generally conducted according to procedures described in the requirements of the FDOT PD&E Manual, Part 2, Chapter 17. Noise levels were measured with a calibrated Larson-Davis Sound Level Meter Model 700 equipped with a microphone and windscreen. All measurements were taken with the microphone 5 feet above the ground, which correlates with the average height of the human ear. Traffic speeds were recorded with a Stalker Solo Plus radar gun. Traffic volumes and classification were recorded during each 10 minute measuring period.

The location of the traffic noise measurements are shown on Figure 3 while Table 4 presents the field measurement data along with the validation results. The noise level prediction model is within an acceptable level of accuracy if measured and predicted noise levels are within the FDOT tolerance standard of 3 dBA. As shown in Table 4, the ability of TNM 2.5 to accurately predict noise levels for this project has been confirmed. A copy of the field measurement data sheets can be found in Appendix A.

**Table 4: Noise Model Validation**

Location	Date	Time	Field Measured (dBA)	Computer Predicted (dBA)	Difference (dBA)
Site 1 – 80' n. of the edge of pavement of SR 52 at San Antonio Community Church	12/21/04	9:39 - 9:49 AM	65.5	65.1	0.4
		9:53 -10:03 AM	63.5	65.0	-1.5
		10:07 - 10:17 AM	64.5	65.0	-0.5
Site 2 – 70' n. of the edge of pavement of SR 52, 550' w. of Corporate Lake Blvd.	12/21/04	10:35 - 10:43 AM	64.5	65.2	-0.7
		10:47 - 10:57 AM	65.0	65.5	-0.5
		11:00 - 11:10 AM	63.0	65.4	-2.4
Source: Environmental Science Associates, Inc., 2004					

### 3.6 Predicted Noise Levels

Predicted noise levels for the Build Alternatives were calculated and compared to the No-Build Alternative and to the existing condition noise levels at all of the noise sensitive sites identified as part of the field review. Traffic noise prediction input and output data can be found in Appendix B.

Table 5 presents the predicted noise levels for the existing condition and the No-Build Alternatives and compares the increase in the predicted Build Alternative noise levels above the predicted existing condition. As shown by the comparisons for each noise sensitive site, none of the evaluated sites are predicted to experience a substantial increase (i.e., an increase of 15 or more decibels above the existing noise level as a direct result of the Build Alternative). The location of the noise sensitive sites modeled is presented in Figure 3.

As can be seen from the data in Table 5, a single noise sensitive site will experience traffic noise levels that will approach or exceed the NAC under the Build Alternative. No sites currently approach or exceed the NAC. Likewise, the NAC is not expected to be approached or exceeded under the Future No-Build Alternative.

The site that is predicted to approach or exceed the NAC is a single family residence north of SR 52.



**Table 5: Predicted Traffic Noise Levels**

Noise Sensitive Site #	Land Use	Predicted LAeq1h (dBA)			Difference Existing vs. Build (dBA)	Approach or Exceed NAC?
		Existing Condition (2004)	No-Build Alternative (2030)	Build Alternative (2030)		
1	SF Residential	61.3	61.3	67.7	6.4	Yes
2	SF Residential	56.3	56.3	63.7	7.4	No
3	SF Residential	49.4	49.4	54.2	4.8	No
4	SF Residential	58.5	58.5	65.3	6.8	No
5	Church (Interior)	47.5	47.5	52.6	5.1	No
6	SF Residential	55.2	55.2	60.2	5.0	No
7	SF Residential	59.6	59.6	64.9	5.3	No
8	SF Residential	55.7	55.7	60.8	5.1	No
9	SF Residential	60.2	60.2	65.3	5.1	No
10	SF Residential	57.1	57.1	62.3	5.2	No
11	Church (Interior)	41.5	41.5	46.1	4.6	No
12	SF Residential	60.2	60.2	64.3	4.1	No
<b>PREDICTED MINIMUM</b>		<b>41.5</b>	<b>41.5</b>	<b>46.1</b>	<b>4.1</b>	
<b>PREDICTED MAXIMUM</b>		<b>61.3</b>	<b>61.3</b>	<b>67.7</b>	<b>7.4</b>	
Total Sites Approaching or Exceeding the NAC		0	0	1		1

Source: Environmental Science Associates, Inc., 2004

## 4.0 EVALUATION OF ABATEMENT ALTERNATIVES

Since noise levels along the study corridor were determined to exceed the NAC for Activity Category B land use, the feasibility and reasonableness of noise abatement measures were evaluated. As outlined in Part 2, Chapter 17, of the PD&E Manual, these measures may include traffic system management, alignment modification, land use controls, and noise barriers.

### 4.1 Traffic Management Measures

Traffic control measures that limit motor vehicle speeds and reduce traffic volumes can be effective noise mitigation measures. However, these measures also negate a project's ability to accommodate forecasted traffic volumes. For example, a substantial speed reduction on SR 52 would lower traffic noise levels; however, the capacity of the roadway to service traffic would also be reduced. Since SR 52 is a primary roadway supporting the Pasco County area, reducing traffic volumes or prohibiting truck traffic is not a viable measure. Therefore, this method of noise mitigation is not considered reasonable.

### 4.2 Alignment Modifications

Alignment modification involves orienting and/or siting the roadway at sufficient distances from the residential areas so as to minimize traffic noise. Since this project involves lane additions to the existing roadway, the existing alignment dictates the proposed horizontal and vertical alignment.



### **4.3 Land Use Controls**

Another noise abatement measure is the use of land use controls to minimize noise level changes to future development. Pasco County planning agencies with land use control authority should anticipate changes to future noise levels along SR 52. This NSR will be made available to Pasco County planning authorities to assist in the siting of future compatible land uses. The noise contours provided in Figure 5 should be used to assist in developing setback distances for future noise sensitive land uses.

### **4.4 Noise Barriers**

Noise barriers reduce noise levels by blocking the sound path between a roadway and noise sensitive sites. In order to be effective in reducing traffic-induced noise levels, a noise barrier must be relatively long, continuous (with no intermittent openings) and sufficiently high enough to provide the necessary reduction in noise levels.

In order for a noise barrier to be considered feasible and economically reasonable it must meet the following minimum conditions:

- Provide a minimum insertion loss (noise reduction) of at least an average of 5 dBA for the affected receivers with a design goal of 10 dBA or more being desirable.
- Cost must not exceed \$35,000 per benefited receiver unless a higher level of expenditure can be justified by other circumstances.

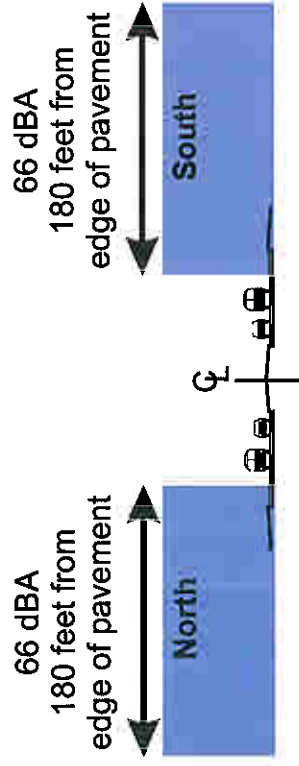
Noise barriers were evaluated at areas along SR 52 where the traffic noise levels are predicted to approach or exceed the NAC as a result of the Build Alternative. TNM 2.5 was used to analyze the effectiveness of each noise barrier. Each barrier was analyzed at varying heights ranging from 8 to 22 feet at various lengths in order to determine the most effective barrier design with the optimum height and length meeting the above conditions.

#### **4.4.1 Noise Barrier 1**

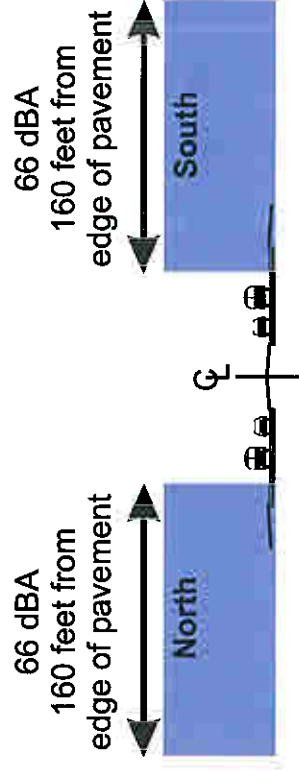
A noise barrier was investigated at Site 1, a single-family residence located north of SR 52 and east of Emmaus Cemetery Road. (See Figure 6) An optimized barrier 289 feet long and ranging in height from 8 to 22 feet was investigated as a potential measure to reduce the anticipated traffic noise levels. As shown in Table 6, a barrier at this location, while capable of providing the required minimum insertion loss of 5 dBA or more, was determined to not be cost reasonable.

Based on the results of the noise barrier modeling effort, it has been determined that a noise barrier evaluated for the single affected residence is not cost reasonable. Therefore noise abatement in the form of noise barriers is not anticipated in conjunction with this project.

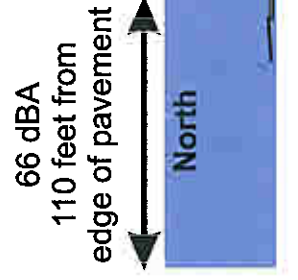
# State Road 52 SEIR



I-75 to McKendree Road



McKendree Road to Clinton



Clinton to East of Emmaus Cemetery Road

Distances do not reflect any reduction in noise levels that would result from existing structures (shielding)

## Noise Contours

WPI Segment #: 408827 1

Figure 5





① NOISE SENSITIVE AREA  
 ■ EVALUATED BARRIER LOCATION

STATE ROAD 52 PD&E STUDY  
 FROM I-75 (SR 93) TO EAST OF  
 EMMAUS CEMETERY ROAD  
 PASCO WORK ORDER NO. C3623.00  
 WPI SEGMENT NO. 408827.1

0 200 400 800 1,200 Feet  
 1 inch equals 400 feet



FIGURE 6  
 NOISE SENSITIVE SITES  
 & EVALUATED BARRIER LOCATION



**Table 6: Noise Barrier Analysis: Barrier 1 – Site 1**

Barrier Height (ft)	Affected Receivers With Insertion Loss of (dBA)						Number of Benefited Receivers			Total Estimated Cost	Cost Per Benefited Receiver	Cost Reasonable Yes/No
	5	6	7	8	9	10 or >	Affect- ed	* Other	Total			
8	1	0	0	0	0	0	1	0	1	\$57,800	\$57,800	No
10	0	1	0	0	0	0	1	0	1	\$72,250	\$72,250	No
12	0	0	0	1	0	0	1	0	1	\$86,700	\$86,700	No
14	0	0	0	1	0	0	1	0	1	\$101,150	\$101,150	No
16	0	0	0	1	0	0	1	0	1	\$115,600	\$115,600	No
18	0	0	0	0	1	0	1	0	1	\$130,050	\$130,050	No
20	0	0	0	0	1	0	1	0	1	\$144,500	\$144,500	No
22	0	0	0	0	1	0	1	0	1	\$158,950	\$158,950	No

Source: Environmental Science Associates, Inc., 2004  
 \* Other = Receivers determined to be unaffected by the project (traffic noise levels less than 66 dBA) but benefited by the noise barrier.

## 5.0 CONSTRUCTION NOISE AND VIBRATION

During the construction phase of the project, short-term noise levels may be generated by mobile and stationary construction equipment. The range of construction noise depends on the noise characteristics of the equipment and activities involved (e.g., pile driving), the construction schedule (time of day and duration of the activity), and the distance from a noise sensitive site.

Several residences and the Piney Grove Missionary Baptist Church abutting SR 52 on the north side could be considered susceptible to construction vibration. Construction noise could be temporary at any location and will be controlled by adherence to the most recent edition of the FDOT Standard Specifications for Road and Bridge Construction.

## 6.0 PUBLIC COORDINATION

### 6.1 Coordination with Local Officials

Local officials can promote compatibility between land development and highways. A copy of this report will be provided to the Pasco County agencies responsible for controlling land use. The 66 dBA noise contour shown in Figure 5 and the other predicted noise levels provided in this report can be used by Pasco County to restrict development of exterior land uses associated with residences, motels, schools, churches, and recreational facilities which would be considered incompatible with traffic noise generated from SR 52. Pasco County officials can use the noise contour data to establish compatible development of currently undeveloped parcels or compatible redevelopment in areas where land use changes.

### 6.2 Public Involvement

The Public Hearing for the project was held on April 21, 2005, from 5:00 p.m. to 7:30 p.m. at the Pasco County Historic Courthouse, located at 37918 Meridian Avenue, Dade City, Florida. The purpose of the hearing was to present the results of the PD&E study, and to provide the public with an opportunity to express their views regarding the project. A total of fourteen (14)

individuals attended the hearing. No comments related to noise were received either at the hearing or during the comment period which followed.

## **7.0 CONCLUSIONS**

Noise levels at 12 locations (10 residences and two churches) were modeled using TNM 2.5. The result of the noise predictions indicates that only one site is expected to approach or exceed the NAC for Activity Category B under the Build Alternative. The increase in noise levels from both the existing condition and No-Build to the Build Alternative is predicted to range from 4.1 to 7.4 dBA. No substantial increases above existing noise levels are predicted to occur.

Noise barriers were evaluated at the site along SR 52 that is predicted to approach or exceed the NAC as a result of the Build Alternative. According to the results, the noise barrier adjacent to Site 1 would not provide at least 5 dBA of noise reduction and meet the reasonable cost criterion of \$35,000 per benefited site. Based on the noise analysis performed to date, there appears to be no apparent solutions available to mitigate traffic noise at the affected residence.

## **8.0 REFERENCES**

Florida Department of Transportation "Project Development and Environment Manual." Part 2, Chapter 17, October 5, 2003. Available at: [www.dot.state.fl.us/emo/pubs/pdeman/pdeman.htm](http://www.dot.state.fl.us/emo/pubs/pdeman/pdeman.htm)

Florida Department of Transportation "Standard Specifications for Road and Bridge Construction." 2004; 974 pages. Available from FDOT Maps and Publications, Mail Station 12, 605 Suwannee Street, Tallahassee, FL 32399-0450.



# ***APPENDICES***

# ***APPENDIX A***

## ***Field Data Sheets***

**ESA NOISE MEASUREMENT DATA SHEET**

Run # 1

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 1 - 80' north of the edge of pavement of SR 52 at the San Antonio Community Church

Start Time: 9:39 End Time: 9:49

Weather Conditions: Sky: Clear   X   Partly Cloudy        Cloudy:        Other:         
Temperature: Start 56 End 57 Wind Speed: Start 2.9 mph End 1.7 mph  
Wind Direction: Start East End East Humidity: Start 45% End 44%

## Equipment:

## Sound Level Meter

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 58 End 53

Response Settings: Fast        Slow   X   Weighting Scale: A Other:       

## Calibrator

Type: Larson-Davis CA250 Serial Number: 1655

**TRAFFIC DATA**

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	81	51	52	51
Medium Trucks	3	44	2	33
Heavy Trucks	8	47	5	49
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

**RESULTS SUMMARY**LMAX        LEQ 65.5 L10        L50        L90        Other                     

Major Noise Source(s): Traffic on SR 52

Background Noise Source(s):

Unusual Events:

Other Notes/Observations:

## ESA NOISE MEASUREMENT DATA SHEET

Run # 2

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 1 - 80' north of the edge of pavement of SR 52 at the San Antonio Community Church

Start Time: 9:52 End Time: 10:02

Weather Conditions: Sky: Clear ☒ Partly Cloudy ☐ Cloudy: ☐ Other: ☐  
Temperature: Start 58 End 57 Wind Speed: Start 1.9 mph End 2.8 mph  
Wind Direction: Start East End East Humidity: Start 49% End 51%

Equipment:

Sound Level Meter

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 53 End 50

Response Settings: Fast ☐ Slow ☒ Weighting Scale: A Other ☐

Calibrator

Type: Larson-Davis CA250

Serial Number: 1655

## TRAFFIC DATA

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	57	52	51	54
Medium Trucks	2	56	3	56
Heavy Trucks	3	52	6	53
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

## RESULTS SUMMARY

LMAX \_\_\_\_\_ LEQ 63.5 L10 \_\_\_\_\_ L50 \_\_\_\_\_ L90 \_\_\_\_\_ Other \_\_\_\_\_

Major Noise Source(s): Traffic on SR 52

Background Noise Source(s): Birds & insects

Unusual Events:

Other Notes/Observations: Light breeze, some agricultural noise in background.

## ESA NOISE MEASUREMENT DATA SHEET

Run # 3

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 1 - 80' north of the edge of pavement of SR 52 at the San Antonio Community Church

Start Time: 10:07 End Time: 10:17

Weather Conditions: Sky: Clear ☒ Partly Cloudy ☐ Cloudy: ☐ Other: ☐  
Temperature: Start 60 End 58 Wind Speed: Start 1.5 mph End 2.3 mph  
Wind Direction: Start East End East Humidity: Start 49% End 51%

### Equipment:

#### Sound Level Meter

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 50 End 50

Response Settings: Fast ☐ Slow ☒ Weighting Scale: A Other ☐

#### Calibrator

Type: Larson-Davis CA250

Serial Number: 1655

## TRAFFIC DATA

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	56	49	50	52
Medium Trucks	1	42	1	55
Heavy Trucks	8	47	6	52
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

## RESULTS SUMMARY

LMAX \_\_\_\_\_ LEQ 64.5 L10 \_\_\_\_\_ L50 \_\_\_\_\_ L90 \_\_\_\_\_ Other \_\_\_\_\_

Major Noise Source(s): Traffic on SR 52

Background Noise Source(s): Birds & insects

Unusual Events: General aviation overflight at 10:09

Other Notes/Observations: Light breeze, some agricultural noise in background.

**ESA NOISE MEASUREMENT DATA SHEET**

Run # 1

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 2 - 70' north of the edge of pavement of SR 52, 550' west of Corporate Lake Blvd.

Start Time: 10:35 End Time: 10:45

Weather Conditions: Sky: Clear ☒ Partly Cloudy ☐ Cloudy: ☐ Other: ☐  
Temperature: Start 59 End 60 Wind Speed: Start 2.9 mph End 2.9 mph  
Wind Direction: Start East End East Humidity: Start 49% End 40%

**Equipment:****Sound Level Meter**

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 52 End 50

Response Settings: Fast ☐ Slow ☒ Weighting Scale: A Other ☐**Calibrator**

Type: Larson-Davis CA250

Serial Number: 1655

**TRAFFIC DATA**

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	59	46	56	48
Medium Trucks	3	35	4	47
Heavy Trucks	11	42	8	47
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

**RESULTS SUMMARY**

LMAX \_\_\_\_\_ LEQ 64.5 L10 \_\_\_\_\_ L50 \_\_\_\_\_ L90 \_\_\_\_\_ Other \_\_\_\_\_

Major Noise Source(s): Traffic on SR 52

Background Noise Source(s): Insects, birds

Unusual Events:

Other Notes/Observations: Light breeze with some gusts.



## ESA NOISE MEASUREMENT DATA SHEET

Run # 2

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 1 - 70' north of the edge of pavement of SR 52, 550' west of Corporate Lake Blvd.

Start Time: 10:47 End Time: 10:57

Weather Conditions: Sky: Clear ☒ Partly Cloudy ☐ Cloudy: ☐ Other: ☐  
Temperature: Start 60 End 64 Wind Speed: Start 2.8 mph End 2.5 mph  
Wind Direction: Start East End East Humidity: Start 41% End 39%

Equipment:

Sound Level Meter

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 50 End 50

Response Settings: Fast ☐ Slow ☒ Weighting Scale: A Other ☐

Calibrator

Type: Larson-Davis CA250

Serial Number: 1655

## TRAFFIC DATA

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	60	46	50	48
Medium Trucks	3	47	2	45
Heavy Trucks	2	45	11	46
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

## RESULTS SUMMARY

LMAX  LEQ 65.0 L10  L50  L90  Other

Major Noise Source(s): Traffic on SR 52

Background Noise Source(s): Birds & insects

Unusual Events: Car horn at 10:56

Other Notes/Observations:

**ESA NOISE MEASUREMENT DATA SHEET**

Run # 3

Date: 12-21-04 Measurement Taken By: Mike Mulbarger

Project: SR 52 from I-75 to east of Emmaus Cemetery Road in Paso County

Site Identification: Site 1 - 70' north of the edge of pavement of SR 52, 550' west of Corporate Lake Blvd.

Start Time: 11:00 End Time: 11:10

Weather Conditions: Sky: Clear ☒ Partly Cloudy ☐ Cloudy: ☐ Other: ☐  
Temperature: Start 63 End 64 Wind Speed: Start 2.1 mph End 2.9 mph  
Wind Direction: Start East End East Humidity: Start 37% End 43%

**Equipment:****Sound Level Meter**

Type: Larson-Davis Model 700 Serial Number: 2041

Date of Last Traceable Meter Calibration: Nov. 4, 2004

Field Calibration Reading: Start 114 dB End 114 dB Battery Check: Start 48 End 48

Response Settings: Fast ☐ Slow ☒ Weighting Scale: A Other ☐**Calibrator**

Type: Larson-Davis CA250

Serial Number: 1655

**TRAFFIC DATA**

Vehicle Types	Eastbound SR 52		Westbound SR 52	
	Volume	Speed	Volume	Speed
Autos	67	47	56	48
Medium Trucks	2	51	3	53
Heavy Trucks	6	44	9	47
Buses	0	0	0	0
Motorcycles	0	0	0	0
Duration (in minutes)	10		10	

**RESULTS SUMMARY**

LMAX \_\_\_\_\_ LEQ 63.0 L10 \_\_\_\_\_ L50 \_\_\_\_\_ L90 \_\_\_\_\_ Other \_\_\_\_\_

Major Noise Source(s): Traffic on SR 52

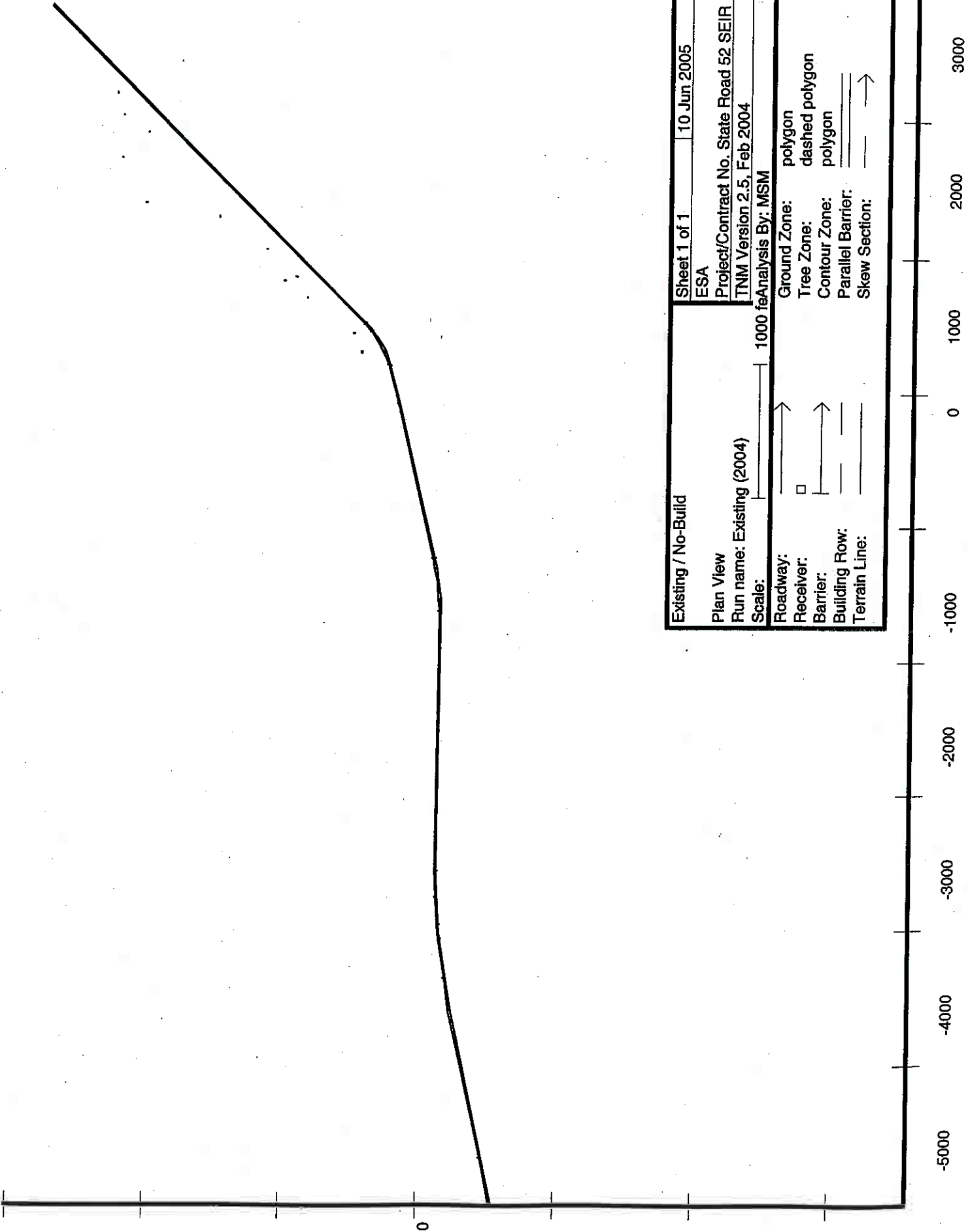
Background Noise Source(s): Birds &amp; insects

Unusual Events:

Other Notes/Observations: Light breeze with gusts

## ***APPENDIX B***

### ***TNM Input/Output***



Existing / No-Build	Sheet 1 of 1	10 Jun 2005
	ESA	
	Project/Contract No. State Road 52 SEIR	
	TNM Version 2.5, Feb 2004	
Plan View	1000 feet Analysis By: MSM	
Run name: Existing (2004)		
Scale:		
Roadway:	Ground Zone:	polygon
Receiver:	Tree Zone:	dashed polygon
Barrier:	Contour Zone:	polygon
Building Row:	Parallel Barrier:	
Terrain Line:	Skew Section:	→

INPUT: ROADWAYS

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5

INPUT: ROADWAYS  
PROJECT/CONTRACT:  
RUN:

State Road 52 SEIR  
Existing / 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	%							
EB SR 52 611+60 to 616+60		12.0	1		-6,150.0	-578.0	94.10				Average						
			2		-5,670.0	-472.0	94.10										
	EB SR 52 616+60 to 712+22.31	12.0	1		-5,670.0	-472.0	94.10				Average						
			2		-4,597.0	-236.0	100.00				Average						
			3		-4,361.0	-196.0	102.50				Average						
			4		-4,064.0	-157.0	105.00			Average							
			5		-3,964.0	-147.0	104.60			Average							
			6		-3,767.0	-134.0	103.30			Average							
			7		-3,567.0	-127.0	102.80			Average							
			8		-1,642.0	-142.0	99.60			Average							
			9		-1,542.0	-139.0	99.60			Average							
			10		-1,403.0	-125.0	100.00			Average							
			11		-1,322.0	-112.0	100.30			Average							
			12		-1,242.0	-97.0	100.70			Average							
			13		-99.0	167.0	95.20			Average							
			14		192.0	242.0	95.20			Average							
			15		289.0	276.0	95.40			Average							
			16		342.0	304.0	95.50			Average							
			17		395.0	338.0	96.00			Average							
			18		445.0	374.0	96.00			Average							
			19		456.0	383.0	96.00			Average							
			20		507.0	425.0	96.00			Average							
			21		2,817.0	2,727.0	107.50										
WB SR 52 712+22.31 to 616+60		12.0	1		2,811.0	2,738.0	107.50				Average						
			2		498.0	431.0	96.00				Average						
G:\204\XXX\204292 - WILSON MILLER SR52 SEIRYTM 2 Elevations (2004)																	

G:\204XXX\204292 - WILSON MILLER SR52 SEIR\TNM 2.5\Existing (2004)

INPUT: ROADWAYS

State Road 52 SEIR

		3	27	452.0	395.0	96.00			Average	
		4	28	436.0	383.0	96.00			Average	
		5	29	387.0	347.0	96.00			Average	
		6	30	342.0	320.0	95.50			Average	
		7	31	283.0	290.0	95.40			Average	
		8	32	192.0	255.0	95.20			Average	
		9	33	-100.0	180.0	95.20			Average	
		10	34	-1,247.0	-82.0	100.70			Average	
		11	35	-1,325.0	-99.0	100.30			Average	
		12	36	-1,405.0	-112.0	100.00			Average	
		13	37	-1,542.0	-124.0	99.60			Average	
		14	38	-1,642.0	-130.0	99.60			Average	
		15	39	-3,567.0	-114.0	102.80			Average	
		16	40	-3,767.0	-120.0	103.30			Average	
		17	41	-3,966.0	-134.0	104.60			Average	
		18	42	-4,066.0	-143.0	105.00			Average	
		19	43	-4,361.0	-188.0	102.50			Average	
		20	44	-4,600.0	-223.0	100.00			Average	
		21	45	-5,675.0	-457.0	94.10				
WB SR 52 616+60 to 611+60	12.0	1	46	-5,675.0	-457.0	94.10			Average	
		2	47	-6,160.0	-556.0	94.10				



INPUT: TRAFFIC FOR LAeq1h Volumes

State Road 52 SEIR

10 June 2005  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT: State Road 52 SEIR  
RUN: Existing / No-Build

Roadway	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	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
EB SR 52 611+60 to 616+60	1			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	2																						
EB SR 52 616+60 to 712+22.31	1			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	2			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	3			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	4			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	5			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	6			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	7			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	8			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	9			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	10			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	11			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	12			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	13			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	14			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	15			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	16			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	17			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	18			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	19			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0
	20			506	45	8	45	11	45	2	45	0	0	0	0	0	0	0	0	0	0	0	0

G:\204XX\1204292 - WILSON MILLER SR52 SEIR\TNM 2.5\Existing (2004)

**State Road 52 SEIR**

[illegible]

INPUT: RECEIVERS

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5

INPUT: RECEIVERS

PROJECT/CONTRACT: State Road 52 SEIR

RUN: Existing / No-Build

Receiver															
Name		No.	#DUs		Coordinates (ground)			Height		Input Sound Levels and Criteria				Active	
			X	Y	Z		above	Existing	Impact	Criteria		NR		in	
						ft	ft	LAeq1h	dBA	LAeq1h	Sub'l	Goal		Calc.	
									dBA			dB			
1		1	2,180.0	2,252.0	111.90	5.00	0.00	66	15.0	10.0				Y	
2		1	2,020.0	2,202.0	112.70	5.00	0.00	66	15.0	10.0				Y	
3		1	1,713.0	2,210.0	111.90	5.00	0.00	66	15.0	10.0				Y	
4		1	1,892.0	2,020.0	111.70	5.00	0.00	66	15.0	10.0				Y	
5		1	1,382.0	2,035.0	106.00	5.00	0.00	66	15.0	10.0				Y	
6		1	1,280.0	1,500.0	101.40	5.00	0.00	66	15.0	10.0				Y	
7		1	1,048.0	1,153.0	100.00	5.00	0.00	66	15.0	10.0				Y	
8		1	815.0	1,020.0	99.20	5.00	0.00	66	15.0	10.0				Y	
9		1	840.0	935.0	99.00	5.00	0.00	66	15.0	10.0				Y	
10		1	687.0	853.0	98.40	5.00	0.00	66	15.0	10.0				Y	
11		1	425.0	510.0	97.00	5.00	0.00	66	15.0	10.0				Y	
12		1	287.0	450.0	93.70	5.00	0.00	66	15.0	10.0				Y	

RESULTS: SOUND LEVELS

State Road 52 SEIR

ESA  
MSM

10 June 2005

TNM 2.5

Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

RUN:

BARRIER DESIGN:

State Road 52 SEIR

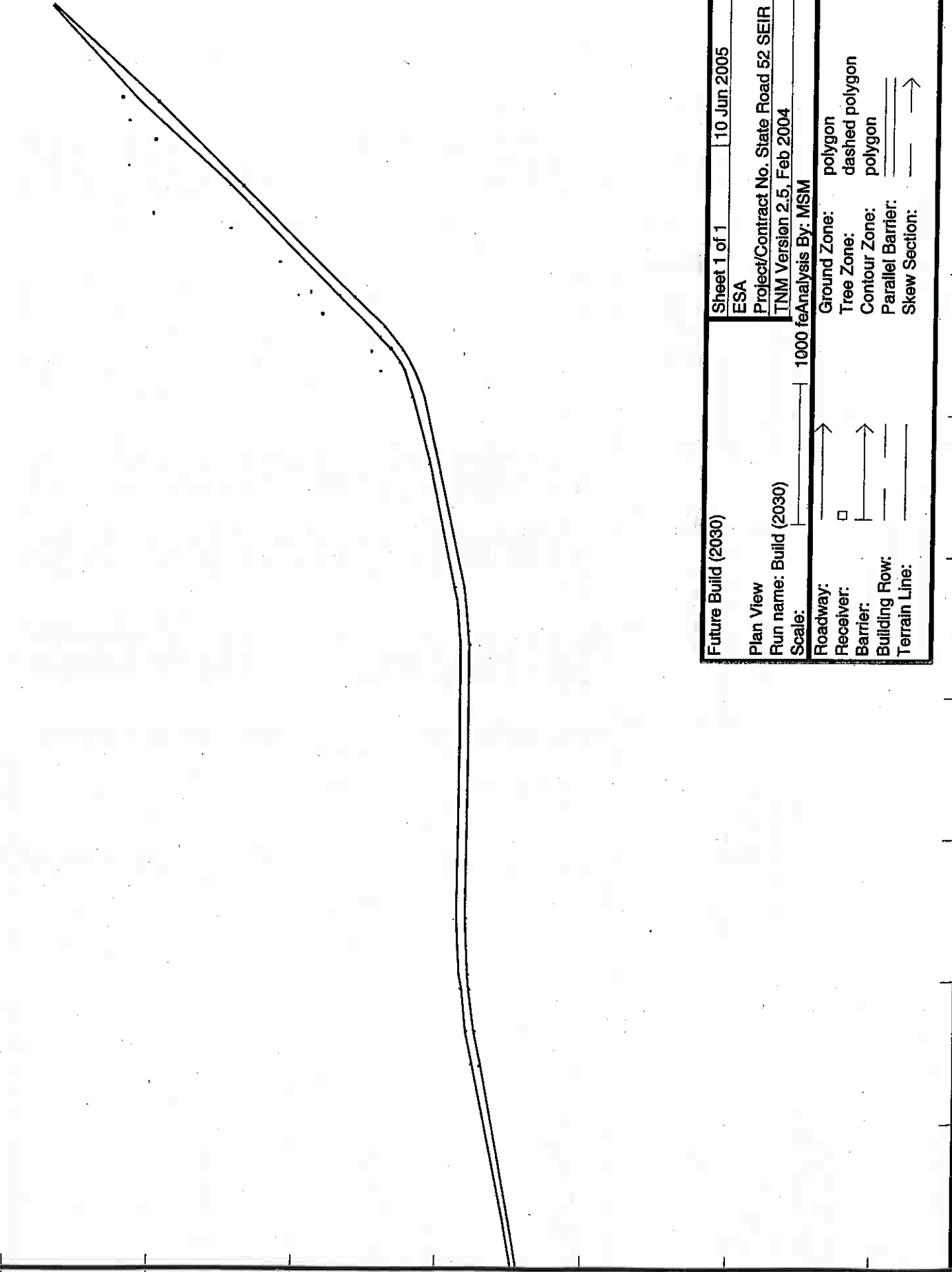
Existing / No-Build

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			Increase over existing			Type Impact	With Barrier			Calculated minus Goal dB	
				LAeq1h		Crit'n	Calculated	Crit'n Sub'l Inc	Calculated LAeq1h		Noise Reduction				
				Calculated	Goal						Calculated	Goal			
				dBA	dBA						dB	dB	dBA		dB
				dBA	dBA	dB	dB					dBA	dB	dB	
1	1	1	0.0	61.3	66	61.3	15				61.3	0.0	10	-10.0	
2	2	1	0.0	56.3	66	56.3	15				56.3	0.0	10	-10.0	
3	3	1	0.0	49.4	66	49.4	15				49.4	0.0	10	-10.0	
4	4	1	0.0	58.5	66	58.5	15				58.5	0.0	10	-10.0	
5	5	1	0.0	47.5	66	47.5	15				47.5	0.0	10	-10.0	
6	6	1	0.0	55.2	66	55.2	15				55.2	0.0	10	-10.0	
7	7	1	0.0	59.6	66	59.6	15				59.6	0.0	10	-10.0	
8	8	1	0.0	55.7	66	55.7	15				55.7	0.0	10	-10.0	
9	9	1	0.0	60.2	66	60.2	15				60.2	0.0	10	-10.0	
10	10	1	0.0	57.1	66	57.1	15				57.1	0.0	10	-10.0	
11	11	1	0.0	61.5	66	61.5	15				61.5	0.0	10	-10.0	
12	12	1	0.0	60.2	66	60.2	15				60.2	0.0	10	-10.0	
Dwelling Units															
		# DUs	Noise Reduction												
			Min dB	Avg dB	Max dB										
All Selected		12	0.0	0.0	0.0										
All Impacted		0	0.0	0.0	0.0										
All that meet NR Goal		0	0.0	0.0	0.0										



Future Build (2030)		Sheet 1 of 1	10 Jun 2005
Plan View		ESA	
Run name: Build (2030)		Project/Contract No. State Road 52 SEIR	
Scale: 1000 feet		TNM Version 2.5, Feb 2004	
Roadway:		Ground Zone:	
Receiver:	□	Tree Zone:	polygons
Barrier:	—	Contour Zone:	dashed polygons
Building Row:	—	Parallel Barrier:	polygons
Terrain Line:	—	Skew Section:	—

INPUT: ROADWAYS

ESA  
MSM

10 June 2005  
TNM 2.5

State Road 52 SEIR

INPUT: ROADWAYS

PROJECT/CONTRACT:

RUN:

State Road 52 SEIR  
Future Build (2030)

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

Roadway														
Name		Width	Points			Coordinates (pavement)			Flow Control			Segment		
			Name	No.	X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?		
	ft				ft	ft	ft		mph	%				
EB 99+00 to 103+94	36.0	1		48	-6,150.0	-580.0	94.10					Average		
		2		49	-5,670.0	-493.0	94.10							
EB 103+94 to 137+00	36.0	1		50	-5,670.0	-493.0	94.10					Average		
		2		51	-4,597.0	-286.0	100.00					Average		
		3		52	-4,361.0	-245.0	102.50					Average		
		4		53	-4,064.0	-207.0	105.00					Average		
		5		54	-3,964.0	-197.0	104.60					Average		
		6		55	-3,767.0	-183.0	103.30					Average		
		7		56	-3,567.0	-176.0	102.80					Average		
		8		57	-2,400.0	-185.0	102.90							
EB 137+00 to 157+40	36.0	1		104	-2,400.0	-185.0	102.90					Average		
		2		105	-1,642.0	-187.0	99.60					Average		
		3		106	-1,542.0	-176.0	99.60					Average		
		4		107	-1,403.0	-164.0	100.00					Average		
		5		108	-1,322.0	-154.0	100.30					Average		
		6		109	-1,242.0	-142.0	100.70					Average		
		7		110	-370.0	41.0	98.60							
EB 157+40 to 199+76.02	36.0	1		111	-370.0	41.0	98.60					Average		
		2		112	98.0	145.0	95.20					Average		
		3		113	192.0	177.0	95.20					Average		
		4		114	289.0	215.0	95.40					Average		
		5		115	342.0	242.0	95.50					Average		
		6		116	440.0	300.0	95.90					Average		
		7		117	522.0	360.0	96.30					Average		
		8		118	600.0	420.0	99.20					Average		

INPUT: ROADWAYS

State Road 52 SEIR

		9	119	808.0	635.0	100.30			Average
		10	120	1,576.0	1,417.0	104.70			Average
		11	121	2,156.0	2,003.0	114.50			Average
		12	122	2,817.0	2,727.0	107.50			
WB 199+76.02 to 157+40	36.0	1	124	2,811.0	2,738.0	107.50			Average
		2	125	2,156.0	2,128.0	114.50			Average
		3	126	1,576.0	1,495.0	104.70			Average
		4	127	808.0	730.0	100.30			Average
		5	128	600.0	527.0	99.20			Average
		6	129	522.0	450.0	96.30			Average
		7	130	440.0	376.0	95.90			Average
		8	131	342.0	309.0	95.50			Average
		9	132	289.0	282.0	95.40			Average
		10	133	192.0	250.0	95.20			Average
		11	134	98.0	223.0	95.20			Average
		12	135	-370.0	100.0	98.60			
WB 157+40 to 137+00	36.0	1	136	-370.0	100.0	98.60			Average
		2	137	-1,242.0	-82.0	100.70			Average
		3	138	-1,322.0	-97.0	100.30			Average
		4	139	-1,403.0	-105.0	100.00			Average
		5	140	-1,542.0	-118.0	99.60			Average
		6	141	-1,642.0	-127.0	99.60			Average
		7	142	-2,400.0	-125.0	102.90			
WB 137+00 to 103+94	36.0	1	143	-2,400.0	-125.0	102.90			Average
		2	144	-3,567.0	-118.0	102.80			Average
		3	145	-3,767.0	-125.0	103.30			Average
		4	146	-3,984.0	-137.0	104.60			Average
		5	147	-4,064.0	-150.0	105.00			Average
		6	148	-4,361.0	-187.0	102.50			Average
		7	149	-4,597.0	-227.0	100.00			Average
		8	150	-5,670.0	-454.0	94.10			
WB 103+94 to 99+00	36.0	1	151	-5,670.0	-454.0	94.10			Average
		2	152	-6,150.0	-543.0	94.10			

INPUT: TRAFFIC FOR LAeq1h Volumes

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT:  
RUN: State Road 52 SEIR  
Future Build (2030)

Roadway	Name	No.	Segment	Points											
				Autos			MTrucks			HTrucks			Buses		
				V	S	veh/hr	V	S	veh/hr	V	S	veh/hr	V	S	veh/hr
EB 99+00 to 103+94	1	48	1730	50	28	50	37	50	6	50	0	0	0	0	0
	2	49													
	1	50	1730	50	28	50	37	50	6	50	0	0	0	0	0
EB 103+94 to 137+00	2	51	1730	50	28	50	37	50	6	50	0	0	0	0	0
	3	52	1730	50	28	50	37	50	6	50	0	0	0	0	0
	4	53	1730	50	28	50	37	50	6	50	0	0	0	0	0
	5	54	1730	50	28	50	37	50	6	50	0	0	0	0	0
	6	55	1730	50	28	50	37	50	6	50	0	0	0	0	0
	7	56	1730	50	28	50	37	50	6	50	0	0	0	0	0
EB 137+00 to 157+40	8	57													
	1	104	1266	50	21	50	27	50	5	50	0	0	0	0	0
	2	105	1266	50	21	50	27	50	5	50	0	0	0	0	0
	3	106	1266	50	21	50	27	50	5	50	0	0	0	0	0
	4	107	1266	50	21	50	27	50	5	50	0	0	0	0	0
	5	108	1266	50	21	50	27	50	5	50	0	0	0	0	0
EB 157+40 to 199+76.02	6	109	1266	50	21	50	27	50	5	50	0	0	0	0	0
	7	110													
	1	111	672	50	11	50	15	50	3	50	0	0	0	0	0
	2	112	672	50	11	50	15	50	3	50	0	0	0	0	0
	3	113	672	50	11	50	15	50	3	50	0	0	0	0	0
	4	114	672	50	11	50	15	50	3	50	0	0	0	0	0
G:1204XXX\204292 - WILSON MILLER SR52 SEIR\TNM 2.5\Build (2030)	5	115	672	50	11	50	15	50	3	50	0	0	0	0	0



INPUT: TRAFFIC FOR LAeq1h Volumes

State Road 52 SEIR

6	116	672	50	11	50	15	50	3	50	0	0
7	117	672	50	11	50	15	50	3	50	0	0
8	118	672	50	11	50	15	50	3	50	0	0
9	119	672	50	11	50	15	50	3	50	0	0
10	120	672	50	11	50	15	50	3	50	0	0
11	121	672	50	11	50	15	50	3	50	0	0
12	122										
WB 199+76.02 to 157+40											
1	124	885	50	14	50	19	50	3	50	0	0
2	125	885	50	14	50	19	50	3	50	0	0
3	126	885	50	14	50	19	50	3	50	0	0
4	127	885	50	14	50	19	50	3	50	0	0
5	128	885	50	14	50	19	50	3	50	0	0
6	129	885	50	14	50	19	50	3	50	0	0
7	130	885	50	14	50	19	50	3	50	0	0
8	131	885	50	14	50	19	50	3	50	0	0
9	132	885	50	14	50	19	50	3	50	0	0
10	133	885	50	14	50	19	50	3	50	0	0
11	134	885	50	14	50	19	50	3	50	0	0
12	135										
WB 157+40 to 137+00											
1	136	1668	50	27	50	36	50	6	50	0	0
2	137	1668	50	27	50	36	50	6	50	0	0
3	138	1668	50	27	50	36	50	6	50	0	0
4	139	1668	50	27	50	36	50	6	50	0	0
5	140	1668	50	27	50	36	50	6	50	0	0
6	141	1668	50	27	50	36	50	6	50	0	0
7	142										
WB 137+00 to 103+94											
1	143	2278	50	37	50	49	50	9	50	0	0
2	144	2278	50	37	50	49	50	9	50	0	0
3	145	2278	50	37	50	49	50	9	50	0	0
4	146	2278	50	37	50	49	50	9	50	0	0
5	147	2278	50	37	50	49	50	9	50	0	0
6	148	2278	50	37	50	49	50	9	50	0	0
7	149	2278	50	37	50	49	50	9	50	0	0
8	150										

INPUT: TRAFFIC FOR LAeq1h Volumes

WB 103+94 to 99+00		State Road 52 SEIR											
	1		151	2278	50	37	50	49	50	9	50	0	0
	2		152										

**State Road 52 SEIR**

**10 June 2005**

## TNPM 2.5

**PROJECT/CONTRACT:** State Road 52 SEIR

**RUN:** Future Build (2030)

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria					Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal		
ft		ft		ft		dBA	dBA	dB	dB			
1		1	2,180.0	2,252.0	111.90	5.00	0.00	66	15.0	10.0	Y	
2		1	2,020.0	2,202.0	112.70	5.00	0.00	66	15.0	10.0	Y	
3		1	1,713.0	2,210.0	111.90	5.00	0.00	66	15.0	10.0	Y	
4		1	1,892.0	2,020.0	111.70	5.00	0.00	66	15.0	10.0	Y	
5		1	1,382.0	2,035.0	106.00	5.00	0.00	66	15.0	10.0	Y	
6		1	1,280.0	1,500.0	101.40	5.00	0.00	66	15.0	10.0	Y	
7		1	1,048.0	1,153.0	100.00	5.00	0.00	66	15.0	10.0	Y	
8		1	815.0	1,020.0	99.20	5.00	0.00	66	15.0	10.0	Y	
9		1	840.0	935.0	99.00	5.00	0.00	66	15.0	10.0	Y	
10		1	687.0	853.0	98.40	5.00	0.00	66	15.0	10.0	Y	
11		1	425.0	510.0	97.00	5.00	0.00	66	15.0	10.0	Y	
12		1	287.0	450.0	93.70	5.00	0.00	66	15.0	10.0	Y	

RESULTS: SOUND LEVELS

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5  
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:  
State Road 52 SEIR  
Future Build (2030)  
RUN:  
BARRIER DESIGN:  
INPUT HEIGHTS

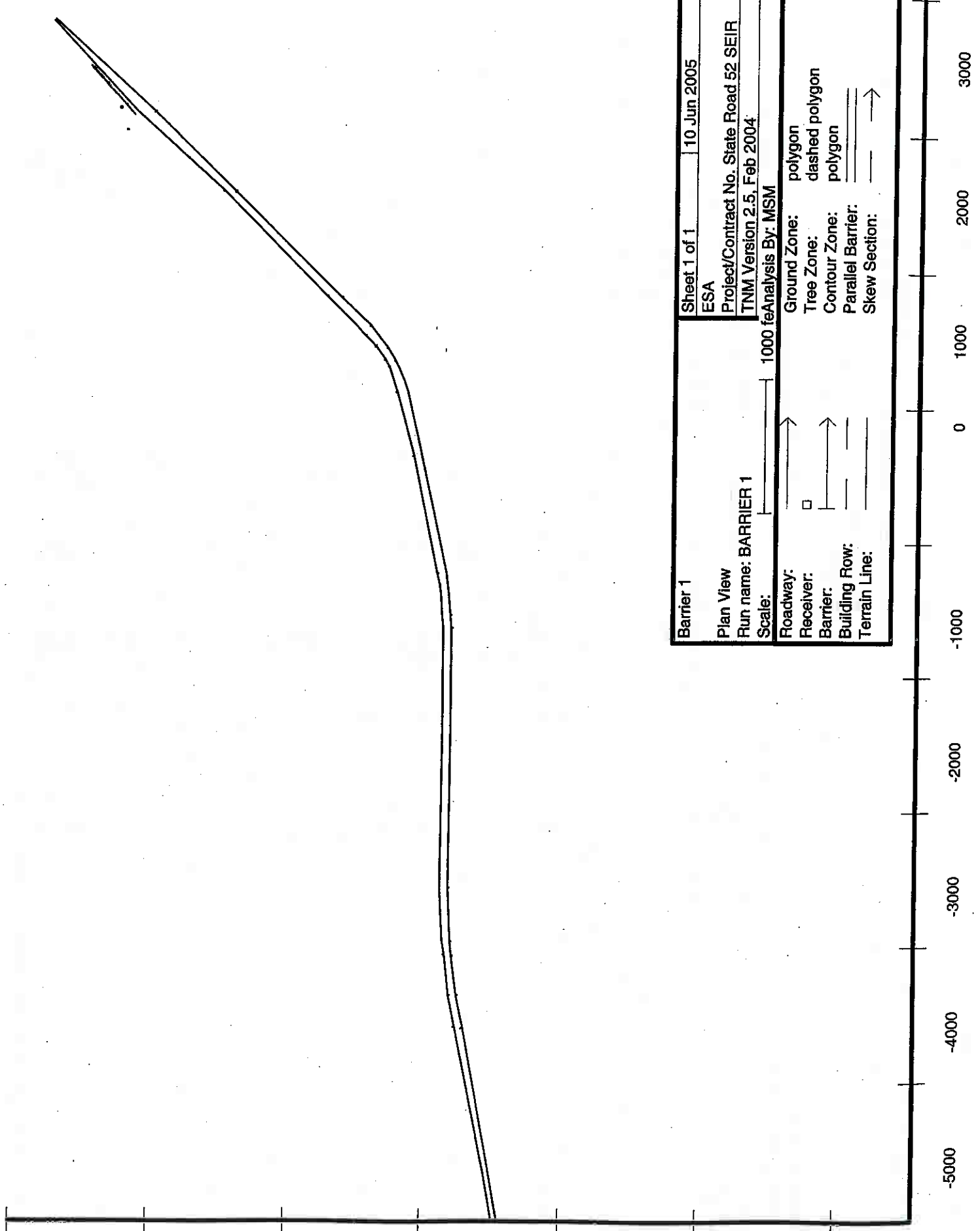
ATMOSPHERICS:

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			With Barrier			Noise Reduction			Calculated minus Goal dB
				LAeq1h		Type Impact	Calculated LAeq1h	Calculated	Goal	Calculated	Goal		
				Calculated	Crit'n							Increase over existing Calculated	
			dBA	dBA		dBA			dBA	dB	dB	dB	dB
1		1	1	0.0	67.7	66	67.7	15	Snd Lvl	67.7	0.0	10	-10.0
2		2	1	0.0	63.7	66	63.7	15	-----	63.7	0.0	10	-10.0
3		3	1	0.0	54.2	66	54.2	15	-----	54.2	0.0	10	-10.0
4		4	1	0.0	65.3	66	65.3	15	-----	65.3	0.0	10	-10.0
5		5	1	0.0	52.6	66	52.6	15	-----	52.6	0.0	10	-10.0
6		6	1	0.0	60.2	66	60.2	15	-----	60.2	0.0	10	-10.0
7		7	1	0.0	64.9	66	64.9	15	-----	64.9	0.0	10	-10.0
8		8	1	0.0	60.8	66	60.8	15	-----	60.8	0.0	10	-10.0
9		9	1	0.0	65.3	66	65.3	15	-----	65.3	0.0	10	-10.0
10		10	1	0.0	62.3	66	62.3	15	-----	62.3	0.0	10	-10.0
11		11	1	0.0	66.1	66	66.1	15	Snd Lvl	66.1	0.0	10	-10.0
12		12	1	0.0	64.3	66	64.3	15	-----	64.3	0.0	10	-10.0
Dwelling Units													
		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		12	0.0	0.0	0.0								
All Impacted		2	0.0	0.0	0.0								
All that meet NR Goal		0	0.0	0.0	0.0								

Barrier 1		Sheet 1 of 1		10 Jun 2005	
Plan View		ESA			
Run name: BARRIER 1		Project/Contract No. State Road 52 SEIR			
Scale: 1000 feet		TNM Version 2.5, Feb 2004			
Roadway:		Ground Zone: polygon			
Receiver:		Tree Zone: dashed polygon			
Barrier:		Contour Zone: polygon			
Building Row:		Parallel Barrier: ———			
Terrain Line:		Skew Section: ———>			



## INPUT: ROADWAYS

ESA  
MSM10 June 2005  
TNM 2.5

## State Road 52 SEIR

## INPUT: ROADWAYS

## PROJECT/CONTRACT:

RUN:

State Road 52 SEIR  
Barrier 1Average pavement type shall be used unless  
a State highway agency substantiates the use  
of a different type with the approval of FHWA

Roadway Name	Width ft	Name	No.	Coordinates (pavement)			Flow Control		Percent Vehicles Affected	Segment Pvmt Type	On Struct?
				X	Y	Z	Control Device	Speed Constraint mph			
EB 99+00 to 103+94	36.0	1	48	-6,150.0	-580.0	94.10				Average	
		2	49	-5,670.0	-493.0	94.10					
EB 103+94 to 137+00	36.0	1	50	-5,670.0	-493.0	94.10				Average	
		2	51	-4,597.0	-286.0	100.00				Average	
		3	52	-4,361.0	-245.0	102.50				Average	
		4	53	-4,064.0	-207.0	105.00				Average	
		5	54	-3,964.0	-197.0	104.60				Average	
		6	55	-3,767.0	-183.0	103.30				Average	
		7	56	-3,567.0	-176.0	102.80				Average	
		8	57	-2,400.0	-185.0	102.90					
EB 137+00 to 157+40	36.0	1	104	-2,400.0	-185.0	102.90				Average	
		2	105	-1,642.0	-187.0	99.60				Average	
		3	106	-1,542.0	-176.0	99.60				Average	
		4	107	-1,403.0	-164.0	100.00				Average	
		5	108	-1,322.0	-154.0	100.30				Average	
		6	109	-1,242.0	-142.0	100.70				Average	
		7	110	-370.0	41.0	98.60					
		1	111	-370.0	41.0	98.60				Average	
EB 157+40 to 199+76.02	36.0	2	112	98.0	145.0	95.20				Average	
		3	113	192.0	177.0	95.20				Average	
		4	114	289.0	215.0	95.40				Average	
		5	115	342.0	242.0	95.50				Average	
		6	116	440.0	300.0	95.90				Average	
		7	117	522.0	360.0	96.30				Average	
		8	118	600.0	420.0	99.20				Average	

G:\204XXX\204292 - WILSON MILLER SR52 SEIR\TNM 2.5\Barrier 1



INPUT: ROADWAYS

State Road 52 SEIR

			9	119	808.0	635.0	100.30				Average
			10	120	1,576.0	1,417.0	104.70				Average
			11	121	2,156.0	2,003.0	114.50				Average
			12	122	2,817.0	2,727.0	107.50				
WB 199+76.02 to 157+40	36.0		1	124	2,811.0	2,738.0	107.50				Average
			2	125	2,156.0	2,128.0	114.50				Average
			3	126	1,576.0	1,495.0	104.70				Average
			4	127	808.0	730.0	100.30				Average
			5	128	600.0	527.0	99.20				Average
			6	129	522.0	450.0	96.30				Average
			7	130	440.0	376.0	95.90				Average
			8	131	342.0	309.0	95.50				Average
			9	132	289.0	282.0	95.40				Average
			10	133	192.0	250.0	95.20				Average
			11	134	98.0	223.0	95.20				Average
			12	135	-370.0	100.0	98.60				
WB 157+40 to 137+00	36.0		1	136	-370.0	100.0	98.60				Average
			2	137	-1,242.0	-82.0	100.70				Average
			3	138	-1,322.0	-97.0	100.30				Average
			4	139	-1,403.0	-105.0	100.00				Average
			5	140	-1,542.0	-118.0	99.60				Average
			6	141	-1,642.0	-127.0	99.60				Average
			7	142	-2,400.0	-125.0	102.90				
WB 137+00 to 103+94	36.0		1	143	-2,400.0	-125.0	102.90				Average
			2	144	-3,567.0	-118.0	102.80				Average
			3	145	-3,767.0	-125.0	103.30				Average
			4	146	-3,964.0	-137.0	104.60				Average
			5	147	-4,064.0	-150.0	105.00				Average
			6	148	-4,361.0	-187.0	102.50				Average
			7	149	-4,597.0	-227.0	100.00				Average
			8	150	-5,670.0	-454.0	94.10				
WB 103+94 to 99+00	36.0		1	151	-5,670.0	-454.0	94.10				Average
			2	152	-6,150.0	-543.0	94.10				

INPUT: TRAFFIC FOR LAeq1h Volumes

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT: State Road 52 SEIR

RUN: Barrier 1

Roadway		Points										
Name	No.	Segment										
		Autos										
		V	S									
		veh/hr	mph									
		MTrucks										
		V	S									
		veh/hr	mph									
		HTrucks										
		V	S									
		veh/hr	mph									
		Buses										
		V	S									
		veh/hr	mph									
		Motorcycles										
		V	S									
		veh/hr	mph									
EB 99+00 to 103+94	1	48	1730	50	28	50	37	50	6	50	0	0
	2	49										
EB 103+94 to 137+00	1	50	1730	50	28	50	37	50	6	50	0	0
	2	51	1730	50	28	50	37	50	6	50	0	0
	3	52	1730	50	28	50	37	50	6	50	0	0
	4	53	1730	50	28	50	37	50	6	50	0	0
	5	54	1730	50	28	50	37	50	6	50	0	0
	6	55	1730	50	28	50	37	50	6	50	0	0
	7	56	1730	50	28	50	37	50	6	50	0	0
	8	57										
EB 137+00 to 157+40	1	104	1266	50	21	50	27	50	5	50	0	0
	2	105	1266	50	21	50	27	50	5	50	0	0
	3	106	1266	50	21	50	27	50	5	50	0	0
	4	107	1266	50	21	50	27	50	5	50	0	0
	5	108	1266	50	21	50	27	50	5	50	0	0
	6	109	1266	50	21	50	27	50	5	50	0	0
	7	110										
EB 157+40 to 199+76.02	1	111	672	50	11	50	15	50	3	50	0	0
	2	112	672	50	11	50	15	50	3	50	0	0
	3	113	672	50	11	50	15	50	3	50	0	0
	4	114	672	50	11	50	15	50	3	50	0	0
	5	115	672	50	11	50	15	50	3	50	0	0
G:\204\XXX\1204292 - WILSON MILLER SR52 SEIR\TNM 2 5\Barrier 1												

G:1204XXX1204292 - WILSON MILLER SR52 SEIR/TNM 2.5\Barrier.1

INPUT: TRAFFIC FOR LAeq1h Volumes

State Road 52 SEIR

6	116	672	50	11	50	15	50	3	50	0	0
7	117	672	50	11	50	15	50	3	50	0	0
8	118	672	50	11	50	15	50	3	50	0	0
9	119	672	50	11	50	15	50	3	50	0	0
10	120	672	50	11	50	15	50	3	50	0	0
11	121	672	50	11	50	15	50	3	50	0	0
12	122										
1	124	885	50	14	50	19	50	3	50	0	0
2	125	885	50	14	50	19	50	3	50	0	0
3	126	885	50	14	50	19	50	3	50	0	0
4	127	885	50	14	50	19	50	3	50	0	0
5	128	885	50	14	50	19	50	3	50	0	0
6	129	885	50	14	50	19	50	3	50	0	0
7	130	885	50	14	50	19	50	3	50	0	0
8	131	885	50	14	50	19	50	3	50	0	0
9	132	885	50	14	50	19	50	3	50	0	0
10	133	885	50	14	50	19	50	3	50	0	0
11	134	885	50	14	50	19	50	3	50	0	0
12	135										
1	136	1668	50	27	50	36	50	6	50	0	0
2	137	1668	50	27	50	36	50	6	50	0	0
3	138	1668	50	27	50	36	50	6	50	0	0
4	139	1668	50	27	50	36	50	6	50	0	0
5	140	1668	50	27	50	36	50	6	50	0	0
6	141	1668	50	27	50	36	50	6	50	0	0
7	142										
1	143	2278	50	37	50	49	50	9	50	0	0
2	144	2278	50	37	50	49	50	9	50	0	0
3	145	2278	50	37	50	49	50	9	50	0	0
4	146	2278	50	37	50	49	50	9	50	0	0
5	147	2278	50	37	50	49	50	9	50	0	0
6	148	2278	50	37	50	49	50	9	50	0	0
7	149	2278	50	37	50	49	50	9	50	0	0
8	150										

INPUT: TRAFFIC FOR LAeq1h Volumes

WB 103+94 to 99+00		State Road 52 SEIR											
1	2	151	2278	50	37	50	49	50	9	50	0	0	0
		152											

**INPUT: RECEIVERS**

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5

**INPUT: RECEIVERS**

**PROJECT/CONTRACT:** State Road 52 SEIR

**RUN:** Barrier 1

Receiver												
Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria					Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria		NR		
								LAeq1h	Sub'l		Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB		
1	1	1	2,180.0	2,252.0	111.90	5.00	0.00	66	15.0	10.0	Y	
2	2	1	2,020.0	2,202.0	112.70	5.00	0.00	66	15.0	10.0	Y	

INPUT: BARRIERS

State Road 52 SEIR

10 June 2005  
TNM 2.5

INPUT: BARRIERS

PROJECT/CONTRACT: State Road 52 SEIR  
Barrier 1

RUN:

Barrier Name	Type	Height		If Wall	\$ per Unit Area	\$ per Unit Vol.	Top Width	Run: Rise	Add'l Length	Points Name	No.	Coordinates (bottom)			Height at Point	Segment			Important Reflec-tions?
		Min	Max									X	Y	Z		Incre- ment	#Up	#Dn	
		ft	ft		\$/sq ft	\$/cu yd	ft	ft/ft	\$/ft			ft	ft	ft	ft	ft			
Barrier 1	W	0.00	99.99	0.00					0.00	point1	1	2,485.0	2,467.0	109.00	14.00	2.00	4	3	
										point7	7	2,470.7	2,454.1	109.12	14.00	2.00	4	3	
										point8	8	2,456.4	2,441.2	109.24	14.00	2.00	4	3	
										point9	9	2,442.0	2,428.4	109.36	14.00	2.00	4	3	
										point10	10	2,427.7	2,415.5	109.48	14.00	2.00	4	3	
										point3	3	2,413.4	2,402.6	109.60	14.00	2.00	4	3	
										point11	11	2,401.5	2,391.9	109.70	14.00	2.00	4	3	
										point12	12	2,389.5	2,381.1	109.80	14.00	2.00	4	3	
										point13	13	2,377.6	2,370.4	109.90	14.00	2.00	4	3	
										point14	14	2,365.7	2,359.7	110.00	14.00	2.00	4	3	
										point15	15	2,353.7	2,348.9	110.10	14.00	2.00	4	3	
										point4	4	2,341.8	2,338.2	110.20	14.00	2.00	4	3	
										point5	5	2,270.2	2,273.8	110.80	14.00	2.00	4	3	
										point6	6	2,198.6	2,209.4	111.40	14.00	2.00	4	3	
										point2	2	2,127.0	2,145.0	112.00	14.00				



RESULTS: SOUND LEVELS

State Road 52 SEIR

ESA  
MSM

10 June 2005  
TNM 2.5  
Calculated with TNM 2.5

RESULTS: SOUND LEVELS

PROJECT/CONTRACT:

State Road 52 SEIR

RUN:

Barrier 1

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			With Barrier						
				LAeq1h		Type Impact	Calculated LAeq1h	Noise Reduction		Calculated LAeq1h	Calculated	Goal	Calculated minus Goal
				Calculated	Crit'n			Calculated	Crit'n Sub'l Inc				
				dB	dB	dB	dB	dB	dB	dB	dB	dB	dB
1	1	1	1	0.0	67.9	66	67.9	15	Snd Lvl	58.4	9.5	10	-0.5
2	2	1	1	0.0	63.8	66	63.8	15	---	61.9	1.9	10	-8.1
Dwelling Units													
		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected			2	1.9	5.7	9.5							
All Impacted			1	9.5	9.5	9.5							
All that meet NR Goal			0	0.0	0.0	0.0							