Appendix D. Noise and Air Quality Analyses

- **Traffic Noise and Air Quality Analysis,**
  St. Tammany Parish, Louisiana
- **Traffic Noise Analysis**
  Hancock County, Mississippi

State Project No. H.000284 & No. H.000286
Federal Aid Project No. H000284 & No. H000286

US 90 Pearl River Bridges
Route US 90
St. Tammany Parish, Louisiana
and
Hancock County, Mississippi

Traffic Noise and Air Quality Analysis Technical Report
St. Tammany Parish, Louisiana

Prepared for:

Louisiana Department of Transportation and Development

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LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

U.S. Department of Transportation
Federal Highway Administration

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1.0 INTRODUCTION

This report documents the results of a noise and air quality analysis as part of the environmental process for the US 90 Pearl River Bridges project in St. Tammany Parish, Louisiana. Figure 1 shows the project area, which extends from US 190 to the west for approximately five miles to 7th Avenue/Kelly Road in Hancock County, Mississippi. For the length of the project, each of the five Pearl River Bridges will be rehabilitated or replaced on the existing or an offset alignment. Though the project area includes Louisiana and Mississippi, only the Louisiana portions of the project are detailed in this report. A separate report is available for the Mississippi portion of the project.

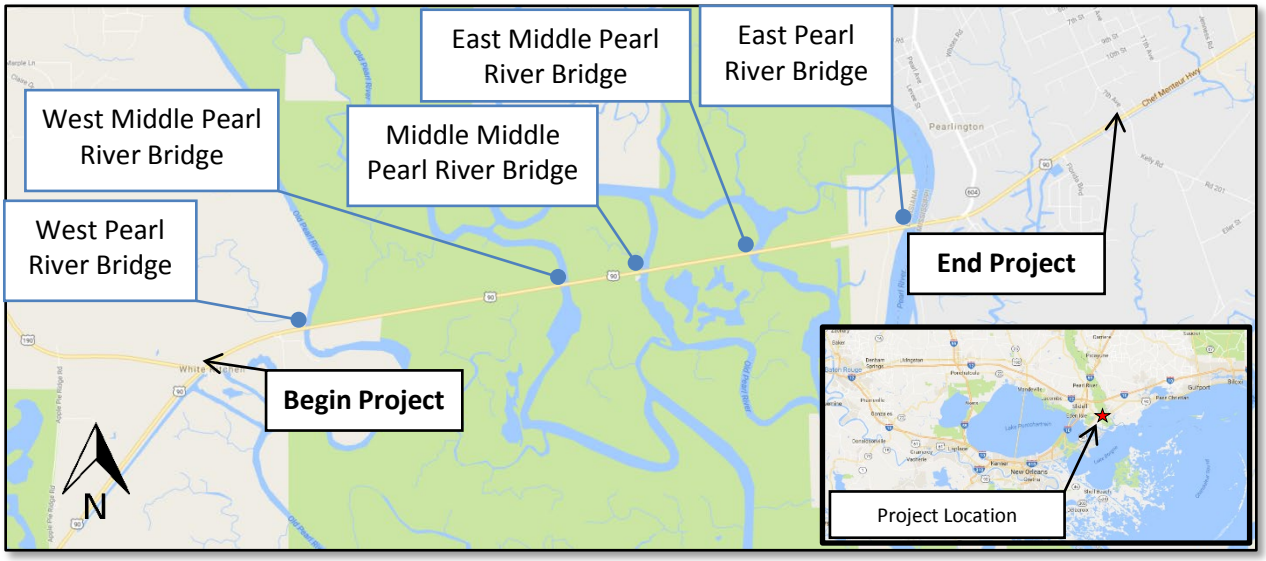


Figure 1. Project Area

The proposed alternatives for each bridge site are:

- No-Build
- Rehabilitation of Existing Bridges, with detour bridges
- Replace Bridges on Alignment, with detour bridges
- Replace bridges on Offset Alignment, maintain traffic on existing alignment

The three Build Alternatives that replace bridges on *offset* alignments and the No-Build Alternative are considered in this study. The Build Alternatives include:

- Alternative 1: Replacement of the bridges with "Fixed" long-span bridges
  - All five bridges
- Alternative 2: Replacement of the bridges with "Bascule" movable bridges
  - East Pearl River Bridge and West Pearl River Bridge only
- Alternative 3: Replacement of the bridges with "Vertical Lift" movable bridges
  - East Pearl River Bridge and West Pearl River Bridge only

These Build Alternatives would also include some changes to other local roads along the project corridor. Appendix C shows the Build Alternative alignments.

2.0 TRAFFIC NOISE ANALYSIS

This study has been prepared in accordance with the FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise*, *23 CFR 772* [1], and the Louisiana Department of Transportation and Development (DOTD) *Highway Traffic Noise Policy*, revised in 2011 [2]. The noise analysis included the following tasks:

1. Identification of noise-sensitive areas (NSA) and associated receptors (discrete or representative locations in an NSA for the land uses listed in 23 CFR 772) within 500 feet of the project;
2. Determination of existing noise levels at selected receptors to characterize the existing noise environment in the project area;
3. Prediction of future noise levels with and without the project at the receptors;
4. Determination of impacted receptors;
5. Evaluation of noise abatement for impacted areas;
6. Discussion of construction noise; and
7. Information for local officials.

Each of these analysis steps is discussed below, following a discussion of basic terminology and DOTD's criteria for determining noise impacts.

2.1 Traffic Noise Terminology

Traffic noise levels are expressed in terms of the hourly, A-weighted equivalent sound level in decibels (dBA). A sound level represents the level of the rapid air pressure fluctuations caused by sources such as traffic that are heard as noise. A decibel is a unit that relates the sound pressure of a noise to the faintest sound the young human ear can hear. The A-weighting refers to the amplification or attenuation of the different frequencies of the sound (subjectively, the pitch) to correspond to the way the human ear "hears" these frequencies.

Generally, when the sound level exceeds the mid-60 dBA range, outdoor conversation in normal tones at a distance of three feet becomes difficult. A 9-10 dBA increase in sound level is typically judged by the listener to be twice as loud as the original sound while a 9-10 dBA reduction is judged to be half as loud. Doubling the number of sources (i.e., vehicles) will increase the hourly equivalent sound level by approximately 3 dBA, which is usually the smallest change in hourly equivalent A-weighted traffic noise levels that people can detect without specifically listening for the change.

Because most environmental noise fluctuates from moment to moment, it is standard practice to condense data into a single level called the equivalent sound level (L_{eq}). The L_{eq} is a steady sound level that would contain the same amount of sound energy as the actual time-varying sound evaluated over the same time period. The L_{eq} averages the louder and quieter moments but gives much more weight to

the louder moments in the averaging. For traffic noise assessment purposes, L_{eq} is typically evaluated over the worst one-hour period and is written as $L_{eq}(h)$.

The term insertion loss (IL) is generally used to describe the reduction in $L_{eq}(h)$ at a location after a noise barrier is constructed. For example, if the $L_{eq}(h)$ at a residence before a barrier is constructed is 75 dB(A) and the $L_{eq}(h)$ after a barrier constructed is 65 dB(A), then the insertion loss would be 10 dB(A).

2.2 Criteria for Determining Impacts

Noise impacts are determined by comparing future "design year" project worst hour $L_{eq}(h)$ values at areas of frequent human use to: (1) a set of Noise Abatement Criteria (NAC) for different land use categories, and (2) existing $L_{eq}(h)$ values. The FHWA noise standards (23 CFR 772) and DOTD's noise policy state that when traffic noise impacts have been identified, then noise abatement should be considered.

Table 1 shows the land uses that are classified as Activity Categories A - G and the corresponding NAC.

Specifically, a receptor is impacted in either of two ways:

1. The predicted, worst hour, design year $L_{eq}(h)$ approaches or exceeds the NAC, even if there is not a substantial increase over the existing levels. "Approach" is defined by DOTD as 1 dBA less than the appropriate NAC. As an example, the NAC for Activity Category B and C land uses is 67 dBA. An impact would occur if the design year $L_{eq}(h)$ is predicted to be 66 dBA or higher at a point of frequent exterior human use for a land use in either category.

2. The predicted, worst hour, design year $L_{eq}(h)$ exceeds the existing $L_{eq}(h)$ by 10 dBA or more, even if the NAC is not approached or exceeded.

2.3 Identification of Noise-Sensitive Receptors

A review of available electronic mapping as well as field reconnaissance identified residences on both sides of US 90. A total of four (4) single-family residences are located within 500 feet of the proposed edge of roadway. The NAC for Activity Category B will apply to these residences. Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 66 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels.

There also are four public boat launch areas within 500 feet of the project: one boat launch is north of the intersection of US 190 and US 90, and three others exist at the West Pearl River Bridge, the "Middle Middle" Pearl River Bridge, and the East Pearl River Bridge. The NAC for Activity Category C will apply to this potentially noise-sensitive land uses. Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 66 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels.

Table 1. Noise Abatement Criteria in 23 CFR 772

Activity Category	Activity $L_{eq}(h)$	Evaluation Location	Activity Description
A	57	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[1]	67	Exterior	Residential
C [1]	67	Exterior	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E [1]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	–––	–––	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–––	–––	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands that are permitted for this activity category.

During the field reconnaissance, exterior commercial land uses (Activity Category E uses) were noted at 55050 US 90 (the "Pearl River Eco-Tours" boat launch) and at several locations at 55345 US 90 (the Cajun Encounters Swamp Tour porch and boat launches). Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 71 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels. Other commercial properties were also noted during the field reconnaissance; however, those commercial properties did not have exterior uses and were not included as part of this study.

There are several tracts of undeveloped Activity Category G lands along the project. These undeveloped lands are not noise-sensitive and have not been included in the noise analysis. However, noise impacts could occur in the future if noise-sensitive land uses are constructed near US 90. A discussion of future noise levels and the need for noise-compatible land use planning is provided later in this report.

2.4 Measurement of Existing Noise Levels

Noise measurements were conducted at several DOTD approved noise-sensitive land uses in the project area on September 14 and 15, 2016. Table 2 summarizes the measured noise levels at each of the measurement locations. The figures in Appendix C show the noise measurement locations. The individual locations' noise measurement results are provided in Appendix A.

Short-term noise measurements at these locations were conducted by making a series of consecutive measurements in one-minute intervals for at least 15 minutes at each site during both a peak and an off-peak traffic period. Background noises (i.e., local traffic, dog barking, sirens, etc.) during these measurements were noted, and the corresponding one-minute measurement intervals were eliminated from the calculation of the measured noise level for the overall measurement period.

As indicated in Table 2, the existing noise levels at the exterior measurement locations were between 52 dBA and 64 dBA during peak traffic volumes. The lower noise levels were measured at the more distant locations from US 90 and the noise levels in the low 60 dBA range were recorded at the first-row residences closest to US 90.

Table 2. Existing Noise Levels at Measurement Locations

Address/Location	Distance to US 90 (ft)	Period	Measured L_{eq}(dBA)
55170 US 90	50	4:00-4:15 PM	64.0
		3:35-3:50 PM	63.4
55345 US 90 (Cajun Encounters boat launch deck)	225	4:59-5:14 PM	54.3
		10:40-11:00 AM	51.7
Residence "NM 3" *	75	5:30-5:45 PM	59.3
		10:12-10:27 AM	58.5

* Address could not be determined; located just west of the East Pearl River Bridge and north of US 90.

2.5 Model Validation

DOTD policy requires validation of the FHWA Traffic Noise Model (TNM 2.5) computer program that is used to calculate worst hour noise levels. Validation involves conducting noise measurements at a few representative locations near the existing roadway while making simultaneous vehicle classification counts of the traffic and estimating travel speed. Then, the traffic counts are factored up to be hourly volumes, and along with the speeds, are entered into a TNM 2.5 model that has been created for the existing highway situation. The modeled levels are compared to the measured levels, and if they are within 3 dB(A) of the measured levels, the model is considered to be validated.

The noise measurements conducted on September 14 and 15, 2016 included simultaneous traffic data collection. The locations are labeled with an "(M)" in the figures in Appendix C. Appendix A contains the detailed measurement results and traffic count data.

Table 3 lists the validation locations and presents the validation results. As shown in the table, the difference in the predicted and measured levels for the noise measurement locations are less than 3 dBA. Traffic counts were not possible at 55345 US 90 (Cajun Encounters boat launch deck) due to the poor vantage point and distance to US 90. Therefore, validation was not completed for this site.

Table 3. Model Validation Results

Location	Start Time	End Time	Measured L_{eq} (dBA)	Predicted L_{eq} (dBA)	Predicted - Measured Difference (dBA)
55170 US 90	4:00 PM	4:15 PM	64.0	63.6	-0.4
	3:35 PM	3:50 PM	63.4	63.0	-0.4
Residence "NM 3" *	5:30 PM	5:45 PM	59.3	58.4	-0.9
	10:12 AM	10:27 AM	58.5	57.0	-1.5

* Address could not be determined; located just west of the East Pearl River Bridge and north of US 90

2.6 Prediction of Existing and Future Noise Levels

The FHWA TNM 2.5 computer program was used to calculate worst hour noise levels for the receptors for the existing case and the future alternatives. These receptors included the measurement locations as well as numerous other locations.

Traffic data was provided by the DOTD Transportation Planning Section for use in the noise modeling. Average Daily Traffic projections, including classification counts, were provided for US 90 for the Base Year 2019 and Future Year 2039.

Each direction of travel was modeled as a separate TNM "roadway." For US 90, the posted speeds of 45 mph and 55 mph were used near the East and West Pearl River Bridges, respectively.

Receptors were modeled by TNM "receiver" points at areas of frequent human use of a property. For single-family residences, that area could be the front or back yard.

Large buildings were modeled as noise barriers to properly account for the shielding of the traffic noise that they provide to the receptor. Given the low density of buildings, the single-family houses and other buildings were modeled as individual noise barriers to account for the shielding that they would provide. Significant terrain features were also modeled. The default ground surface of lawn grass was used, with any large areas of paved ground or water specifically modeled accordingly.

Appendix C provides tables of predicted results and figures showing the Build Alternatives, modeled receiver points, and noise impact designations.

A summary of predicted noise levels and impacts is shown in Table 4 below, and the resulting impacts are discussed in the following section.

2.6.1 Existing Year 2016

The TNM model that was developed for the validation testing was used to predict worst hour noise levels for the Existing Year conditions at the noise-sensitive land uses in the project area, including the measurement locations. For US 90, the posted speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

As shown in Table 4, predicted worst noise hour L_{eq} (h) for the Existing Year 2016 case ranged from 44 dBA to 62 dBA at the residences closest to the US 90.

None of the Category B residences are impacted in the Existing Year 2016. Additionally, no Activity Category C or E impacts are predicted.

2.6.2 Build Year 2039

The noise levels for the three Build Alternatives were determined by modeling the proposed US 90 geometry and traffic within TNM and then calculating the L_{eq}(h) for each TNM receiver. Anticipated future speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

The predicted L_{eq}(h) for the three Build Alternatives ranged from 46 dBA to 61 dBA. Though there are differences in geometry for the three Build Alternatives, those differences do not produce any significant changes in the predicted noise levels when the alternatives are compared.

Changes in existing noise levels for the three Build Alternatives range from a 7 dB decrease (the decrease is caused by the shifting of the new alignment away from existing receptors) to a 7 dB increase.

None of the Category B residences are impacted by the Build Alternatives. Additionally, no Activity Category C or E impacts are predicted.

2.6.3 No-Build Year 2039

The TNM model that was used for the Existing case was modified to predict worst noise hour noise levels for the No-Build Year 2039 conditions at the noise-sensitive land uses in the project area, including the measurement locations. The posted speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

As shown in Table 4, predicted worst noise hour L_{eq} (h) for the No-Build Year 2039 case ranged from 45 dBA to 62 dBA.

None of the Category B residences are impacted under the No-Build Alternatives. Additionally, no Activity Category C or E impacts are predicted.

2.7 Noise Impact Summary

An impact assessment was completed for the Existing, Build and No-Build cases. As noted previously, a receptor is impacted in two ways:

1. The predicted, worst hour, design year L_{eq}(h) approaches or exceeds the NAC. DOTD defines "approach" as 1 dB(A) less than the NAC. These levels apply at areas of frequent human use.

2. The predicted, worst hour, design year L_{eq}(h) exceeds the existing L_{eq}(h) by 10 dBA or more.

As shown in Table 4, there will be a total of zero impacted residential properties (Activity Category B), for each of the three Build Alternatives. None of the residential properties are predicted to approach or exceed the NAC, and none are predicted to have a substantial increase of 10 dBA over the Existing noise level.

Table 4. Noise Impact Summary

Prediction Case	Range of Predicted L_{eq}(h) (dBA)	Range of Increases over Existing L_{eq}(h) (dB)*	Impacts
Existing (2016)	44 - 62	N/A	0 residences
Build Alternative 1 (2039) – All five bridges	46 - 61	(7) - 6	0 residences
Build Alternative 2 (2039) - East Pearl River Bridge and West Pearl River Bridge only	46 – 61	(4) - 7	0 residences
Build Alternative 3 (2039) - East Pearl River Bridge and West Pearl River Bridge only	46 - 61	(4) - 7	0 residences
No-Build Alternative (2039)	45 - 62	1	0 residences

* Parentheses around value indicates a negative value (i.e., noise levels are reduced with the project)

2.8 Noise Abatement Evaluation

In accordance with criteria in the DOTD noise policy, noise abatement will be considered when traffic noise impacts are identified. Since impacts were not identified, abatement was not considered.

2.9 Construction Noise

The construction of the project would result in temporary noise increases for the residences and noise-sensitive land uses along US 90. Any other noise-sensitive land uses that are located farther from the project area would likely experience little, if any, increase in noise levels because of the background noise of the US 90 traffic, traffic on other roads, and other community noise sources. The construction noise would be generated primarily from heavy equipment used in hauling materials and accomplishing the widening of the roadway.

The construction contractor has the responsibility for protection of the general public in all aspects of construction throughout the life of the project. All construction equipment will be required to comply with OSHA Regulations as they apply to the employees' safety, and in accordance with the DOTD Standard Specifications. All construction equipment used in the construction phase of the project should be properly muffled and all motor panels should be shut during operation. In order to minimize the potential for impacts of construction noise on the local residents, the contractor should only operate, whenever possible, between the hours of 7:00 AM and 5:00 PM.

2.10 Information for Local Officials

DOTD encourages local communities and developers to practice noise compatibility planning in order to avoid future noise impacts. Two guidance documents on noise compatible land use planning are available from FHWA. [3, 4]

Table 5 presents future predicted noise levels based on an assumed at-grade situation for areas along US 90 where vacant and possibly developable lands exist. Noise predictions were made at several distances from centerline of closest travel lane of US 90 for the design year 2039 PM peak hour. The results showed exterior residential activities would be considered to be impacted in terms of a level of 66 or more dBA out to a distance of roughly 25 feet from edge of pavement of the nearest travel lane of US 90.

Table 5. Design Year (2039) Predicted Noise Levels for Undeveloped Areas

Distance*	L_{eq} (1h) (dBA)
25 feet	66
50 feet	64
75 feet	63
100 feet	61
125 feet	59
150 feet	57

* Perpendicular distance to the centerline of the nearest travel lane of US 90.

The values in Table 5 do not represent predicted levels at every location at a particular distance back from the roadway. Noise levels will vary with changes in terrain and other site conditions. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

3.0 AIR QUALITY

This report section summarizes the results of an analysis of the potential air quality effects of the project. The purpose of this analysis is, first, to address the potential for the project to affect air quality standards including transportation conformity requirements; and second, to address the potential Mobile Source Air Toxics (MSATs) effects of the project.

3.1 National Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has established allowable concentrations and exposure limits called the National Ambient Air Quality Standards (NAAQS) for various "criteria" pollutants. These pollutants include carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb).

In accordance with the Clean Air Act Amendments of 1990 (CAAA of 1990), EPA identified those areas that did not meet the NAAQS for the criteria pollutants and designated them as "nonattainment" areas. Once a nonattainment area meets the NAAQS, it is redesignated as a "maintenance" area.

St. Tammany Parish is currently not a nonattainment or maintenance area for any criteria pollutant.

3.2 Transportation Conformity

Transportation conformity is a process required of Metropolitan Planning Organizations (MPOs) pursuant to the Clean Air Act Amendments of (CAAA) of 1990. CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration (FHWA) be in conformity with the State Implementation Plan (SIP), which represents the State's plan to either achieve or maintain the NAAQS for a particular pollutant.

The proposed project is not located in a nonattainment or maintenance area, so conformity does not apply to this project.

3.3 Carbon Monoxide (CO)

Transportation projects have the potential to affect air quality by changing the number of vehicles at specific locations. Tailpipe emissions from vehicles could result in increases in ambient concentrations of carbon monoxide (CO) near the project.

Carbon monoxide (CO) is a colorless, odorless gas that interferes with the delivery of oxygen to a person's organs and tissues. The health effects of CO exposure depend on the duration and intensity of exposure as well as a person's health. CO concentrations are usually higher during the winter months because vehicles emit higher CO emissions in cold weather due to the characteristics of internal combustion engines.

The state of Louisiana is in attainment for CO. Project CO concentrations are not anticipated to cause or contribute to an exceedance of the CO NAAQS.

3.4 Mobile Source Air Toxics (MSATs)

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*" This guidance was superseded on September 30, 2009, December 6, 2012 and most recently on October 18, 2016 by FHWA's "*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*" [5]. The purpose of FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSAT) in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will continue to revise and update the guidance.

The qualitative analysis presented below provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled *"A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives"* (Claggett, 2006) [6]. Appendix D provides additional MSAT information.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and
- Projects with Higher Potential MSAT Effects.

FHWA's Updated Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street, or where design year traffic projections are less than 140,000 to 150,000 average annual daily traffic (AADT).
The Build Alternatives include the improvement of US 90 bridges and meet the definition of a "Project with Low Potential MSAT Effects" as the highest design year AADT on US 90 is substantially lower than the FHWA criterion.

For the No-Build and Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The estimated VMT for the Build Alternative is essentially the same as the VMT for the No-Build Alternative. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

EPA's MOVES2014 model indicates that emissions of all of the priority MSAT decrease as speed increases. Travel speeds for the Build Alternative may be higher than for the No-Build Alternative although the project is not adding through capacity, so any changes would be small.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The alignment changes contemplated for the Build Alternative may have the effect of moving some traffic closer to nearby sensitive land uses; therefore, under the Build Alternative there may be localized areas where ambient concentrations of MSAT could be higher than under the No-Build Alternative.

Finally, the magnitude and the duration of any potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

In sum, the localized level of MSAT emissions for the Build Alternative could be slightly higher in some locations relative to the No-Build Alternative but may be lower in other locations where the alignment shifts farther away. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Substantial construction related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area.

4.0 REFERENCES

[1] *Procedures for Abatement of Highway Traffic and Construction Noise*, 23 CFR 772, Federal Highway Administration.

[2] *Highway Traffic Noise Policy*, Louisiana Department of Transportation and Development, July 2011.

[3] *The Audible Landscape: A Manual for Highway Noise and Land Use*, FHWA, November, 1974. http://www.fhwa.dot.gov/environment/audible/index.htm

[4] *Entering the Quiet Zone: Noise Compatibility Land Use Planning*, FHWA, May, 2002. http://www.fhwa.dot.gov/environment/noise/quietzon

[5] Claggett, M., et. al., "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives,"* Federal Highway Administration Resource Center, May 4, 2006.

[6] Federal Highway Administration (FHWA), *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*, October 18, 2016.

Appendix A – Noise Measurement Results and Traffic Counts

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site NM1

Area

Address 55170

Site Sketch

see other sketch

Weather

Temp

Wind occas. gusts to 6-8 mph

Direction fr. south

Other

Notes

RION/LD/N121#

Cal@ previous cal Cal Check= 16:16 -0.12

file 1638.010

#	Time Start	Description
1	16:00	A-7, A-72
2	1	
3	2	(wind gust to 8 mph from S)
4	3	A-63, lull @ 40 (background) -15 secs
5	4	pickup-73
6	5	
7	6	A-70
8	7	lull @ 40-42; @ 38 lull
9	8	
10	9	A-69
11	10	
12	11	A's ~70, A-69
13	12	
14	13	A's - 67
15	14	MT- 80, A-69, A's ~70
16	#	
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Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM1, 55170 US90 (peak), LA**
Description:	**Residential; 90°F; occasional gusts from south**
SLM Filename:	**1638 LxT_1638.010**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	4:00:00 PM	64.1	72.9		
2	4:01:00 PM	63.6	74.4		
3	4:02:00 PM	59.4	68.6		
4	4:03:00 PM	55.2	65.6		
5	4:04:00 PM	66.3	74.2		
6	4:05:00 PM	65.9	74.2		
7	4:06:00 PM	63.4	70.8		
8	4:07:00 PM	52.4	64.8		
9	4:08:00 PM	62.8	69.9		
10	4:09:00 PM	68.6	81.7		
11	4:10:00 PM	61.8	74.0		
12	4:11:00 PM	62.9	70.3		
13	4:12:00 PM	60.0	70.3		
14	4:13:00 PM	59.6	67.8		
15	4:14:00 PM	68.3	79.4		
~~16~~	~~4:15:00 PM~~	~~43.8~~	~~44.7~~	x	stop measure at 16:15
	Leq	**64.0**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site 55170 Hwy 90 NM1

Area

Address 55170 Hwy 90

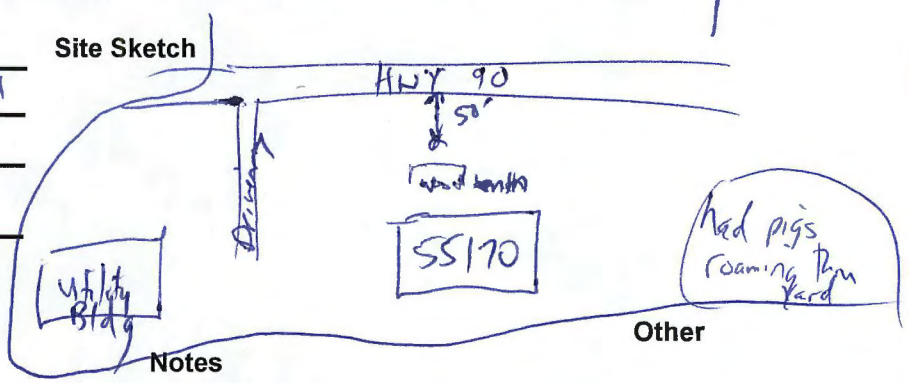
Weather

Temp 90°

Wind gusts from S

Direction from south

Site Sketch



RION/LD/N121#

Cal@ 15:31 +0.00 Cal Check= 0

fil 1638.004

55mph

#	Time Start	Description
1	15:35	Airplane audible - Auto 70
2	36	A-64; Bull - SLM 44
3	37	Pickup-71, Pickup-65 A-67 Pickup 67
4	38	HT-76 < Bull 42; faint gunshots audible, SLM 40
5	39	A-68
6	40	Pickup-?
7	41	NO NOTES
8	42	
9	43	HT-75 Pickup 71
10	44	A-64, HT-?
11	45	
12	46	AS-71 MC 75
13	47 X	GA audible @ 47
14	48	Pickup-68
15	49	2 autos-67
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
.30		

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM1, 55170 US90 (offpeak), LA**
Description:	**Residential; 90°F; occasional gusts from south**
SLM Filename:	**1638 LxT_1638.009**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	3:35:00 PM	62.7	71.0		
2	3:36:00 PM	61.2	71.0		
3	3:37:00 PM	61.8	71.7		
4	3:38:00 PM	64.5	76.9		
5	3:39:00 PM	61.5	70.9		
6	3:40:00 PM	62.8	73.8		
7	3:41:00 PM	60.3	69.3		
8	3:42:00 PM	63.4	74.7		
9	3:43:00 PM	66.3	74.2		
10	3:44:00 PM	63.6	73.1		
11	3:45:00 PM	58.9	70.8		
12	3:46:00 PM	66.0	75.4		
~~13~~	~~3:47:00 PM~~	~~61.7~~	~~70.7~~	x	GA audible ~47
14	3:48:00 PM	61.6	68.7		
15	3:49:00 PM	65.8	75.4		
~~16~~	~~3:50:00 PM~~	~~59.8~~	~~60.4~~	x	stop measure at 15:49
	Leq	**63.4**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site Boat Launch Pier (S of Cajun Encounter)

Area

Address S of Cajun Tours

Weather

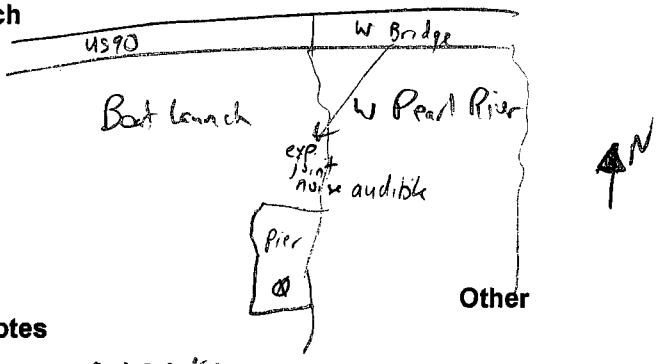
Temp 85-90

Wind N/A

Direction

RION/LD/N121#

Site Sketch



Notes

Cal@ +0.15 @ 16Hz Cal Check=

#	Time Start		Description
1	16:45		
2	46		
3	47		A_S -62, A_S -57
4	48		A-56, MT + A-58 MT-60
5	49	X	A_S-60 } men next to mic
6	50	X	A_S -60 }
7	51	X	
8	52	X	
9			stop @ 16:53 excessive talking (file 1638.011 – don't use
10			
11	1659		start @ pier/deck (exp joint audible)
12	1700	X	tour guides talking / start boat engine / leave site
13	1		A + MT - 62
14	2		MC-? >60
15	3		faint aircraft -45
16	4	X	" - 49
17	5		A-57 lull ↓ 45
18	6		A_S -57, seedas - 48
19	7	X	engine noise to south + local door slam
20	8		A -49, A_S -56
21	9	X	aircraft -50 (15 secs) lull ↓ 42
22	10		Bus -53
23	11		MT-60, seedas - 54 (10 secs)
24	12		A_S -60
25	13		
26	14		stop meas (file 1638.012
27			
28			
29			
.30			

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM2, Cajun deck (peak), LA**
Description:	**Commercial; 85-90°F**
SLM Filename:	**1638 LxT_1638.012**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	4:59:00 PM	53.1	61.0		
~~2~~	~~5:00:00 PM~~	~~50.4~~	~~58.1~~	x	tour guide talking; boat engine
3	5:01:00 PM	57.7	64.7		
4	5:02:00 PM	51.6	56.7		
5	5:03:00 PM	55.0	61.6		
~~6~~	~~5:04:00 PM~~	~~55.2~~	~~60.0~~	x	aricraft ~49
7	5:05:00 PM	52.0	57.3		
8	5:06:00 PM	50.3	57.3		
~~9~~	~~5:07:00 PM~~	~~53.7~~	~~58.7~~	x	engine noise to south & local door slam
10	5:08:00 PM	53.1	58.9		
~~11~~	~~5:09:00 PM~~	~~52.2~~	~~58.9~~	x	aircraft ~50
12	5:10:00 PM	52.8	58.2		
13	5:11:00 PM	56.8	61.8		
14	5:12:00 PM	55.0	60.5		
15	5:13:00 PM	53.2	58.4		
~~16~~	~~5:14:00 PM~~	~~44.1~~	~~48.0~~	x	stop at 17:14
	Leq	**54.3**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15

Site

Area

Address (Southern) Cajun Tour Pier

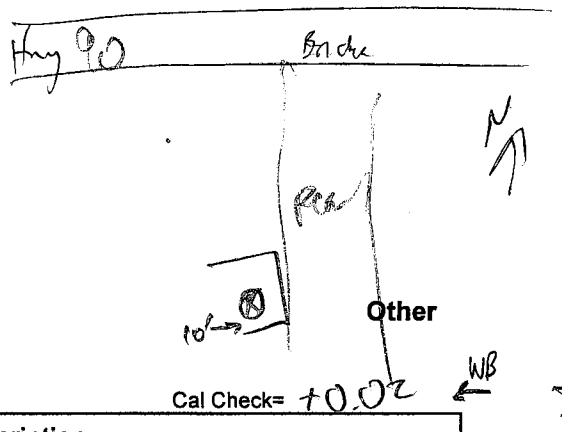
Weather

Temp 85-90

Wind 0-4 mph

Direction N/A (rustling, plants, trees)

Site Sketch



Notes

Other

RION/LD/N121#

Cal@

Cal Check= +0.02

#	Time Start		Description
1	10:40		secadas-50 (15 secs)
2	41		As-58-60, secadas (10-15 secs), As 59
3	42		HT-65 wb, MT-61
4	43		
5	44		
6	45	X	Boat tour passby
7	46	X	
8	47	X	
9	48	X	
10	49	X	
11	50		Secadas 49 (all ↓ 42-44)
12	51		A-56, secadas 50
13	52		As-56, A-58, A-57, secadas-51
14	53		(all ↓ 42-44) :55 → As + MT-58
15	54		A-51
16	55		A-54, secadas-43
17	56		As-57, A-54
18	57		A-54 A-57
19	58		A-57 (faint-plane ambient) (all ↓ 41)
20	59		As-55, A-61 (secadas-50)
21			
22			
23			
24			fl# 1638.020
25			
26			
27			
28			
29			
.30			

A MT / 7 1 (or A MT / 3 1)

stop (dam)

reset (wrong) count

A A MT / 4 4 1

A A MT / 11 9 1

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM2, Cajun deck (offpeak), LA**
Description:	**Commercial; 85-90°F; 0-4 mph winds**
SLM Filename:	**1638 LxT_1638.020**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	10:40:00 AM	50.8	56.6		
2	10:41:00 AM	53.4	60.0		
3	10:42:00 AM	56.7	65.5		
4	10:43:00 AM	52.2	57.2		
5	10:44:00 AM	49.8	54.4		
~~6~~	~~10:45:00 AM~~	~~56.6~~	~~63.6~~	x	Boat tour passby
~~7~~	~~10:46:00 AM~~	~~55.0~~	~~62.0~~	x	Boat tour passby
~~8~~	~~10:47:00 AM~~	~~53.6~~	~~60.6~~	x	Boat tour passby
~~9~~	~~10:48:00 AM~~	~~52.3~~	~~60.8~~	x	Boat tour passby
~~10~~	~~10:49:00 AM~~	~~48.8~~	~~57.0~~	x	Boat tour passby
11	10:50:00 AM	44.5	49.9		
12	10:51:00 AM	49.6	56.7		
13	10:52:00 AM	53.4	58.5		
14	10:53:00 AM	51.2	59.6		
15	10:54:00 AM	49.2	57.5		
16	10:55:00 AM	47.7	54.5		
17	10:56:00 AM	51.4	57.1		
18	10:57:00 AM	51.7	58.1		
19	10:58:00 AM	48.5	57.0		
20	10:59:00 AM	53.1	61.0		
~~21~~	~~11:00:00 AM~~	~~41.9~~	~~42.1~~	x	stop measure at 11:00
	Leq	**51.7**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site NM3

Area

Address just west of E Pearl River

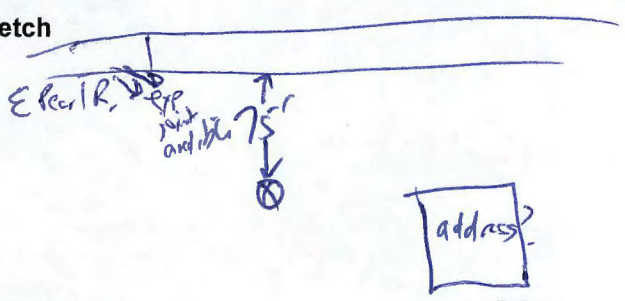
Weather

Temp 85

Wind occ. gusts to 8mph

Direction From S

Site Sketch



Other

Notes

RION/LD/N121#

Cal@ +.03 17:26 Cal Check= -0.04

#	Time Start		Description
1	17:30		A-62
2	31		AS-67 SL 39
3	32	X	MT-63 dogs barking
4	33	X	Quiet ↓ 39 " "
5	34		MT-59 Quiet ↓ 40 AS 66
6	35		A-68 AS 67
7	36		AS-65
8	37		AS-68, mult AS-?
9	38		mult AS-?
10	39		A-66; Quiet ↓ 40-41 (15-20 secs), MT-65
11	40		mult. AS-68
12	41		A-64 Quiet ↓ 40-43
13	42		A-64
14	43		multiple Autos-66, A-65
15	44		A-61
16			stop @ 17:45
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
.30			

file 638.013

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM3, ## US90 (peak), LA**
Description:	**Residential; 85°F; occasional gusts to 8 mph from south**
SLM Filename:	**1638 LxT_1638.013**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	5:30:00 PM	58.7	67.5		
2	5:31:00 PM	56.3	65.5		
~~3~~	~~5:32:00 PM~~	~~56.5~~	~~63.5~~	x	dogs barking
~~4~~	~~5:33:00 PM~~	~~50.8~~	~~61.5~~	x	dogs barking
5	5:34:00 PM	56.9	66.5		
6	5:35:00 PM	61.9	68.4		
7	5:36:00 PM	55.1	65.1		
8	5:37:00 PM	62.1	69.2		
9	5:38:00 PM	62.1	67.4		
10	5:39:00 PM	58.6	68.9		
11	5:40:00 PM	59.5	68.2		
12	5:41:00 PM	53.2	65.0		
13	5:42:00 PM	56.0	63.6		
14	5:43:00 PM	61.4	67.4		
15	5:44:00 PM	58.1	65.8		
~~16~~	~~5:45:00 PM~~	~~66.1~~	~~68.1~~	x	stop at 17:45
	Leq	**59.3**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15

Site

Area

Address unknown (W of E Pearl River Bridge)

Site Sketch

see other sketch

Weather

Temp 85°

Wind 4-8 mph gusts

Direction from NE

Other

Notes

RION/LD/N121#

Cal@ +0.01 10:07 Cal Check= -0.10

#	Time Start		Description
1	10:12		A-? A-61 A-68 (pickup)
2	13		A-65 A-64 A-64 A-67
3	14		A-65 A-64 ; A-69
4	15		A-? A-64 ;
5	16		lull ↓ 38
6	17		A-? A-65? lull ↓ 40-43 (insects
7	18		lull 38 , A-64 , A-65
8	19		A-67
9	20		A-61
10	21	X	A-66 lull ↓ 39 , A-61 (boat engine) 50
11	22		A-63
12	23		HF-71
13	24		A-64 3 MCs - 76 (eastbound)
14	25		(MCs still loud :15) (lull ↓ 42) Secadas-49
15	26		Secadas - 50
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
.30			



File 10 38.019

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM3, ## US90 (off peak), LA**
Description:	**Residential; 85°F; gusts to 4-8 mph from northeast**
SLM Filename:	**1638 LxT_1638.019**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	10:12:00 AM	57.8	68.9		
2	10:13:00 AM	59.1	67.8		
3	10:14:00 AM	59.8	69.4		
4	10:15:00 AM	56.0	64.9		
5	10:16:00 AM	50.4	62.0		
6	10:17:00 AM	57.7	65.6		
7	10:18:00 AM	56.1	65.5		
8	10:19:00 AM	55.5	66.7		
9	10:20:00 AM	54.7	64.0		
~~10~~	~~10:21:00 AM~~	~~55.2~~	~~66.4~~	x	boat engine ~50
11	10:22:00 AM	58.3	70.9		
12	10:23:00 AM	59.5	71.7		
13	10:24:00 AM	65.4	76.8		
14	10:25:00 AM	47.1	51.5		
15	10:26:00 AM	54.5	64.7		
~~16~~	~~10:27:00 AM~~	~~43.3~~	~~43.6~~	x	stop measure at 10:27
	Leq	**58.5**			

Vehicle Count Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16 **Name:** RW

Site _____

Roadway	Hwy 90	**Roadway**	Hwy 90
Direction	WB	**Direction**	EB

"Running Count"

Time Start	Auto	MT	HT	Bus	MC	Auto	MT	HT	Bus	MC
5570 Hwy 90 1535 -1540	10	1	1	0	0	13	0	0	0	0
1540 -1545	19	2	3	0	0	25	1	0	0	0
1545 -1550	27	2	4	0	1	43	1	0	0	0
1600 -05	7	0	0	0	0	15	2	0	0	0
05 -10	15	6	0	0	0	30	4	0	0	0
10 -15	25	0	1	0	0	44	5	0	0	0
Cajun Tour deck boat launch 1659 -1704	9	0	0	0	1	7	2	0	0	0
04 -09	16	0	0	0	0	24	3	0	0	0
09 -14	22	1	0	1	1	36	4	0	0	1
"NM3" no address 1730 -1735	8	1	0	0	0	7	1			
35 -40	17	1	0	0	0	31	2			
40 -45	26	2	0	0	0	41	4			
9/15 "NM3" ~~Cajun deck boat launch~~ 10:12 -17	9	0	0	0	0	6	0	0	0	0
17 -22	13	0	0	0	0	14	0	0	0	0
22 -27	16	0	0	0	0	19	0	1	0	3
9/15 ~~"NM3"~~ Cajun Tour ~~no address~~ 10:40 -45	7	1	1	0	0	3	1	0	0	0
45 -50	~~Stop count~~									
50 -55	11	1	1	0	0	7	2	0	0	0
55 - 11:00	18	1	1	0	0	12	2	0	0	0

Notes:

US90 Pearl River Bridges - St. Tammany Parish, LA

Traffic Counts during Noise Measurements

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM1, 55170 US90 (peak), LA	16:00	10	1	1	0	0	13	0	0	0	0
	16:05	9	1	2	0	0	12	1	0	0	0
	16:10	8	0	1	0	1	18	0	0	0	0
	Total	27	2	4	0	1	43	1	0	0	0
	Calc 1-Hr Volume	**108**	**8**	**16**	**0**	**4**	**172**	**4**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM1, 55170 US90 (offpeak), LA	15:35	7	0	0	0	0	15	2	0	0	0
	15:40	8	0	0	0	0	15	2	0	0	0
	15:45	10	0	1	0	0	14	1	0	0	0
	Total	25	0	1	0	0	44	5	0	0	0
	Calc 1-Hr Volume	**100**	**0**	**4**	**0**	**0**	**176**	**20**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM2, Cajun deck (peak), LA	16:59	9	0	0	0	1	7	2	0	0	0
	17:04	7	0	0	0	0	17	1	0	0	0
	17:09	6	1	0	1	0	12	1	0	0	1
	Total	22	1	0	1	1	36	4	0	0	1
	Calc 1-Hr Volume	**88**	**4**	**0**	**4**	**4**	**144**	**16**	**0**	**0**	**4**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM2, Cajun deck (offpeak), LA	10:40	7	1	1	0	0	3	1	0	0	0
	10:50	4	0	0	0	0	4	1	0	0	0
	10:55	7	0	0	0	0	5	0	0	0	0
	Total	18	1	1	0	0	12	2	0	0	0
	Calc 1-Hr Volume	**72**	**4**	**4**	**0**	**0**	**48**	**8**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM3, ## US90 (peak), LA	17:30	8	1	0	0	0	7	1	0	0	0
	17:35	9	0	0	0	0	24	1	0	0	0
	17:40	9	1	0	0	0	10	2	0	0	0
	Total	26	2	0	0	0	41	4	0	0	0
	Calc 1-Hr Volume	**104**	**8**	**0**	**0**	**0**	**164**	**16**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM3, ## US90 (off peak), LA	10:12	9	0	0	0	0	6	0	0	0	0
	10:17	4	0	0	0	0	8	0	0	0	0
	10:22	3	0	0	0	0	5	0	1	0	3
	Total	16	0	0	0	0	19	0	1	0	3
	Calc 1-Hr Volume	**64**	**0**	**0**	**0**	**0**	**76**	**0**	**4**	**0**	**12**

Appendix B – Traffic Data for TNM Modeling

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
TRANSPORTATION PLANNING SECTION
P. O. BOX 94245
BATON ROUGE, LOUISIANA 70804-9245
(225) 379-1925

TRAFFIC ASSIGNMENT

DATE:	11-Aug-16
PROJECT NO.	H.000284
NAME:	US 90 Pearl River Bridges
DESCRIPTION:	
ROUTE:	US 90
FUNCTIONAL CLASS:	Rural Minor Arterial
PARISH:	St. Tammany

2019 ADT =	2,300	2900 ANN. GROWTH	1.0%
2039 ADT =	2,800		

D =	55%
K =	10%
T =	15%

AXLE DISTRIBUTION

VEHICLE TYPE	PERCENT	2019 ADT	2039 ADT	MEDIAN YEAR
1 MOTORCYCLES	0.20%	5	6	5
2 PASSENGER CARS	53.90%	1,240	1,509	1,374
3 2A-4T SINGLE UNIT	29.90%	688	837	762
4 BUSES	0.70%	16	20	18
5 2A-6T SINGLE UNIT	6.70%	154	188	171
6 3A SINGLE UNIT	1.00%	23	28	26
7 4A SINGLE UNIT	0.20%	5	6	5
8 4A SINGLE TRAILER	1.90%	44	53	48
9 5A SINGLE TRAILER	4.60%	106	129	117
10 6A SINGLE TRAILER	0.60%	14	17	15
11 5A MULTI-TRAILER	0.10%	2	3	3
12 6A MULTI-TRAILER	0.10%	2	3	3
13 7A MULTI-TRAILER	0.10%	2	3	3
TOTALS		2,300	2,800	2,550

The above traffic data is an estimate based on data available at the time of preparation.

SUBMIT TO:	Catherine Mastin	SECTION:	34
COPY TO:	Jeff Lambert	SECTION:	67
PREPARED BY:	John Spragio	SECTION:	85

Classification Count Summary	
Road:	**US 90 Pearl River Bridges**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	6	0.21%
2. Cars	1,509	53.85%
3. Pick-Up, Panel, Van	837	29.87%
Sub-total Passenger Vehicles	2,352	84%
4. Buses	20	0.71%
5. Dual Rear	188	6.71%
6. 3-Axle Truck	28	1.00%
7. 4-Axle Truck	6	0.21%
Sub-total Single-Unit Trucks	242	9%
8. 2S-1, 3S-1, 2S-2	53	1.89%
9. 3S-2, 2S-3	129	4.60%
10. 3S-3, 3S-4	17	0.61%
Sub-total Combination Trucks	199	7%
11. 2S-1-2	3	0.11%
12. 2S-2-2, 3S-1-2	3	0.11%
13. Any 7 Axle	3	0.11%
Sub-total Twin Trailers	9	0.32%
Total Combinations	208	0%
Total Trucks	450	16.06%
TOTAL ALL VEHICLES	2,802	

TNM Vehicle Types	Total	%	% of Trucks
Autos	2,346	83.7%	n/a
MTs	236	8.4%	52%
HTs	214	7.6%	48%
Motorcycles	6	0.2%	n/a
Total	2,802	100.0%	n/a

Project:	**US 90 Pearl River Bridges**
County	**St. Tammany Parish, LA**
Description:	**Future Build**
Design Year:	**2039**

K	10%
D	55%
%MT of T	52%
%HT of T	48%

							55%				45%			
Road	***From***	***To***	***Average Daily Traffic (ADT)***	***Design Hour Volume (DHV)***	***AADT Trucks***	***DHV Trucks***	***Total***	***Autos***	***MTs***	***HTs***	***Total***	***Autos***	***MTs***	***HTs***
US 90	Hwy 190	Hwy 604	2,800	280	15%	10%	154	139	8	7	126	113	7	6
US 90	Hwy 604	east	4,776	478	15%	10%	263	236	14	12	215	193	11	10
Hwy 604	US 90	north	1,767	177	15%	10%	97	87	5	5	79	72	4	4

Build 2039 growth rate: based on LA Traffic (west of Hwy 604)		
	Year	AADT
Future Year	2039	2,800
Base Year	2019	2,300
Annual Growth rate is 1%	**1.0%**	

Project:	**US 90 Pearl River Bridges**
County	**St. Tammany Parish, LA**
Description:	**Existing**
Design Year:	**2016**

K	10%
D	55%
%MT of T	52%
%HT of T	48%

							55%				45%			
Road	***From***	***To***	***Average Daily Traffic (ADT)***	***Design Hour Volume (DHV)***	***AADT Trucks***	***DHV Trucks***	***Total***	***Autos***	***MTs***	***HTs***	***Total***	***Autos***	***MTs***	***HTs***
US 90	Hwy 190	Hwy 604	2,233	223	15%	10%	123	111	6	6	100	90	5	5
US 90	Hwy 604	east	3,809	381	15%	10%	209	189	11	10	171	154	9	8
Hwy 604	US 90	north	1,409	141	15%	10%	77	70	4	4	63	57	3	3

Build 2039 growth rate: based on LA Traffic (west of Hwy 604)		
	Year	AADT
Future Year	2039	2,800
Base Year	2019	2,300
Annual Growth rate is 1%	**1.0%**	

Existing 2016 Traffic, US 90 (west of Hwy 604)		
	Year	AADT
Future Year	2019	2,300
Desired Year	2016	2,233

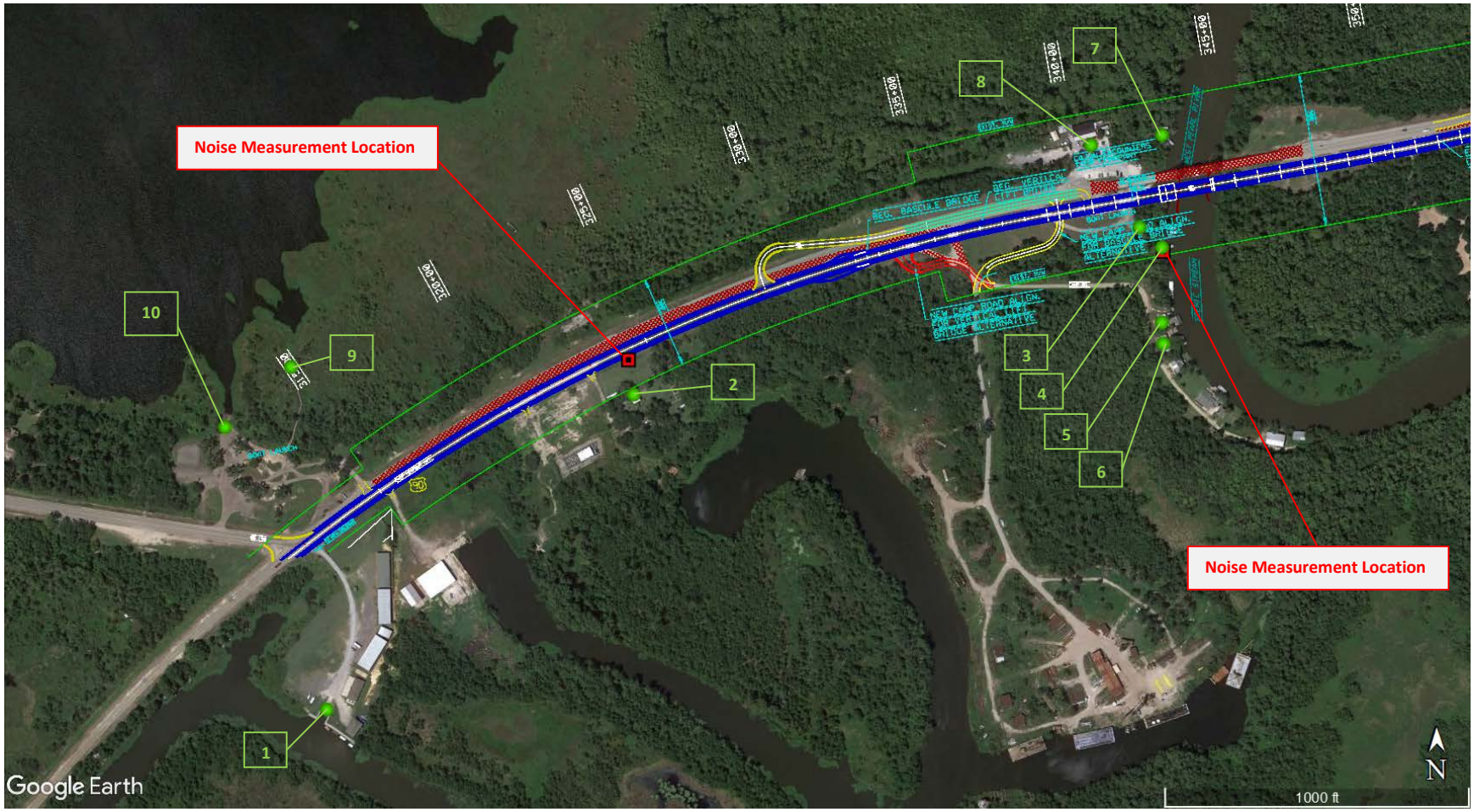
Appendix C – Noise Prediction Results and Impacts

Receptor Number	Receiver Name	Dwelling Units	NAC	NAC Approach Impact Level	Existing	Design Year 2039 Sound Levels, dBA*						
						No Build	Alternative 1: Fixed Span Bridge		Alternative 2: Bascule Bridge		Alternative 3: Vertical Lift Bridge	
							Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing
1	Storage and Boat Tour	0	E	71	47	48	49	2	49	2	49	2
2	55170 US90	1	B	66	55	56	61	6	61	7	61	7
	55170 US90 (M)	0	N/A	N/A	62	63	68	6	68	6	68	6
3	Boat Launch - south (Cajun Encount)	0	E	71	54	55	52	(2)	55	1	56	2
4	Cajun Encounters (boat dock) (M)	0	E	71	52	53	52	0	53	2	55	3
5	Residence at Camp Rd**	1	B	66	47	48	50	3	51	4	51	4
6	43637 Camp Rd	1	B	66	44	45	47	3	48	3	48	3
7	Boat Launch - north (Cajun Encount)	0	E	71	55	56	52	(3)	54	(1)	54	(1)
8	Cajun Encounters - patio	0	E	71	55	56	52	(3)	54	(1)	54	(1)
9	Pier (near US190)	0	C	66	45	46	46	2	46	2	46	2
10	Boat Launch (near US190)	0	C	66	45	46	46	2	46	2	47	2
11	Middle Pearl boat launch***	0	C	66	62	62	57	(4)	N/A***		N/A***	
12	Residence “NM 3”**	1	B	66	50	51	50	0	52	2	52	2
	Residence “NM 3” (M)**	1	N/A	N/A	59	60	51	(7)	58	(1)	59	0
13	Boat Launch	0	C	66	53	54	48	(5)	55	2	56	3

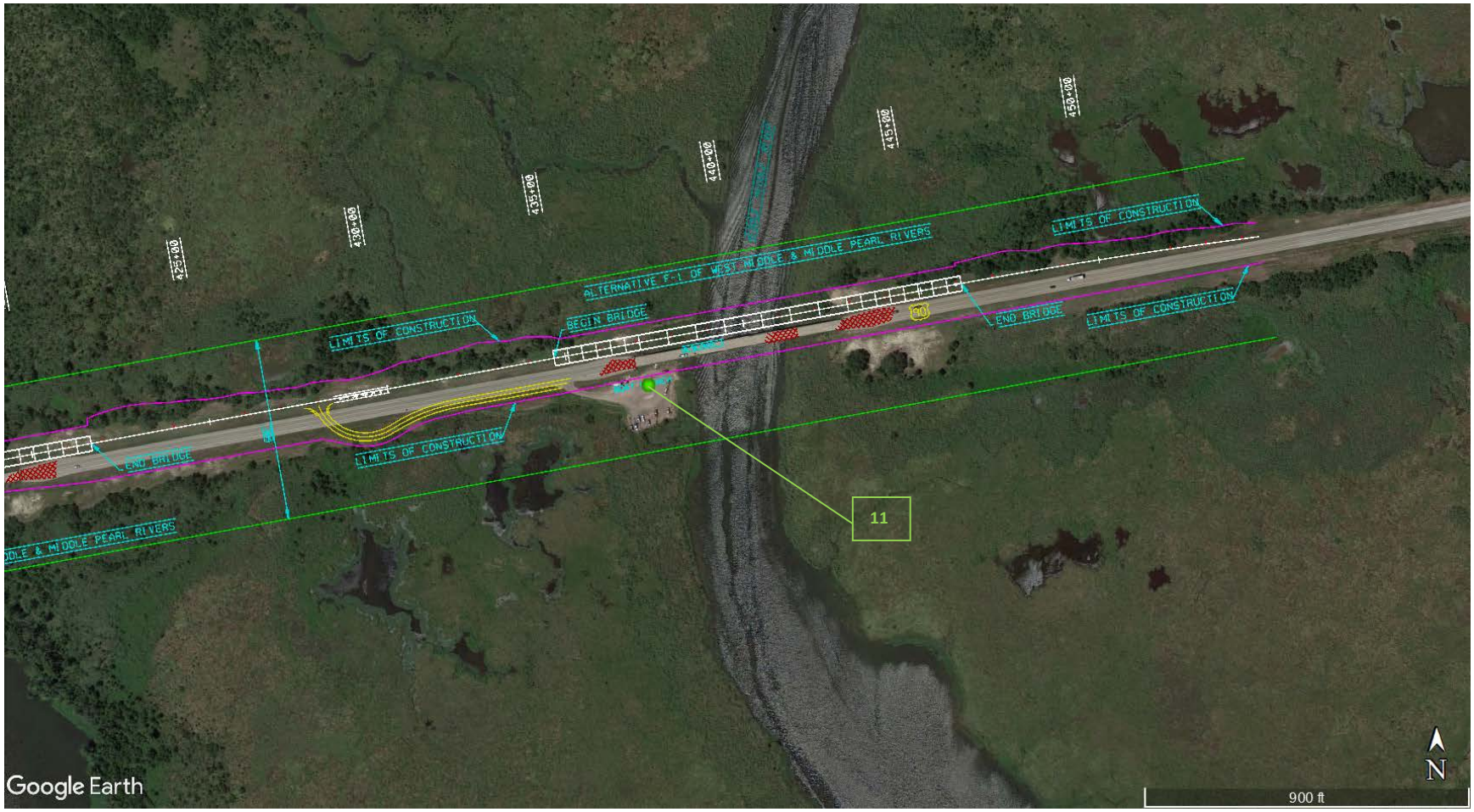
* Parentheses around value indicates a negative value (i.e., sound levels are reduced with the project)

** Address could not be determined

*** There is no Bascule or Vertical Bridge Alternative for the Middle-Middle Pearl River Bridge



West Pearl River Bridge Receptor Locations (numbered) and Noise Measurement Locations (red squares)



Middle-Middle Pearl River Bridge Receptor Location (numbered)



East Pearl River Bridge Receptor Locations (numbered) and Noise Measurement Location (red square)

Appendix D – MSATs Background Information

MOBILE SOURCE AIR TOXICS (MSATS)

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS).[1] In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA).[2] These are *1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.* While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide,[3] EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

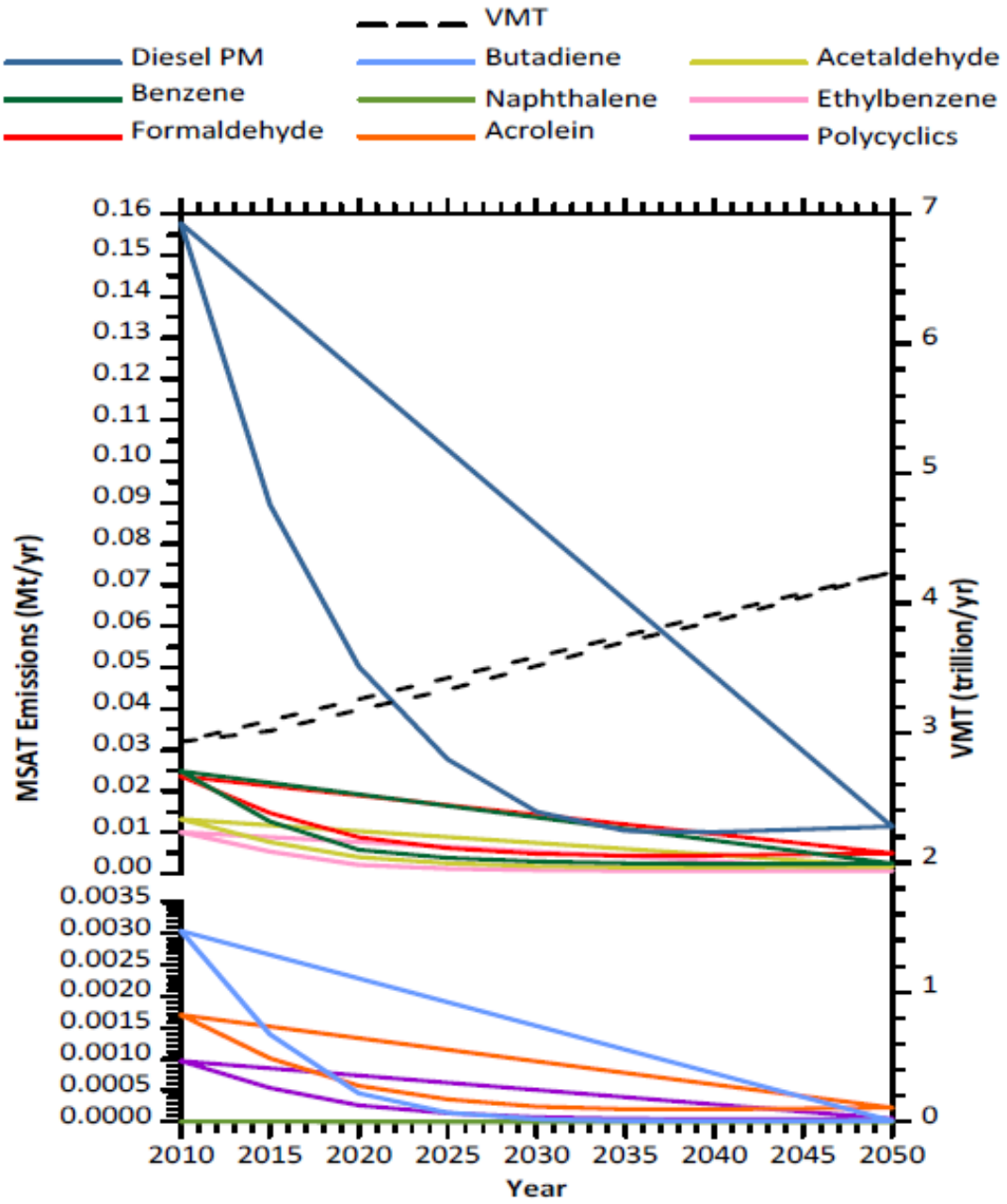
Using EPA's MOVES2014a model, as shown in Figure 1, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

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[1] https://www.epa.gov/iris
[2] https://www.epa.gov/national-air-toxics-assessment
[3] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNR0.txt

Figure 1
FHWA PROJECTED NATIONAL MSAT EMISSION TRENDS 2010 - 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOVES2014a MODEL



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPA Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals, and that Federal agencies use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment (42 U.S.C. 4332). In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest (23 U.S.C. 109(h)). The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report

16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-criticalreview-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (https://www.epa.gov/iris)."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD5985257800050C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion such as the example provided in this Appendix (reflecting any local and project-specific circumstances), should be included regarding incomplete or unavailable information in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)]. The FHWA Headquarters and Resource Center staff, Victoria Martinez (787) 771-2524, James Gavin (202) 366-1473, and Michael Claggett (505) 820-2047, are available to provide guidance and technical assistance and support.

State Project No. H.000284 & No. H.000286
Federal Aid Project No. H000284 & No. H000286

US 90 Pearl River Bridges
Route US 90
St. Tammany Parish, Louisiana
and
Hancock County, Mississippi

Traffic Noise Analysis
Technical Report
Hancock County, Mississippi

Prepared for:
Louisiana Department of Transportation and Development
on behalf of
Mississippi Department of Transportation

Prepared by:

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DOTD LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

MDOT MISSISSIPPI DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation Federal Highway Administration

October 2019

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Addenda

Addendum A: Project Alternatives

Addendum B: Noise Measurement Data Sheets

Addendum C: Traffic Data

1. INTRODUCTION

The proposed US 90 Pearl River Bridges project spans approximately five miles along US 90 (Chef Menteur Hwy) from US 190 in St. Tammany Parish, Louisiana to 7th Avenue/Kelly Road in Hancock County, Mississippi. Exhibit 1 shows the location of the proposed project. The proposed project provides for the rehabilitation or replacement of the five Pearl River Bridges on the existing - or an offset - alignment. This noise analysis addresses the section of the project within Hancock County, Mississippi, extending from the East Pearl River Bridge to 7th Avenue/Kelly Road. The analysis was conducted in accordance with the Federal Highway Administration (FHWA) noise regulation, Title 23 of the Code of Federal Regulations Part 772, *Procedures for Abatement of Highway Traffic and Construction Noise, 23 CFR 772* and the *Mississippi Department of Transportation (MDOT) Highway Traffic Noise Policy* (effective July 13, 2011).

The No-Build Alternative and four East Pearl River Build Alternatives are being studied as part of the National Environmental Policy Act (NEPA) process for the project. Addendum A includes figures of the Build Alternatives which include: two fixed *Long Span Replacement* Alternatives ("Loop Road" and "Gooseneck Frontage Road") and two *Movable Span Replacement* Alternatives (Bascule Bridge and Lift Bridge). Each Build Alternative will replace the East Pearl River Bridge at a location south of the existing bridge. The *Movable Span Replacement* Alternatives (Bascule Bridge and Lift Bridge) both include an at-grade intersection with Hwy 604; however, the bridge profiles are different. The *Long Span Replacement* Alternatives ("Loop Road" and "Gooseneck Frontage Road") have different configurations with Hwy 604. A noise study was conducted for the proposed project using the electronic design files to:

(a) Predict the effects that the proposed project will have on the noise environment

(b) Identify sites where noise impact is likely to occur

(c) Determine if there are any feasible noise abatement measures which will eliminate or reduce expected noise impact

(d) Satisfy the requirements of 23 CFR 772

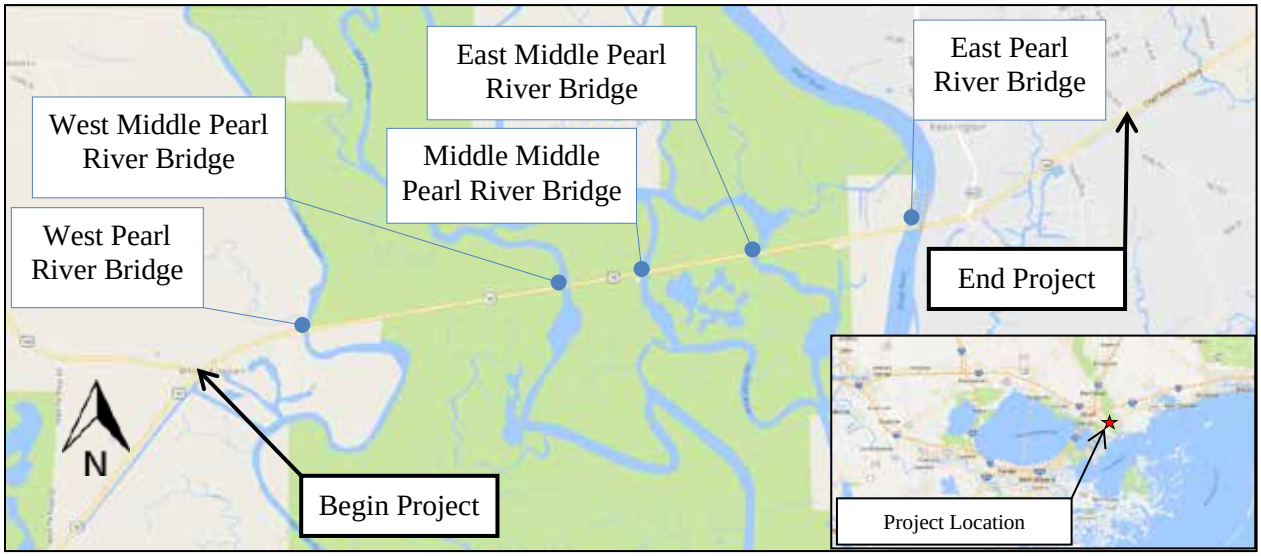


EXHIBIT 1. General Location and Site Location Map

2. SUMMARY OF RESULTS

This analysis includes twenty-five (25) noise sensitive receptors that are located within 500 feet of the centerline of the median of the proposed project. All the sensitive receptors are residential.

None of the residences are predicted to have existing traffic noise levels approaching or exceeding the FHWA noise abatement criteria (NAC) levels in 23 CFR 772. If the proposed project is not constructed (No-Build Alternative), none of the residences are predicted to be impacted in the Design Year 2044. These residences will also not be impacted under the Build Alternatives in the Design Year 2044. Since no noise impacts are predicted under 23 CFR 772 and MDOT's noise policy, noise abatement measures were not considered for this project.

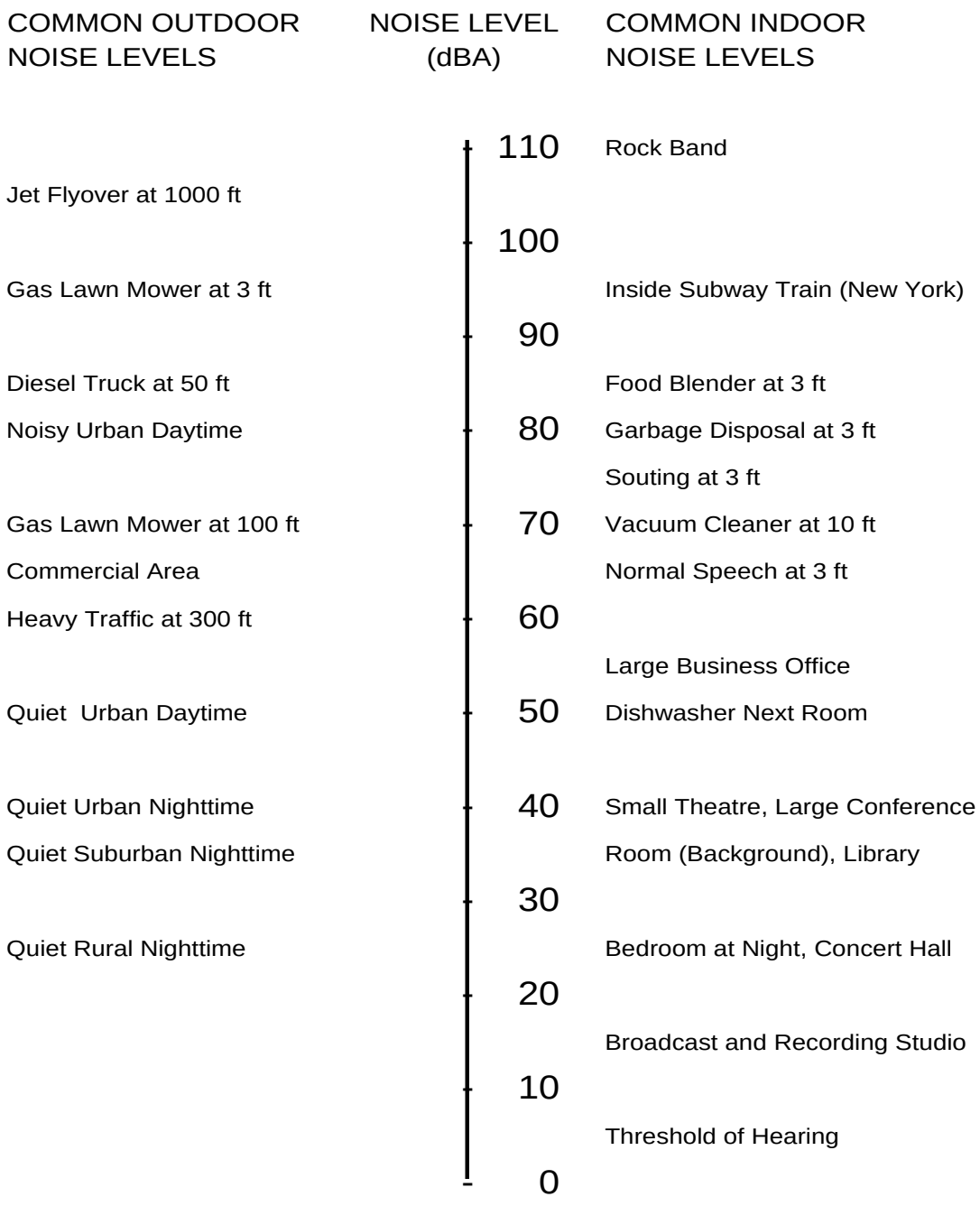
3. FUNDAMENTALS OF SOUND AND NOISE

Sound is the vibration of air molecules in waves, like ripples on water. When these vibrations (or sound waves) reach our ears, we hear what we call *sound*. These sound waves are produced by objects, which move back and forth very rapidly, such as our vocal cords when we speak. The rate at which these objects move back and forth is called their *frequency*. The frequency of the moving objects determines the frequency, or *pitch*, of the sound. Human ears can only hear sound waves with a frequency between approximately 20 cycles per second and 15,000 cycles per second.

The intensity or loudness of sound is measured in units called *decibels* (dB). However, since the human ear does not hear sound waves of different frequencies at the same subjective "loudness," an adjustment or weighting of the high-pitched and low-pitched sounds is often made to approximate how an average person hears sounds. When such adjustments to the sound levels are made, they are called "A-weighted levels" and are usually labeled "dBA". Exhibit 2 shows some common A-weighted noise levels.

It has been found by testing large numbers of people that a 10 dBA increase in the sound level is perceived to be a "doubling" of the sound level as heard by the human ear. This means that a sound level of 60 dBA sounds *twice as loud* as a sound level of 50 dBA, and a sound level of 60 dBA sounds *half as loud* as a sound level of 70 dBA. It also means that a sound level of 70 dBA sounds four times as loud as a sound level of 50 dBA.

The decibel scale for measuring the intensity of sound is based on the logarithm of the sound level pressure relative to a reference sound level pressure. Logarithmic scales are based on powers of ten and are not linear, like when measuring with a conventional ruler. Because of the logarithmic nature of the decibel scale for sound levels, changes in sound levels are complex to define. For example, if a sound of 60 dBA is added to another sound of 60 dBA, the resulting sound is 63 dBA instead of 120 dBA.



COMMON INDOOR AND OUTDOOR NOISE LEVELS

"Fundamentals and Abatement of Highway Traffic Noise"
Bolt Beranek and Newman Inc.
Jun-73

EXHIBIT 2. Common Outdoor and Indoor Sound Levels

Noise is defined as unwanted sound. Since highway traffic sound is normally unwanted, highway traffic sound is usually called highway traffic noise. The level of highway traffic noise is never constant; therefore, it is necessary to use a statistical descriptor to describe the varying traffic noise levels. The equivalent continuous sound level (L_{eq}) is the statistical descriptor used in this report. L_{eq} is the steady A-weighted sound level, which would produce the same A-weighted sound energy over a stated period of time as a specified time-varying sound.

4. NOISE IMPACT CRITERIA

The FHWA noise regulation defines traffic noise impacts as "impacts which occur when the predicted traffic noise levels approach or exceed the Noise Abatement Criteria shown in Table 1, or when the predicted traffic noise levels substantially exceed the existing noise levels."

MDOT's noise policy with FHWA guidance and approval define "approach" to be 1 dBA less than the NAC. With FHWA guidance and approval, MDOT has also defined a "substantial increase" in traffic noise levels to be 15 dBA or more.

5. NOISE LEVEL MEASUREMENTS

Noise level measurements were conducted at selected and approved sites in the vicinity of the proposed project on September 15, 2016. The measurement sites are shown in Exhibits 3 through 5.

The measurements were recorded using a Larson Davis SoundTrack LxT sound level meter during hours of maximum traffic volume. The calibration of the Larson Davis SoundTrack LxT was checked with a Larson Davis CAL150 acoustic calibrator before and after each measurement. Measurements were conducted for a period of at least 15 minutes at each location. The noise measurement data sheets are supplied in Addendum B.

TABLE 1. Federal Highway Administration Noise Abatement Criteria (NAC)

Hourly A-Weighted Sound Level – Decibel (dBA)

Activity Category	Activity Criteria[1]		Evaluation Location	Activity Description
	$L_{eq}(h)$	$L_{10}(h)$		
A	57	60	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[2]	67	70	Exterior	Residential
C[2]	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[2]	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	--	--	--	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	--	--	--	Undeveloped lands that are not permitted

[1] Either $L_{eq}(h)$ or $L_{10}(h)$ (but not both) may be used on a project. The $L_{eq}(h)$ and $L_{10}(h)$ Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

[2] Includes undeveloped lands permitted for this activity category.

TABLE 2. Measurement Site Noise Levels and Validation (dBA)

Measurement Location	Date & Time	Measured Noise Level (dBA)	Predicted Noise Level (dBA)	Difference (Predicted minus Measured, dB)
16500 US90, MS ("NM6")	09/15/16, 6:45 am to 7:05 am	57.0	56.5	-0.5
16604 US90, MS ("NM4")	09/15/16, 7:20 am to 7:35 am	56.2	54.0	-2.2
16050 US90, MS ("NM7")	09/15/16, 8:16 am to 8:36 am	59.3	58.1	-1.2
16022 Bali, MS ("NM5")	09/15/16, 7:48 am to 8:02 am	46.0	n/a	n/a
5098 Hwy604, MS ("NM8")	09/15/16, 8:52 am to 9:08 am	46.5	n/a	n/a

At three sites (16500 US 90, 16604 US 90, and 16050 US 90), traffic counts were simultaneously recorded during the noise level measurements, and those traffic counts and posted speeds were used for validation testing of the FHWA Traffic Noise Model Version 2.5 (TNM). As shown in Table 2, the noise measurements in the field *were* within 3 dB of the predicted highway traffic noise levels; therefore, the model is considered validated.

6. NOISE LEVEL ESTIMATES

Estimates of the exterior noise levels at all noise sensitive, occupied facilities in the vicinity of the proposed project were made using TNM. Traffic noise level predictions were made for: 1) Existing conditions; 2) Design Year 2044 conditions if the proposed project is constructed (i.e., Build Alternatives); and 3) Design Year 2044 conditions if the proposed project is not constructed (i.e., No-Build Alternative). In making these estimates, the traffic volume, operating speed, intervening buildings, and terrain were considered. For the Existing and No-Build cases, the US 90 posted speeds of 55 mph and 45 mph were used west and east, respectively, of the East Pearl River Bridge. For the Build Alternatives, an operating speed of 50 mph on US 90 was used per the March 27, 2018 Louisiana Department of Transportation and Development (DOTD)

memorandum, *Traffic Analysis for US 90 at MS 604*. The results are shown in Table 3. The locations of the receptors are shown in Exhibits 3 through 5.

Properties at comparable distances from US 90 may have different predicted noise levels due to different ground cover and intervening buildings between US 90 and the property.

7. TRAFFIC

Paragraph d, Section 772.9 of 23 CFR 772 says that, "in predicting noise levels and assessing noise impacts, traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year shall be used." Since the level of highway traffic noise is normally related directly to the traffic volume, the traffic characteristics which will yield the worst hourly traffic noise impact on a regular basis for the design year will be the Design Hourly Volume (DHV).

The March 27, 2018 DOTD memorandum, *Traffic Analysis for US 90 at MS 604*, provided Existing Year 2017 and Design Year 2044 “base volumes” which were used in making estimates of traffic noise levels in this study. This memorandum also contained classification counts for the project that were applied to the “base volumes” for input into the TNM model. For the Build Alternatives, an operating speed of 50 mph was used per the DOTD traffic memorandum. For the Existing and No-Build cases, the posted speeds of 55 mph and 45 mph were used west and east, respectively, of the East Pearl River Bridge. The traffic data is supplied in Addendum C.

8. EXISTING NOISE ENVIRONMENT

Twenty-five occupied facilities are located in the vicinity of the proposed project: All twenty-five are residential. As shown in Table 3, none of these facilities have existing traffic noise levels approaching or exceeding 23 CFR 772 Noise Abatement Criteria levels.

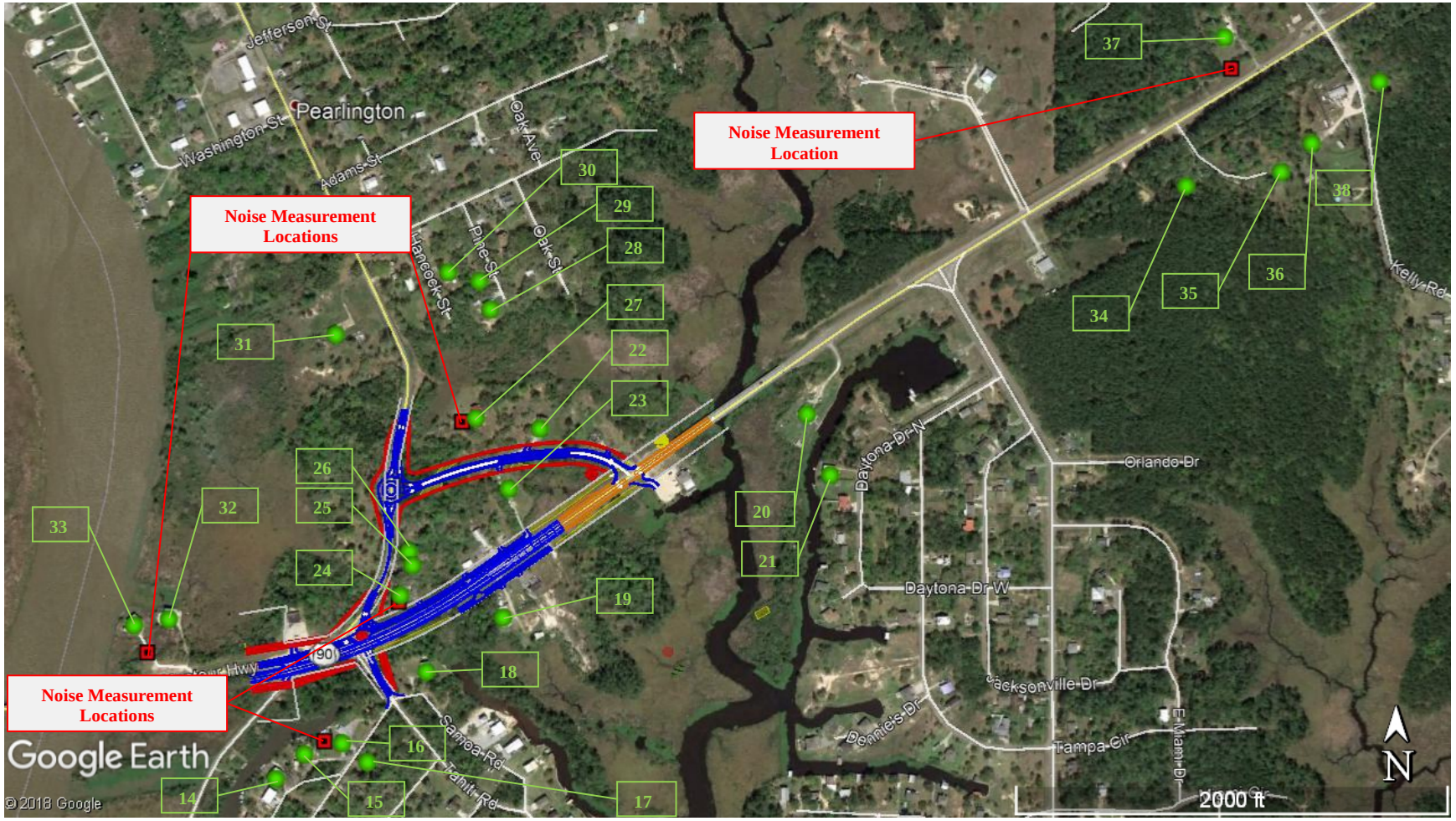


EXHIBIT 3. Long Span Replacement ("Loop Road") Alternative - Receptor Locations (numbered) and Noise Measurement Locations (red squares)

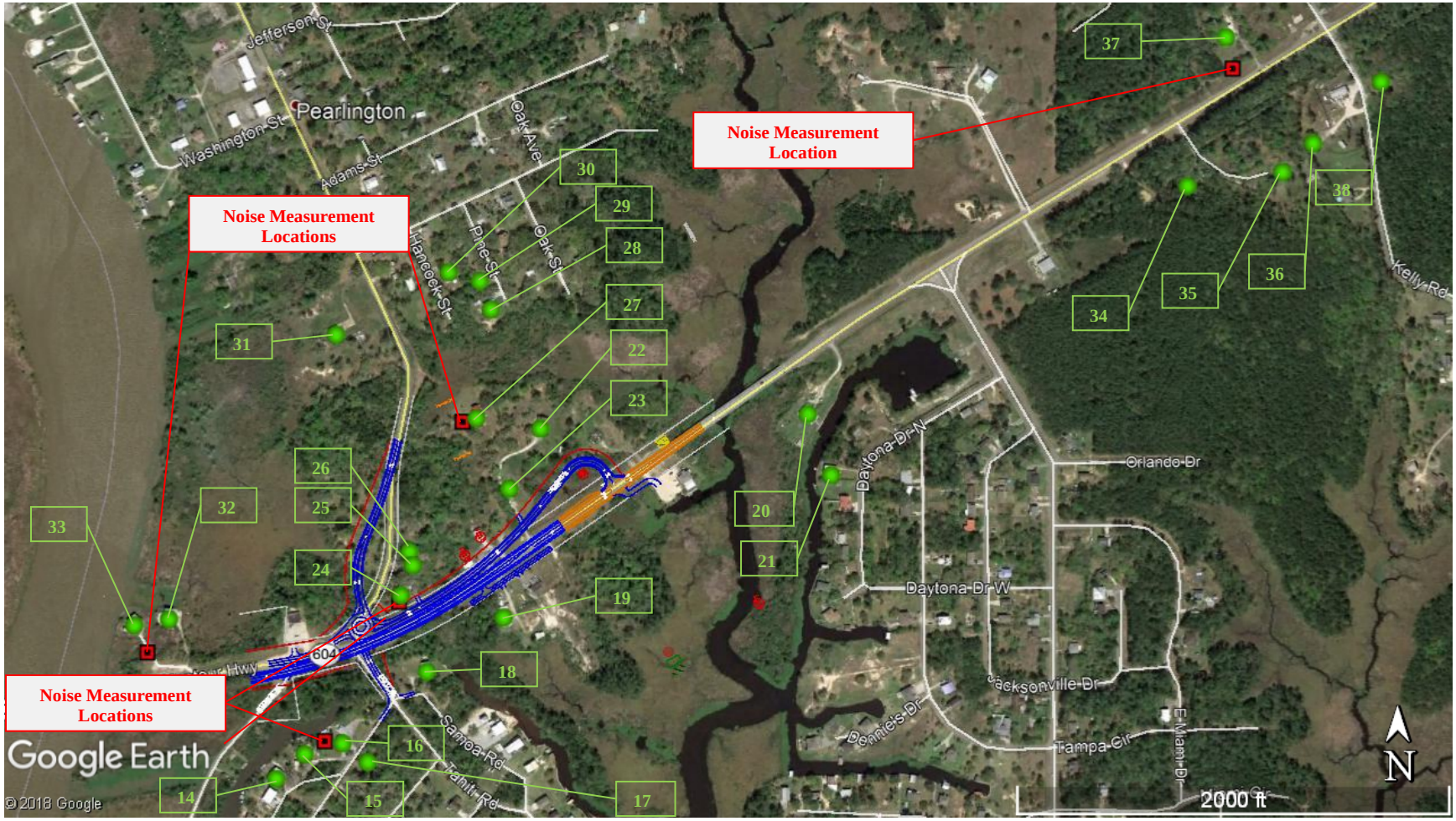


EXHIBIT 4. Long Span Replacement ("Gooseneck Frontage Road") Alternative - Receptor Locations (numbered) and Noise Measurement Locations (red squares)

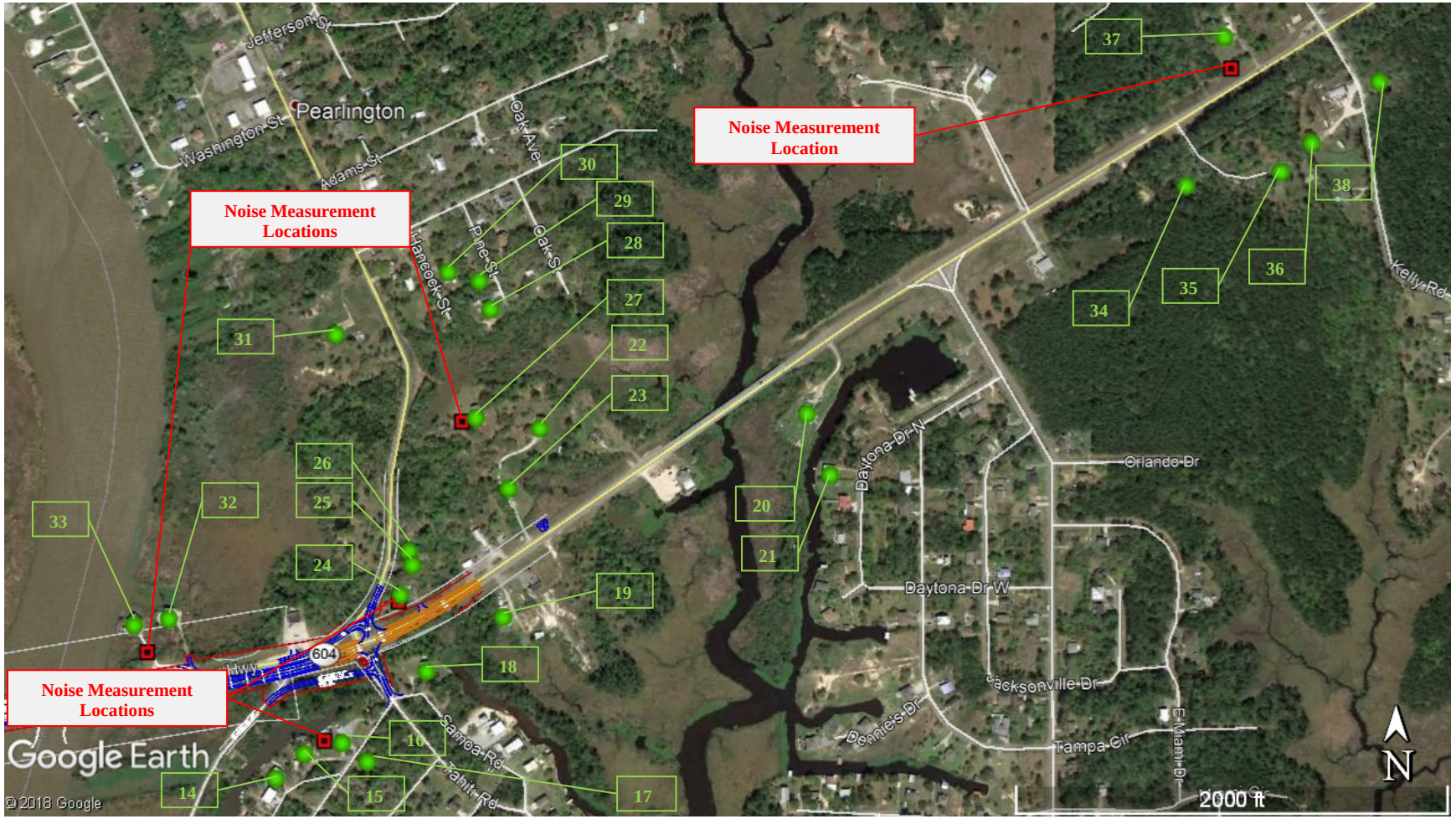


EXHIBIT 5. Movable Span Replacement (Bascule Bridge and Lift Bridge) - Receptor Locations (numbered) and Noise Measurement Locations (red squares)

TABLE 3. Existing and Build Condition Modeled Noise Levels (dBA)

Receptor Number *	Receiver Name	Dwelling Units	Existing Noise Level (dBA)	Design Year 2044 Noise Levels***								
				No Build	Long Span "Loop Road"		Long Span "Gooseneck Frontage Road"		Movable Span Bascule Bridge		Movable Span Lift Bridge	
					Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing
14	16038 Oahu Rd	1	49.6	51.4	53.7	4.1	48.0	(1.6)	54.4	4.8	54.5	4.9
15	16028 Oahu Rd	1	50.5	52.3	54.5	4.0	48.5	(2.0)	55.8	5.3	56.1	5.6
16	16022 Bali Rd	1	50.2	52.0	54.3	4.1	48.3	(1.9)	55.6	5.4	56.0	5.8
	16022 Bali Rd (M)		50.1	51.9	54.3	4.2	48.3	(1.8)	55.2	5.1	55.4	5.3
17	16021 Bali Rd	1	46.7	48.3	52.8	6.1	46.9	0.2	53.5	6.8	53.8	7.1
18	5046 Samoa Rd	1	56.7	58.2	56.2	(0.5)	51.5	(5.2)	61.4	4.7	61.4	4.7
19	16485 US90	1	59.4	60.9	59.5	0.1	53.8	(5.6)	63.1	3.7	63.1	3.7
20	16395 US90	1	55.5	57.0	58.3	2.8	52.7	(2.8)	58.9	3.4	58.9	3.4
21	5061 Daytona Circle	1	46.9	48.4	49.9	3.0	44.1	(2.8)	49.6	2.7	49.6	2.7
22	16480 US90	1	48.8	50.3	58.4	9.6	51.2	2.4	52.0	3.2	52.0	3.2
23	16478 US90 (front yard)	1	52.9	54.4	59.0	6.1	54.6	1.7	56.3	3.4	56.3	3.4
	16478 US90 (backyard)		50.4	51.8	59.7	9.3	52.5	2.1	53.7	3.3	53.7	3.3
24	16500 US90	1	59.3	60.7	56.7	(2.6)	56.1	(3.2)	63.6	4.3	63.6	4.3
	16500 US90 (M)		60.6	62.0	55.8	(4.8)	57.1	(3.5)	64.5	3.9	64.5	3.9
25	5042 Hwy 604 (front yard)	1	54.8	55.6	53.5	(1.3)	50.0	(4.8)	58.5	3.7	58.5	3.7
	5042 Hwy 604 (backyard)		53.3	54.7	55.9	2.6	52.8	(0.5)	58.8	5.5	58.8	5.5
26	5040 Hwy 604 (front yard)	1	58.3	59.1	53.8	(4.5)	49.3	(9.0)	61.1	2.8	61.0	2.7
	5040 Hwy 604 (backyard)		50.6	51.8	53.6	3.0	49.2	(1.4)	54.7	4.1	54.8	4.2

Receptor Number *	Receiver Name	Dwelling Units	Existing Noise Level (dBA)	Design Year 2044 Noise Levels***							
				No Build	Long Span "Loop Road"		Long Span "Gooseneck Frontage Road"		Movable Span Bascule Bridge		Movable Span Lift Bridge	
					Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing
27	5098 Hwy 604	1	46.3	47.3	53.8	7.5	47.2	0.9	48.8	2.5	48.9	2.6
	5098 Hwy 604 (M)		47.0	47.9	54.0	7.0	47.4	0.4	49.4	2.4	49.5	2.5
28	5025 Pine St	1	42.6	43.4	48.0	5.4	42.8	0.2	45.1	2.5	45.2	2.6
29	5097 Pine St	1	41.4	42.2	46.9	5.5	41.7	0.3	44.0	2.6	44.1	2.7
30	5108 Hancock St	1	43.5	44.0	47.8	4.3	42.9	(0.6)	45.6	2.1	45.7	2.2
31	5153 Hwy 604	1	46.9	46.9	49.6	2.7	44.9	(2.0)	48.3	1.4	48.3	1.4
32	16600 US90	1	52.0	54.1	52.4	0.4	47.3	(4.7)	54.9	2.9	54.9	2.9
33	16604 US90	1	52.2	54.3	52.4	0.2	47.2	(5.0)	54.7	2.5	54.6	2.4
	16604 US90 (M)		56.3	58.4	51.1	(5.2)	47.2	(9.1)	56.5	0.2	56.4	0.1
34	16103 US90	1	53.8	55.3	56.5	2.7	50.8	(3.0)	57.1	3.3	57.1	3.3
35	16101 US90	1	47.0	48.5	49.6	2.6	44.0	(3.0)	49.9	2.9	49.9	2.9
36	5595 Kelly Rd	1	47.8	49.4	50.4	2.6	44.8	(3.0)	50.8	3.0	50.8	3.0
37	16050 US90	1	55.0	56.6	57.8	2.8	52.6	(2.4)	58.5	3.5	58.5	3.5
	16050 US90 (M)		63.0	64.5	65.8	2.8	60.7	(2.3)	65.8	2.8	65.8	2.8
38	5610 Kelly Rd	1	51.0	52.5	53.6	2.6	48.0	(3.0)	54.1	3.1	54.1	3.1

* Receptor numbering starts at "14" as they are a continuation of the 13 receptors located within the project limits in St. Tammany Parish, Louisiana.
** "(M)" denotes a receiver modeled at a noise measurement location.
*** Parentheses around value indicates a negative value (i.e., traffic noise levels are reduced with the project).

9. DESIGN YEAR 2044 NO-BUILD NOISE ENVIRONMENT

The No-Build noise levels at the noise sensitive receptors in the Design Year 2044 are expected to be approximately 1 to 2 dBA higher than the existing noise levels if the proposed project is not constructed, as shown in Table 3. Noise impacts are not predicted at any of the noise sensitive receptors.

10. DESIGN YEAR 2044 BUILD ALTERNATIVES NOISE ENVIRONMENT

As shown in Table 3, if any of the Build Alternatives are constructed, none of the occupied facilities are predicted to be impacted because: 1) Traffic noise levels are predicted to be below the NAC of 66 dBA for all residential Category B land uses and 2) a substantial increase of 15 dB in noise level is not predicted at any of the receptors. Predicted Design Year 2044 noise levels at some receptors are lower than existing levels under the *Long Span Replacement "Loop Road"* and *Long Span Replacement "Gooseneck Frontage Road"* Alternatives. These decreases are predicted at locations near the new elevated section of US 90 east of the bridge. . However, it is important to note that TNM does not account for traffic noise that may propagate from under the bridge structure to nearby receivers, nor does it account for expansion joint noise.

11. TRAFFIC NOISE ABATEMENT

There are no predicted traffic noise impacts per 23 CFR 772 and MDOT's noise policy; therefore, noise abatement is not considered for this project.

12. CONSTRUCTION NOISE ABATEMENT

The following noise abatement measures will be incorporated in the contract plans and specifications in order to prevent adverse construction noise impact in the vicinity of the proposed project:

(a) The contractor shall comply with all state and local sound control and noise level rules, regulations and ordinances that apply to any work performed pursuant to the contract.

(b) Each internal combustion engine used for any purpose on work related to the project shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without such muffler.

13. FHWA POLICY REGARDING LAND USE DEVELOPMENT AND FUTURE NOISE ABATEMENT

FHWA will not normally participate in noise abatement measures unless there is construction or reconstruction of a highway section (or portion thereof). However, FHWA may participate in "Type II" noise abatement measures on an existing highway where land development or substantial construction predated the existence of any highway. The granting of a building permit, filing of a plat plan or a similar action must have occurred prior to right-of-way acquisition or construction approval for the original highway. However, MDOT does not develop or implement Type II projects.

14. INFORMATION FOR LOCAL OFFICIALS

The lack of consideration of highway traffic noise in land use planning and development at the local level has added to the highway traffic noise problem. Many developments now experiencing high noise levels were constructed adjacent to major highways long after these highways were proposed and constructed. This lack of concern for predictably high noise levels by local planning and zoning agencies and by developers has impacted many residents. Since the FHWA and the MDOT do not have any authority over land use planning and development, they can only encourage local officials and developers to consider highway traffic noise in the planning, zoning and development of property near existing and proposed highways. To learn more about Noise Compatible Planning, local officials and developers are encouraged to visit the FHWA Highway Traffic Noise website (www.fhwa.dot.gov/environment/noise/).

The approximate distances to the 66 dBA and the 71 dBA contours at the "worst case" location (i.e., with the loudest traffic noise levels for Design Year 2044) are included in Table 4. Noise sensitive land uses

should generally not be constructed within these areas unless noise mitigation measures are also provided. The values in Table 4 do not represent predicted levels at every location at a particular distance back from the roadway. Noise levels will vary with changes in terrain and will be affected by the shielding of objects, such as buildings. This information is being included to make local officials and planners aware of anticipated traffic noise levels so that future development will be compatible with these levels.

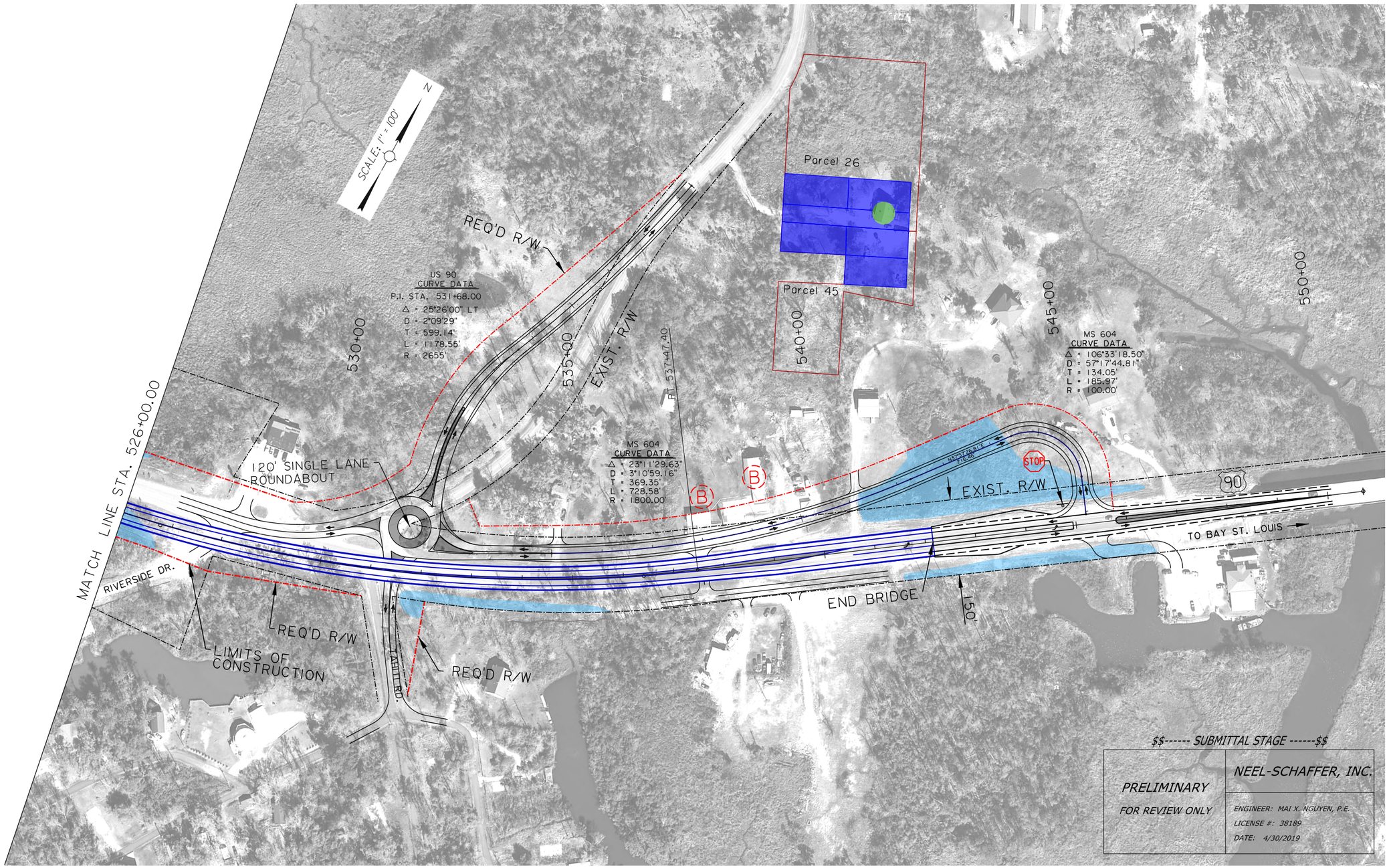
TABLE 4. Approximate Distance to 66 and 71 dBA Planning Contours

Location	66 dBA	71 dBA
US 90 from Hwy 604 to 7th Avenue/Kelly Rd	25 ft	Less than 25 ft

Addendum A: Project Alternatives

4/30/2019 10:48:03 AM

US 90 EA



$$------ SUBMITTAL STAGE ------$$

PRELIMINARY FOR REVIEW ONLY	NEEL-SCHAFFER, INC. ENGINEER: MAI X. NGUYEN, P.E. LICENSE #: 38189 DATE: 4/30/2019

PREPARED BY NEEL-SCHAFFER, INC.

Federal Highway Administration

DOTD LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

MDOT

US 90: EAST PEARL RIVER BRIDGE
LONG SPAN BRIDGE ALTERNATIVE F-4: GOOSENECK OPTION
STATE PROJECT NO. H.000286
ST. TAMMANY PARISH, LA / HANCOCK COUNTY, MS

LEGEND

- HISTORIC STRUCTURE
- NATIONAL REGISTER PROPERTY LIMITS
- WILDLIFE MANAGEMENT AREA
- (B) BUSINESS TAKING
- WETLANDS (EXCLUDED WATER OF THE U.S.)
- REMOVAL

SHEET NUMBER	
PARISH	ST. TAMMANY
CONTROL SECTION	
STATE PROJECT	H.000286
DESIGNED / CHECKED	
DETAILED / CHECKED	
DATE / SHEET	03-09-17 / 3 OF 3

NO.	DATE	REVISION DESCRIPTION	BY

STATE OF LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

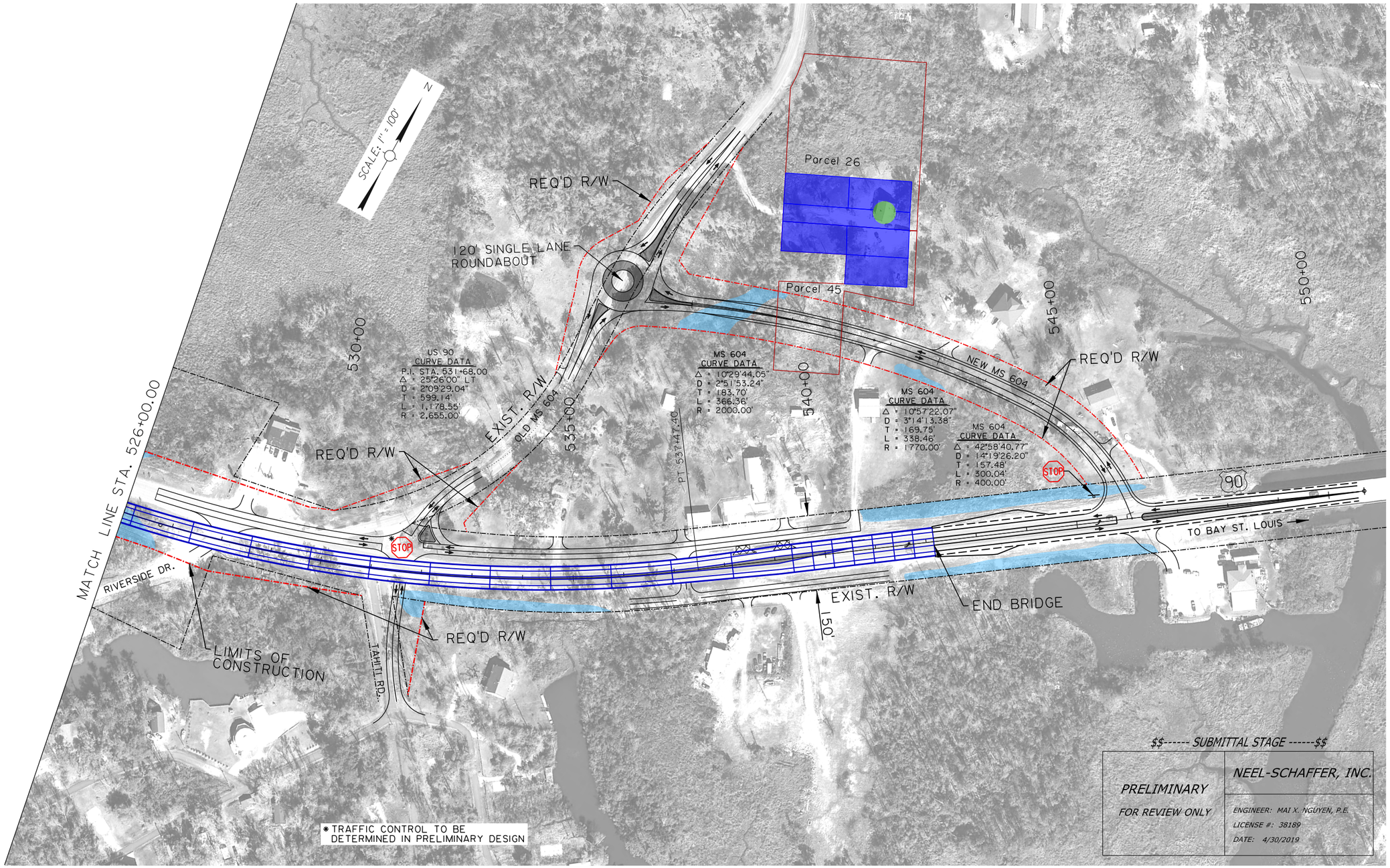
EAST PEARL RIVER BRIDGE
FIXED BRIDGE ALTERNATIVE
PLAN VIEW

EAST PEARL RIVER BRIDGE

EW_Lay_ EP_Fix_3_Goose Neck Option.dgn

4/30/2019 10:48:09 AM

US 90 EA



100 50 0 100
GRAPHIC SCALE
SCALE: 1"=100'

$$------ SUBMITTAL STAGE ------$$

PRELIMINARY	NEEL-SCHAFFER, INC.
FOR REVIEW ONLY	ENGINEER: MAI X. NGUYEN, P.E. LICENSE #: 38189 DATE: 4/30/2019

PREPARED BY NEEL-SCHAFFER, INC.

Federal Highway Administration

DOTD LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

MDOT

US 90: EAST PEARL RIVER BRIDGE
LONG SPAN BRIDGE ALTERNATIVE F-4 LOOP OPTION
STATE PROJECT NO. H.000286
ST. TAMMANY PARISH, LA / HANCOCK COUNTY, MS

LEGEND

- HISTORIC STRUCTURE
- NATIONAL REGISTER PROPERTY LIMITS
- WILDLIFE MANAGEMENT AREA
- WETLANDS (EXCLUDED WATER OF THE U.S.)
- REMOVAL

SHEET NUMBER	
PARISH	ST. TAMMANY
CONTROL SECTION	
STATE PROJECT	H.000286
DESIGNED / CHECKED	
DETAILED / CHECKED	
DATE / SHEET	03-09-17 3 OF 3

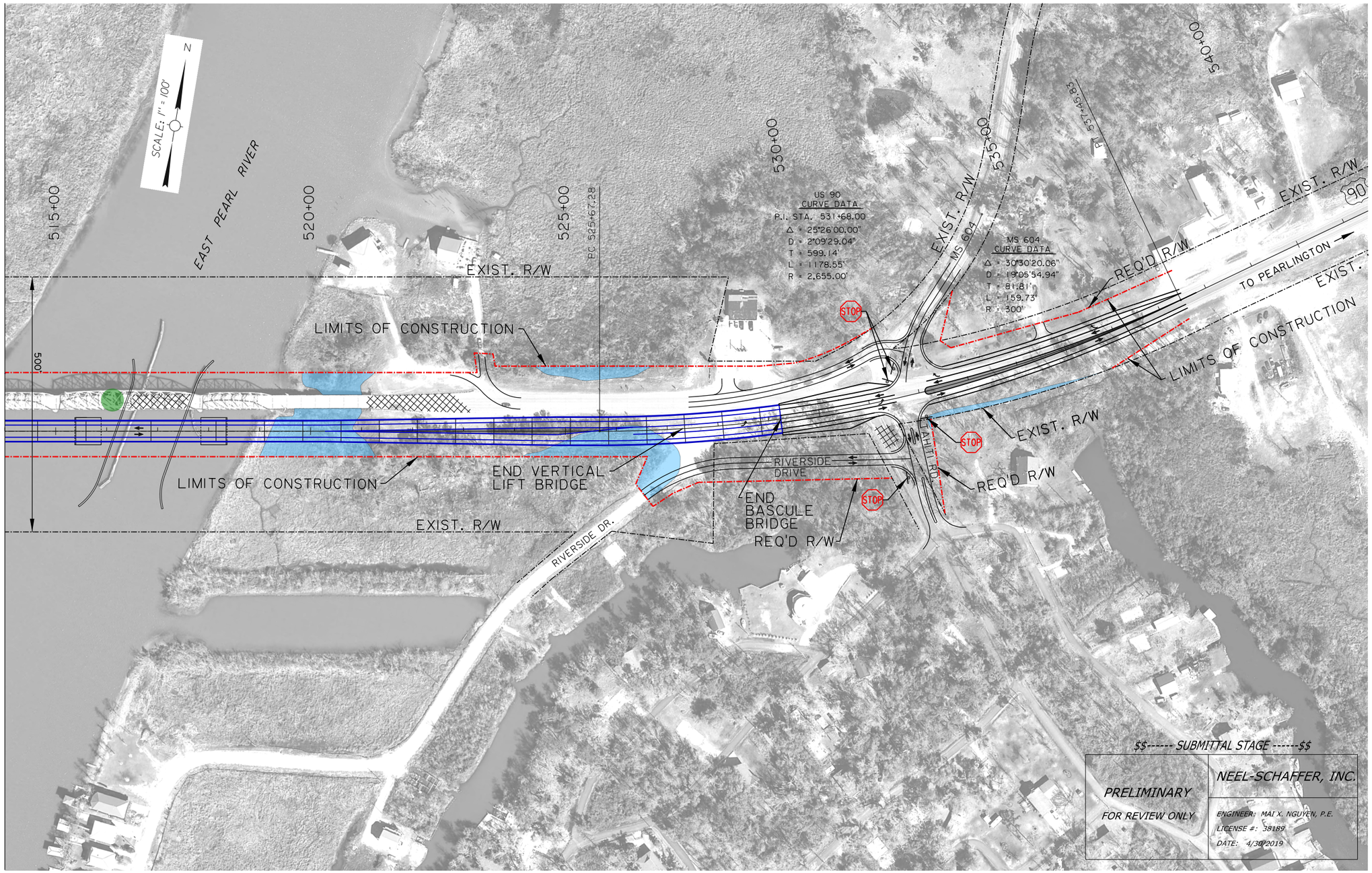
NO.	DATE	REVISION DESCRIPTION	BY

EAST PEARL RIVER BRIDGE
FIXED BRIDGE ALTERNATIVE
PLAN VIEW

EAST PEARL RIVER BRIDGE

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT DOTD

EW Lay_ EP_Fix_3_Loop Option.dgn



100 50 0 100
GRAPHIC SCALE
SCALE: 1"=100'

PREPARED BY NEEL-SCHAFFER, INC.

Federal Highway Administration
DOTD LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
MDOT

US 90: EAST PEARL RIVER BRIDGE
MOVABLE BRIDGE ALTERNATIVES
STATE PROJECT NO. H.000286
ST. TAMMANY PARISH, LA / HANCOCK COUNTY, MS

LEGEND
- WILDLIFE MANAGEMENT AREA
- WETLANDS (EXCLUDED WATER OF THE U.S.)
- HISTORIC STRUCTURE
- REMOVAL

SHEET NUMBER
PARISH: ST. TAMMANY
CONTROL SECTION
STATE PROJECT: H.000286
DESIGNED
CHECKED
DETAILED
CHECKED
DATE SHEET: 03-09-17 2 OF 2
REVISION DESCRIPTION
NO. DATE BY

EAST PEARL RIVER BRIDGE
MOVABLE BRIDGE ALTERNATIVES
PLAN VIEW
EAST PEARL RIVER BRIDGE

DOTD DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

EW_Lay_ EP_Mov_2.dgn

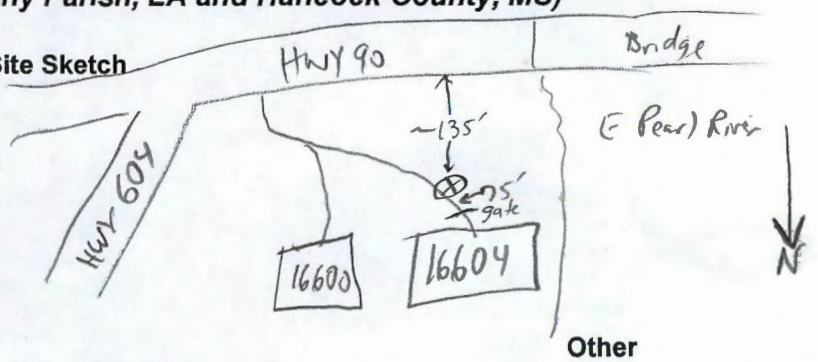
Addendum B: Noise Measurement Data Sheets

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15
Site
Area E Pearl River Bridge
Address 16600 + 16604

Site Sketch



Weather
Temp 80°
Wind occas. 2mph gust fr. N
Direction from N

Other

Notes

RION/LD/N121#

Cal@ +0.05 Cal Check= +0.010 739

#	Time Start		Description	← EB Running Counts	WB →
1	720		A-58, GA audible (masked by vehicles), A-58, A-56		
2	21	X	As-62 Boat motor – 55		
3	22	X	↓ stop@ :30		
4	23		(veh audible on Hwy 604 or to east on US 90 ~50)	A HT	A
5	24		As-58, A-52, HT-67	0 1	13
6	25		A-65		
7	26		(lull ↓ 47 – Background – Bugs		
8	27	X	A-55, GA-audible, A-55		
9	28		HT-66?	A HT	A
10	29		A-58	5 2	22
11	30		HT-65, A-54		
12	31		As-58, As-55		
13	32		HT-67, HT-66		
14	33		As-58, As+MT-58	A HT	A MT HT
15	34		A-61, A-59, As-58	11 2	37 1 3
16	35				
17	36		A-60		
18	37		(lull bugs 45-46; intrm, Bird-50) A-57		
19			stop@ 7:38		
20					
21			file 1638.015		
22					
23					
24					
25					
26					
27					
28					
29					
.30					

xtra 3 minutes 5 more Autos

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM4, 16604 US90, MS**
Description:	**Residential; 80°F; occasional gusts from north**
SLM Filename:	**1638 LxT_1638.015**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	7:20:00 AM	56.1	59.1		
~~2~~	~~7:21:00 AM~~	~~57.3~~	~~63.0~~	x	Boat motor ~ 55
~~3~~	~~7:22:00 AM~~	~~48.6~~	~~55.2~~	x	Boat motor
4	7:23:00 AM	48.7	51.9		
5	7:24:00 AM	58.1	67.5		
6	7:25:00 AM	56.8	65.4		
7	7:26:00 AM	48.7	54.2		
~~8~~	~~7:27:00 AM~~	~~53.7~~	~~56.9~~	x	GA audible
9	7:28:00 AM	57.2	66.2		
10	7:29:00 AM	53.8	62.5		
11	7:30:00 AM	56.3	66.3		
12	7:31:00 AM	55.2	58.9		
13	7:32:00 AM	59.9	67.0		
14	7:33:00 AM	55.5	61.0		
15	7:34:00 AM	57.0	64.3		
~~16~~	~~7:35:00 AM~~	~~51.3~~	~~58.6~~	x	optional extra minutes of measurement
~~17~~	~~7:36:00 AM~~	~~53.5~~	~~60.4~~	x	optional extra minutes of measurement
~~18~~	~~7:37:00 AM~~	~~49.7~~	~~58.9~~	x	optional extra minutes of measurement
~~19~~	~~7:38:00 AM~~	~~46.8~~	~~47.1~~	x	stop at 7:38
	Leq	**56.2**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15/16

Site

Area

Address 16022 Bali

Weather

Temp 80°

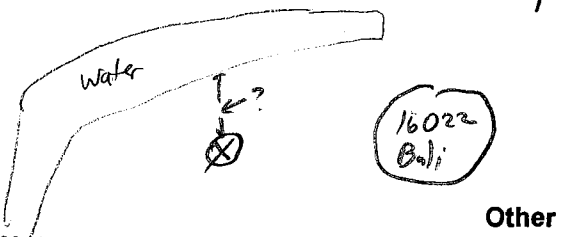
Wind N/A

Direction N/A

Site Sketch

E Pearl Bridge HWY 90

N



Notes

Other

RION/LD/N121#

Cal@

Cal Check= -0.01

#	Time Start	Description
1	7:48	hull ↓ 36
2	49	veh-39 veh-45
3	50	vehs-41-48; MC? from east ~ 51, veh-55
4	51	veh-48 veh-41
5	52	veh-46 V-48, truck stack-52 (1 sec)
6	53	vehs-44; Birds (intermitt)-44
7	54	HT?-51 V-45-47
8	55	hull ↓ 37
9	56	V-44 truck!-48
10	57	V-42
11	58	resident voice (2 secs) 48, veh 45
12	59	V-48-50 (20 secs)
13	8:00	V-44, V-56, vehs-47
14	01	vehs-45
15	02	vehs-44-45
16	03 X	local van
17	04	stop @ 8:04
18		
19		
20		file 1638.016
21		
22		
23		
24		
25		
26		
27		
28		
29		
.30		

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM5, 16022 Bali, MS**
Description:	**Residential; 80°F**
SLM Filename:	**1638 LxT_1638.016**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	7:48:00 AM	37.6	40.3		
2	7:49:00 AM	42.0	48.1		
3	7:50:00 AM	50.4	56.3		
4	7:51:00 AM	47.5	50.0		
5	7:52:00 AM	47.1	52.0		
6	7:53:00 AM	43.4	45.3		
7	7:54:00 AM	47.7	51.0		
8	7:55:00 AM	40.3	45.0		
9	7:56:00 AM	45.1	50.2		
10	7:57:00 AM	41.4	43.1		
11	7:58:00 AM	44.8	49.4		
12	7:59:00 AM	47.6	51.0		
13	8:00:00 AM	49.3	55.9		
14	8:01:00 AM	44.2	46.6		
15	8:02:00 AM	43.9	46.3		
~~16~~	~~8:03:00 AM~~	~~45.5~~	~~51.6~~	x	local van
~~17~~	~~8:04:00 AM~~	~~44.0~~	~~44.1~~	x	stop measure at 8:04
	Leq	**46.0**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15

Site

Area

Address 16500

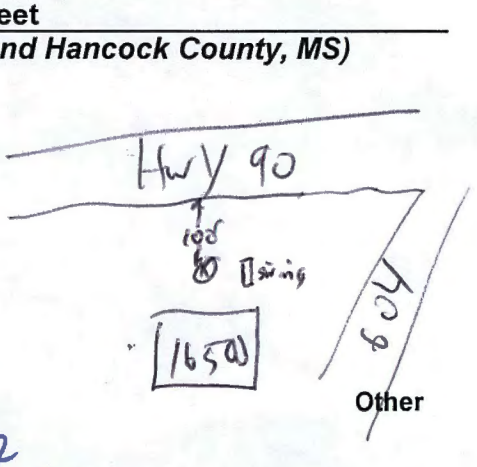
Weather

Temp 80

Wind N/A

Direction N/A

Site Sketch



Notes

RION/LD/N121# Cal@ 1:12 ↑.08 Cal Check=

#	Time Start		Description	
1	6:45		HT - 78 (loud)	Hwy 604 traffic
2	46		Pickup - 60	II
3	47		HT - 70, A5 - ?	I
4	48	X	A's - 65 Bus stop @ res. dwelling idle 15 secs accel - 72	II
5	49		Bull ↓ 42 (20 secs	I
6	50		A - 65 A - 60	
7	51		Birds in trees - 48 Bull ↓ 42, 604 WA - 52	I
8	52		A - 61, A - 62	I
9	53			I
10	54	X	A - 60 HT - 78 A5 64, Analyst Noise	I
11	55		A - 57 Inter. Bird - 50	
12	56			(II) - from 5
13	57		A - 63, A - 63	
14	58		HT - 72?	
15	59			II
16	7:00			I
17	01		A - 60 (Faint veh/engine to past audible)	
18	2		(Bull ↓ 42) (Birds on 604 - 55 dB)	II
19	3		A - Hwy 604 - 51	II
20	4		A - Hwy 604 - 51; Birds + water noise from behind house	(I) - from 5
21	5		(Bull ↓ 42 - background), A - Hwy 604 - 55	I
22	6		A - 61	(I) - from 5
23	7		A - 63	
24	8		Bull ↓ 42	I
25	9			I
26	10		Stop (1638.01)	
27	11			
28	12			
29	13			
.30	14			

↑ Not included in counts for US 90

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM6, 16500 US90, MS**
Description:	**Residential; 80°F**
SLM Filename:	**1638 LxT_1638.014**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	6:45:00 AM	64.4	78.8		(Loud HT)
2	6:46:00 AM	54.9	62.8		
3	6:47:00 AM	63.0	74.1		
~~4~~	~~6:48:00 AM~~	~~64.0~~	~~72.7~~	x	Bus idle near mic
5	6:49:00 AM	50.4	64.4		
6	6:50:00 AM	55.4	65.1		
7	6:51:00 AM	50.7	61.8		
8	6:52:00 AM	54.1	62.1		
9	6:53:00 AM	56.5	65.1		
~~10~~	~~6:54:00 AM~~	~~65.3~~	~~79.0~~	x	Analyst noise
11	6:55:00 AM	52.3	58.7		
12	6:56:00 AM	53.1	63.8		
13	6:57:00 AM	55.7	63.1		
14	6:58:00 AM	59.7	71.6		
15	6:59:00 AM	55.3	63.3		
16	7:00:00 AM	55.2	63.6		
17	7:01:00 AM	51.2	59.9		
18	7:02:00 AM	49.5	55.8		
19	7:03:00 AM	47.4	54.5		
20	7:04:00 AM	47.2	53.6		
~~21~~	~~7:05:00 AM~~	~~47.0~~	~~55.2~~	x	Traffic counts not recorded
~~22~~	~~7:06:00 AM~~	~~51.8~~	~~60.9~~	x	Traffic counts not recorded
~~23~~	~~7:07:00 AM~~	~~55.6~~	~~63.5~~	x	Traffic counts not recorded
~~24~~	~~7:08:00 AM~~	~~53.5~~	~~62.0~~	x	Traffic counts not recorded
~~25~~	~~7:09:00 AM~~	~~50.8~~	~~60.2~~	x	Traffic counts not recorded
~~26~~	~~7:10:00 AM~~	~~44.1~~	~~44.4~~	x	stop measure at 7:10
	Leq	**57.0**			

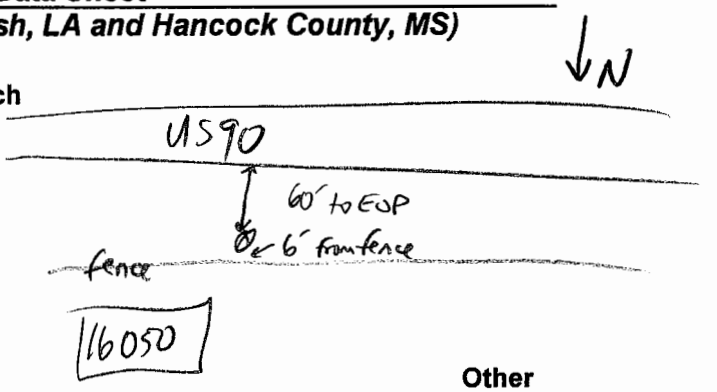
Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15
Site
Area
Address 16050 US90

Weather
Temp 80-85
Wind gusts to 5 mph
Direction fr. east

Site Sketch



Other

Notes

RION/LD/N121# Cal@ Cal Check= -0.10

#	Time Start		Description
1	8:16		A-55 A-? A-61
2	17		lull ↓ 40, MT-74
3	18		A-69, insects -44
4	19		A-68 A+MT 68-70, As-69
5	20		lull ↓ 40, (faint engine audible fr. south, insects -45 (5 secs)
6	21		A-?
7	22	X	lull ↓ 40, A-66, As-65, MT-76, aircraft
8	23		A-66, MT-70
9	24		A-65
10	25		
11	26	X	veh -48
12	27	X	
13	28	X	spoke w/resident NO COUNTS
14	29	X	
15	30	X	
16	31		A-61, A-65
17	32		A-64, A-65 MT-72 A-63
18	33		A-65, (lull ↓ 40-41)
19	34		A-63, A-67
20	35		A-61
21			stop @ 8:36
22			
23			
24			file 16 38.017
25			
26			
27			
28			
29			
.30			

EB | WB

A MT A
5 1 6

A MT HT A MT
10 1 1 13 1

X X

counts for 5 min

A MT A
7 1 5

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM7, 16050 US90, MS**
Description:	**Residential; 80-85°F; gusts to 5mph from east**
SLM Filename:	**1638 LxT_1638.017**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	8:16:00 AM	54.3	62.7		
2	8:17:00 AM	61.4	73.9		
3	8:18:00 AM	57.9	69.5		
4	8:19:00 AM	64.4	71.5		
5	8:20:00 AM	46.6	58.4		
6	8:21:00 AM	53.3	65.2		
~~7~~	~~8:22:00 AM~~	~~64.8~~	~~76.7~~	x	aircraft
8	8:23:00 AM	63.2	71.5		
9	8:24:00 AM	58.0	66.8		
10	8:25:00 AM	60.9	68.6		
~~11~~	~~8:26:00 AM~~	~~48.3~~	~~54.8~~	x	analyst speaking with resident near mic
~~12~~	~~8:27:00 AM~~	~~56.6~~	~~65.7~~	x	analyst speaking with resident near mic
~~13~~	~~8:28:00 AM~~	~~46.0~~	~~53.3~~	x	analyst speaking with resident near mic
~~14~~	~~8:29:00 AM~~	~~61.3~~	~~71.7~~	x	analyst speaking with resident near mic
~~15~~	~~8:30:00 AM~~	~~60.0~~	~~69.0~~	x	analyst speaking with resident near mic
16	8:31:00 AM	55.9	65.6		
17	8:32:00 AM	61.2	71.8		
18	8:33:00 AM	53.9	64.4		
19	8:34:00 AM	56.8	67.5		
20	8:35:00 AM	54.1	65.3		
~~21~~	~~8:36:00 AM~~	~~61.3~~	~~64.4~~	x	stop measurement @ 8:36
	Leq	**59.3**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/16/17

Site Historic Property

Area

Address

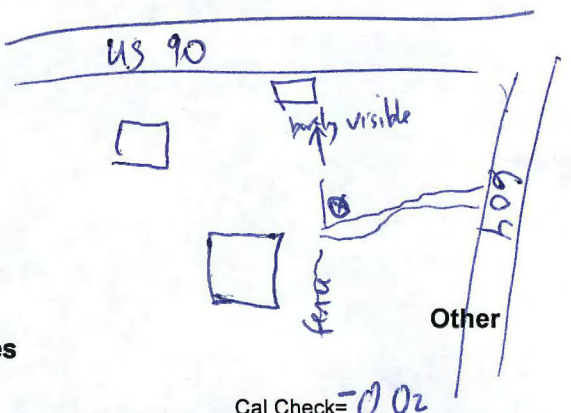
Weather

Temp 85°F

Wind occas. gusts

Direction N/A

Site Sketch



Notes

RION/LD/N121#

Cal@

Cal Check= -0.02

#	Time Start	Description
1 0	8:52	A-? on Hwy 604
2 1	53	
3 2	54 X	A-604-44 (plane -46) min
4 3	55	vehs US90-47, Bird-52, veh-604-46 + insects
5 4	56	veh-604-59, veh audible on US 90; secada-50
6 5	57	Secadas 48, veh-604-44
7 6	58	veh-US90-48, vehs-604-49
8 7	59	veh-604-48, veh US 90-51
9 8	9 00	veh-604+90 - 47
10 9	01	veh-604-?, secadas-48
11 10	02	(Quiet 37), Secadas 46
12 11	03	veh 604-48-49, veh on 90
13 12	04	veh 604-47, veh-604-47
14 13	05	Quiet 36, #90-44
15 14	06	veh-90-55 dB, veh on 604-?
16 15	07	veh-604-57
17		stop @ 9:08
18		
19		file 1638.018
20		
21		
22		
23		
24		
25		
26		
27		
28		
29		
.30		

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM8, 5098 Hwy 604, MS**
Description:	**Residential (Historic); 85°F; occasional gusts**
SLM Filename:	**1638 LxT_1638.018**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	8:52:00 AM	43.5	48.5		
2	8:53:00 AM	42.6	46.3		
~~3~~	~~8:54:00 AM~~	~~47.4~~	~~51.6~~	x	plane ~ 46
4	8:55:00 AM	45.4	52.4		
5	8:56:00 AM	51.4	59.4		
6	8:57:00 AM	43.9	49.9		
7	8:58:00 AM	45.5	49.5		
8	8:59:00 AM	47.7	52.2		
9	9:00:00 AM	43.5	49.1		
10	9:01:00 AM	43.1	49.0		
11	9:02:00 AM	43.1	49.2		
12	9:03:00 AM	46.2	49.2		
13	9:04:00 AM	44.8	47.4		
14	9:05:00 AM	40.0	45.2		
15	9:06:00 AM	49.2	55.4		
16	9:07:00 AM	50.1	57.8		
~~17~~	~~9:08:00 AM~~	~~47.9~~	~~48.2~~	x	stop measurement at 9:08
	Leq	**46.5**			

Addendum C: Traffic Data

Vehicle Count Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15/16 **Name:** RW

Site _____

Roadway Hwy 90 **Roadway** Hwy 90

Direction WB **Direction** EB

"Running Counts"

Time Start	Auto	MT	HT	Bus	MC	Auto	MT	HT	Bus	MC
6:45 - 50	8	0	2	1	0	9	0	0	0	0
50 - 55	19	0	3	1	0	12	0	0	0	0
55 - 700	22	0	4	1	0	17	0	0	0	0
700 - 05	26	0	4	1	0	19	0	0	0	0
05 - 10	← Didn't record final counts →									
720 - 725	13	0	0	0	0	0	0	1	0	0
725 - 730	22	0	0	0	0	5	0	2	0	0
7:30 - 735	37	1	3	0	0	11	0	2	0	0
7:35 - 738	← (total of 5 more autos)									
8:16 - 8:21	6	0	0	0	0	5	1	0	0	0
8:21 - 8:26	13	1	0	0	0	10	1	1	0	0
8:26 - 8:31	X	X	X	X	X	X	X	X	X	X
8:31 - 8:36	18	1	0	0	0	17	2	1	0	0

16580 Hwy 90

16604 Other data from this site 9/15

16050

Notes:

Existing 2017

Road	From	To	Design Hour Volume (DHV)		AM				PM				Speed (mph)
			AM	PM	Auto	MT	HT	MC	Auto	MT	HT	MC	
US 90 eastbound	west	Hwy 604	45	484	41	2	1	1	445	18	12	9	50
	Hwy 604	east	62	409	57	2	1	1	378	15	9	7	50
US 90 westbound	west	Hwy 604	91	97	84	4	2	2	89	4	2	2	50
	Hwy 604	east	92	122	85	4	2	1	113	5	2	2	50
MS604 NB	US90	north	38	137	35	2	1	0	127	6	2	1	35
MS604 SB	north	US90	39	46	35	2	1	0	41	3	1	1	35

Build 2044

Road	From	To	Design Hour Volume (DHV)		AM				PM				Speed (mph)
			AM	PM	Auto	MT	HT	MC	Auto	MT	HT	MC	
US 90 eastbound	west	Hwy 604	102	741	94	4	3	2	681	28	19	13	50
	Hwy 604	east	92	579	85	3	2	1	536	22	13	9	50
US 90 westbound	west	Hwy 604	155	205	143	6	3	3	189	8	4	4	50
	Hwy 604	east	132	170	122	6	2	2	157	7	3	3	50
MS604 NB	US90	Gas Station	79	235	73	4	1	1	218	11	4	2	35
	Gas Station	north	63	200	58	3	1	1	185	9	4	2	35
MS604 SB	north	Gas Station	45	69	41	3	1	1	62	4	2	1	35
	Gas Station	US90	54	103	49	3	1	1	93	6	3	1	35
Gas station driveway	MS604	west	28	49	25	2	1	0	44	3	1	1	15

Classification Count Summary	
Road:	**US 90EB - east (Pearl River Bridges)**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	170	1.62%
2. Cars	6,648	63.51%
3. Pick-Up, Panel, Van	3,034	28.98%
Sub-total Passenger Vehicles	9,852	94%
4. Buses	22	0.21%
5. Dual Rear	348	3.32%
6. 3-Axle Truck	19	0.18%
7. 4-Axle Truck	1	0.01%
Sub-total Single-Unit Trucks	390	4%
8. 2S-1, 3S-1, 2S-2	137	1.31%
9. 3S-2, 2S-3	80	0.76%
10. 3S-3, 3S-4	8	0.08%
Sub-total Combination Trucks	225	2%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	1	0.01%
Sub-total Twin Trailers	1	0.01%
Total Combinations	226	0%
Total Trucks	616	5.88%
TOTAL ALL VEHICLES	10,468	

TNM Vehicle Types	Total	%	% of Trucks
Autos	9,682	92.5%	n/a
MTs	389	3.7%	63%
HTs	227	2.2%	37%
Motorcycles	170	1.6%	n/a
Total	10,468	100.0%	n/a

Classification Count Summary	
Road:	**US 90WB - east (Pearl River Bridges)**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	151	1.53%
2. Cars	6,200	62.75%
3. Pick-Up, Panel, Van	2,934	29.69%
Sub-total Passenger Vehicles	9,285	94%
4. Buses	23	0.23%
5. Dual Rear	377	3.82%
6. 3-Axle Truck	16	0.16%
7. 4-Axle Truck	0	0.00%
Sub-total Single-Unit Trucks	416	4%
8. 2S-1, 3S-1, 2S-2	120	1.21%
9. 3S-2, 2S-3	48	0.49%
10. 3S-3, 3S-4	11	0.11%
Sub-total Combination Trucks	179	2%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	1	0.01%
Sub-total Twin Trailers	1	0.01%
Total Combinations	180	0%
Total Trucks	596	6.03%
TOTAL ALL VEHICLES	9,881	

TNM Vehicle Types	Total	%	% of Trucks
Autos	9,134	92.4%	n/a
MTs	416	4.2%	70%
HTs	180	1.8%	30%
Motorcycles	151	1.5%	n/a
Total	9,881	100.0%	n/a

Classification Count Summary	
Road:	**US 90EB - west (Pearl River Bridges)**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	183	1.77%
2. Cars	6,463	62.64%
3. Pick-Up, Panel, Van	3,020	29.27%
Sub-total Passenger Vehicles	9,666	94%
4. Buses	20	0.19%
5. Dual Rear	363	3.52%
6. 3-Axle Truck	9	0.09%
7. 4-Axle Truck	0	0.00%
Sub-total Single-Unit Trucks	392	4%
8. 2S-1, 3S-1, 2S-2	169	1.64%
9. 3S-2, 2S-3	78	0.76%
10. 3S-3, 3S-4	9	0.09%
Sub-total Combination Trucks	256	2%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	3	0.03%
Sub-total Twin Trailers	3	0.03%
Total Combinations	259	0%
Total Trucks	651	6.31%
TOTAL ALL VEHICLES	10,317	

TNM Vehicle Types	Total	%	% of Trucks
Autos	9,483	91.9%	n/a
MTs	392	3.8%	60%
HTs	259	2.5%	40%
Motorcycles	183	1.8%	n/a
Total	10,317	100.0%	n/a

Classification Count Summary	
Road:	**US 90WB - west (Pearl River Bridges)**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	178	1.84%
2. Cars	6,124	63.22%
3. Pick-Up, Panel, Van	2,811	29.02%
Sub-total Passenger Vehicles	9,113	94%
4. Buses	14	0.14%
5. Dual Rear	346	3.57%
6. 3-Axle Truck	14	0.14%
7. 4-Axle Truck	1	0.01%
Sub-total Single-Unit Trucks	375	4%
8. 2S-1, 3S-1, 2S-2	138	1.42%
9. 3S-2, 2S-3	48	0.50%
10. 3S-3, 3S-4	10	0.10%
Sub-total Combination Trucks	196	2%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	3	0.03%
Sub-total Twin Trailers	3	0.03%
Total Combinations	199	0%
Total Trucks	574	5.93%
TOTAL ALL VEHICLES	9,687	

TNM Vehicle Types	Total	%	% of Trucks
Autos	8,935	92.2%	n/a
MTs	374	3.9%	65%
HTs	200	2.1%	35%
Motorcycles	178	1.8%	n/a
Total	9,687	100.0%	n/a

Classification Count Summary	
Road:	**MS 604 NB Pearl River Bridges**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	45	0.85%
2. Cars	3,308	62.52%
3. Pick-Up, Panel, Van	1,596	30.16%
Sub-total Passenger Vehicles	4,949	94%
4. Buses	16	0.30%
5. Dual Rear	225	4.25%
6. 3-Axle Truck	7	0.13%
7. 4-Axle Truck	0	0.00%
Sub-total Single-Unit Trucks	248	5%
8. 2S-1, 3S-1, 2S-2	79	1.49%
9. 3S-2, 2S-3	14	0.26%
10. 3S-3, 3S-4	1	0.02%
Sub-total Combination Trucks	94	2%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	0	0.00%
Sub-total Twin Trailers	0	0.00%
Total Combinations	94	0%
Total Trucks	342	6.46%
TOTAL ALL VEHICLES	5,291	

TNM Vehicle Types	Total	%	% of Trucks
Autos	4,904	92.7%	n/a
MTs	248	4.7%	73%
HTs	94	1.8%	27%
Motorcycles	45	0.9%	n/a
Total	5,291	100.0%	n/a

Classification Count Summary	
Road:	**MS604 SB Pearl River Bridges**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	53	1.27%
2. Cars	2,165	51.82%
3. Pick-Up, Panel, Van	1,600	38.30%
Sub-total Passenger Vehicles	3,818	91%
4. Buses	13	0.31%
5. Dual Rear	228	5.46%
6. 3-Axle Truck	10	0.24%
7. 4-Axle Truck	0	0.00%
Sub-total Single-Unit Trucks	251	6%
8. 2S-1, 3S-1, 2S-2	89	2.13%
9. 3S-2, 2S-3	20	0.48%
10. 3S-3, 3S-4	0	0.00%
Sub-total Combination Trucks	109	3%
11. 2S-1-2	0	0.00%
12. 2S-2-2, 3S-1-2	0	0.00%
13. Any 7 Axle	0	0.00%
Sub-total Twin Trailers	0	0.00%
Total Combinations	109	0%
Total Trucks	360	8.62%
TOTAL ALL VEHICLES	4,178	

TNM Vehicle Types	Total	%	% of Trucks
Autos	3,765	90.1%	n/a
MTs	251	6.0%	70%
HTs	109	2.6%	30%
Motorcycles	53	1.3%	n/a
Total	4,178	100.0%	n/a

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

INTRADEPARTMENTAL CORRESPONDENCE

MEMORANDUM

TO: **Spencer P. Robinson**
Planning Division, MDOT

FROM: **Mathilda Rilovich, P.E.** Mathilda Rilovich
Traffic Engineering Management, LADOTD

DATE: **March 27, 2018**

SUBJECT: **H.000284 US 90 Pearl River Bridges (HBI)**
Traffic Analysis for US 90 at MS 604

LA DOTD project H.000284 US 90 Pearl River Bridges (HBI) includes replacement of a bridge adjacent to the US 90 at MS 604 intersection. As part of that project, several bridge configurations were developed, each of which requires modifications to the intersection of US 90 and MS 604.

The concepts identified in project H.000284 did not include traffic analysis. The purpose of this report is to provide traffic analysis for the intersection.

Installation of either a two-way stop controlled intersection with turn lanes or a single-lane roundabout to connect US 90 and MS 604 is recommended. For the stop controlled option, the turn lanes should be a minimum of 250-feet in length in order to allow vehicles to decelerate and queue as needed.

The exact east/west placement of this intersection will depend on the bridge type that is selected in the parent project H.000284. These designs are expected to enhance mobility and safety along the corridor by allowing the major east-west movements to proceed unimpeded by turning vehicles.

If there are any questions concerning this analysis, please contact Mathilda Rilovich at 225-379-1380 or Mathilda.Rilovich@la.gov .

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Introduction

This report will document the results of traffic analyses performed at the intersection of US 90 and MS 604 for the LA DOTD project H.000284 US 90 Pearl River Bridges (HBI). The project includes the replacement of five bridges, one of which will be in the immediate vicinity of the US 90 at MS 604 intersection and may require modifications to the existing intersection.

Various alignments and intersection types were analyzed, including roundabouts and stop-controls with added turning lanes. Measures of Effectiveness (MOEs) including queue and delay will be discussed in the Alternative Analysis section.

Study Area

The study area includes the intersection of US 90 and MS 604 on the Louisiana/Mississippi state border as shown in the vicinity map in Figure 1. The area west of the intersection is predominantly marshland, while the north, south, and east are mainly residential areas.



Figure 1

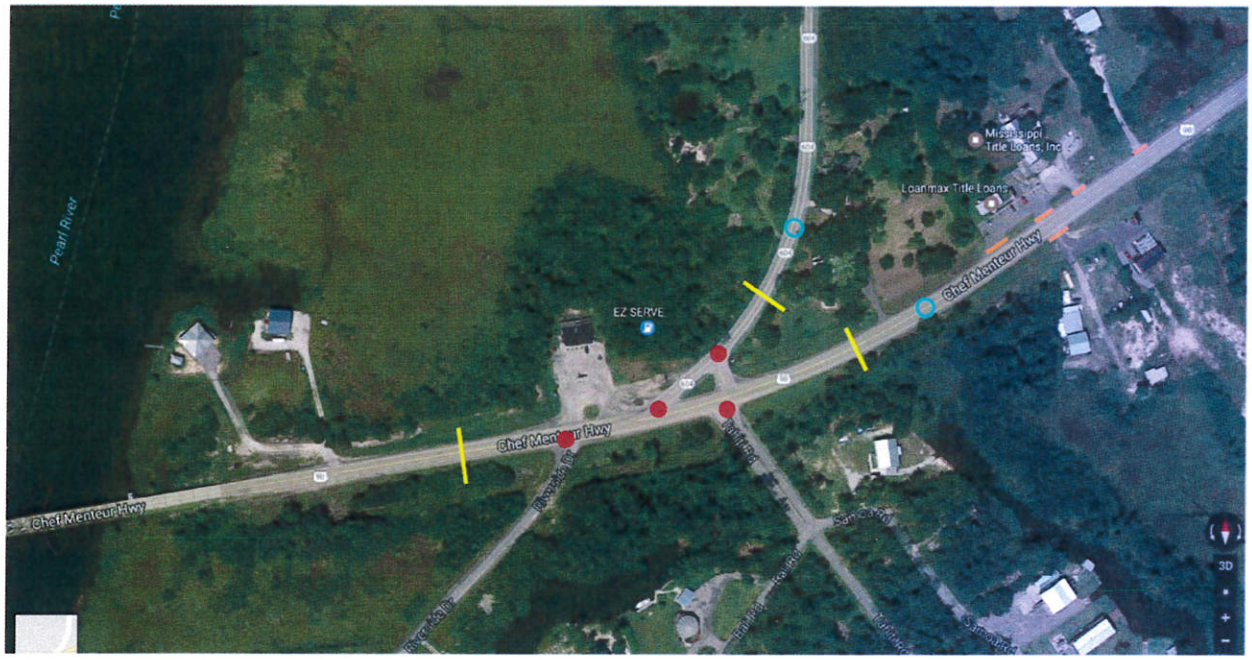
Currently, US 90 at MS 604 operates as three separate, but closely spaced, stop-controlled intersections. The close-up view in Figure 2 shows the skew angle and various legs of the intersection.



Figure 2

Data Collection

7-day/24-hour counts, turning movement counts, and speed studies were gathered by Mississippi DOT (MDOT) during the week of Sept 22, 2017 while school was in session without holidays. The count locations are shown in Figure 3. Based on the initial data, peak periods from 6:30 a.m. to 8:30 a.m. and 3:30 p.m. to 5:30 p.m. were recommended for turning movement counts during the morning and evening peaks respectively. See **Appendix A** for detailed information.



US 90 PEARL RIVER BRIDGES

COUNT MAP

TMC
15-min Driveway
7-day 24-hr count
SPEED STUDY

Figure 3

Peak Period Observations

During the morning peak period, all approaches appeared to have low volume. There were steady, small platoons of 1-2 vehicles. No unmet demand, queuing, congestion, or operational issues were observed.

During the evening peak period, the eastbound approach of US 90 appeared to have significantly higher volume than any other approach, with steady platoons of 5-20 vehicles. Light queuing was caused by eastbound US 90 vehicles attempting to turn left onto MS 604, and dissipated immediately. This queuing only occurred a few times during the peak period when opposing vehicles prevented adequate gaps to allow the turn movement. Otherwise, the eastbound US 90 vehicles appear to slow down a few mph and turn onto MS 604 at nearly the same speed they were traveling.

Some other general comments to note about the intersection area include:

- The MS 604 (Tahiti Rd.) leg appears to be used mostly for the following movements; westbound US 90 to northbound MS 604 and the opposite, southbound MS 604 to eastbound US 90.
- Eastbound US 90 vehicles were seen turning left at two different locations: the skewed MS 604 leg and the MS 604 (Tahiti Rd.) leg. In one instance these two left turn options posed a conflict.
- Eastbound US 90 vehicles turning left at the MS 604 (Tahiti Rd.) leg were seen over-tracking the other lane due to the limited space and anticipated secondary turn. If a vehicle was queued there, this maneuver could be difficult.
- A westbound US 90 vehicle was seen merging into oncoming traffic to pass a right-turning vehicle.
- There is no street lighting at the intersection.
- There is some rutting just off the shoulder of southbound MS 604 and westbound US 90. This may be caused by large trucks over-tracking when making the right turn from MS 604 to US 90.

Growth Rate

MDOT recommends a growth rate of 1.25% for this area based on historical data and planned projects in the surrounding areas. This growth rate was applied to existing volumes to forecast future conditions.

Existing Conditions (2017)

Based on the turning movement counts, the heaviest movement occurs eastbound along US 90 during the p.m. peak. Over 80% of the vehicles coming eastbound from the Pearl River Bridge continue eastbound along US 90, while fewer than 20% turn northbound onto MS 604, and the rest turn southbound onto Tahiti Road.

The opposing directions of travel, US 90 westbound and MS 604 southbound, appear to have significantly lower volumes during the p.m. peak.

All directions of travel during the a.m. peak appear to be low volume, with fewer than 100 vehicles on any approach. During this time, the major direction of travel is westbound along US 90.

Safety/Crash History

The safety/crash history provided by MDOT indicates that from January 2013 through the end of December 2017 there were five crashes at the intersection of US 90 and MS 604, of which, four were rear-ends on the southbound approach of MS 604. There were no injuries reported in the crashes.

Existing Network Analysis (Vistro)

The intersection of US 90 and MS 604 is skewed and currently operates as three separate, but closely spaced, stop-controlled intersections as shown in Figure 4 below. Analysis indicates that these intersections had similar operational performance. The remainder of the analysis data is included in **Appendix B**.

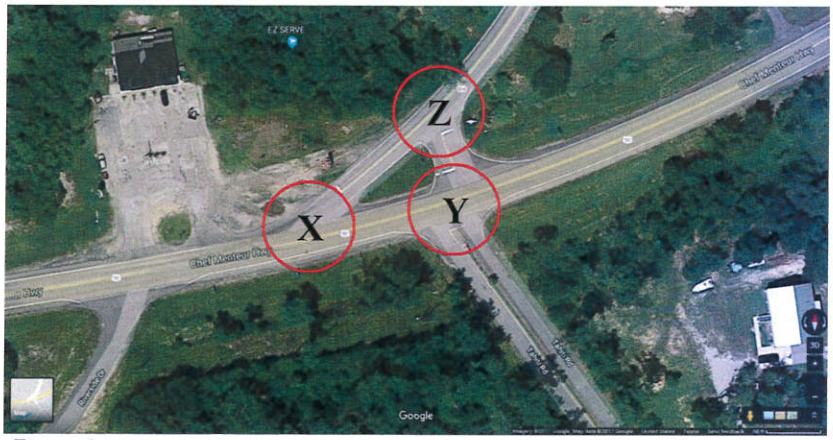


Figure 4

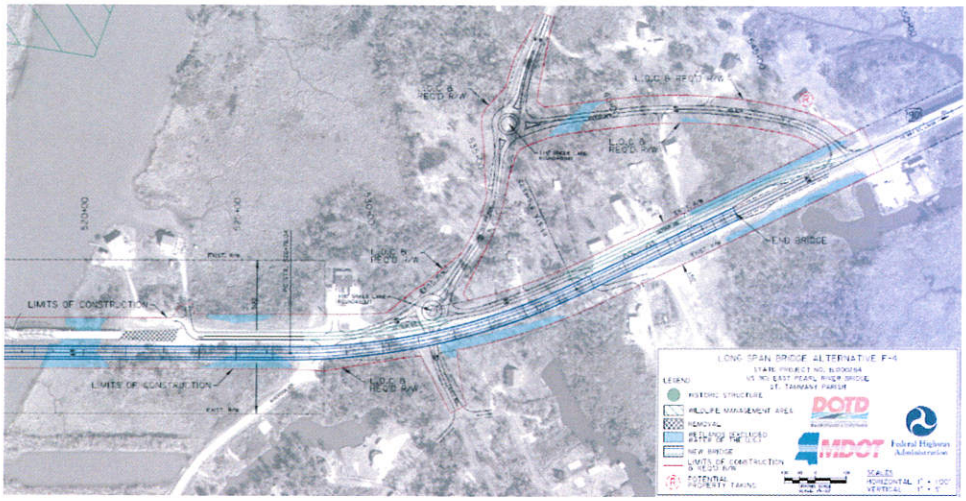
- PM Peak – Of all three intersections, the heaviest delays occurred at Intersection-X. The eastbound left experienced a delay of approximately 8-sec/veh and a queue of 40-feet, while the southbound right movement had a delay of approximately 9-sec/veh but no significant queueing. There did not appear to be any operational issues or congestion.

- AM Peak - Of all three intersections, the heaviest delays occurred at Intersection-X. The eastbound left experienced a delay of approximately 7-sec/veh with no significant queueing, while the southbound right movement had a delay of approximately 9-sec/veh with no significant queueing. There did not appear to be any operational issues or congestion.

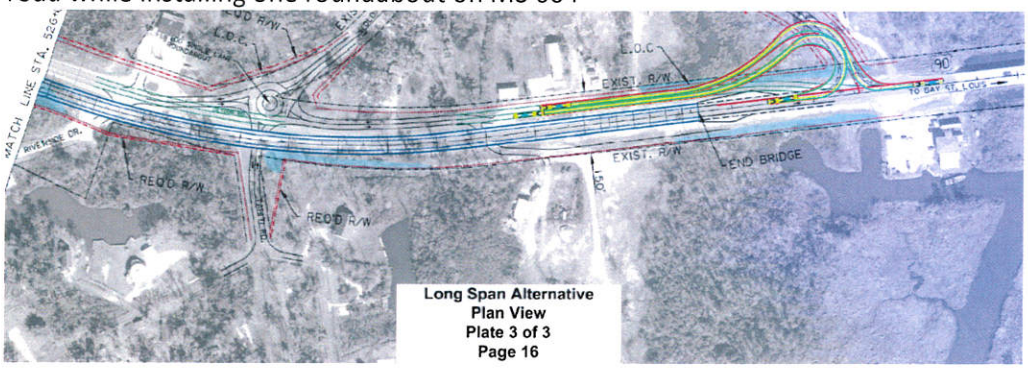
Alternative Analysis

LA DOTD project H.000284 US 90 Pearl River Bridges (HBI) includes replacement of a bridge adjacent to the US 90 at MS 604 intersection. As part of that project, several bridge configurations were developed, each of which requires modifications to the intersection. Full size conceptual layouts are provided in **Appendix C**, and include:

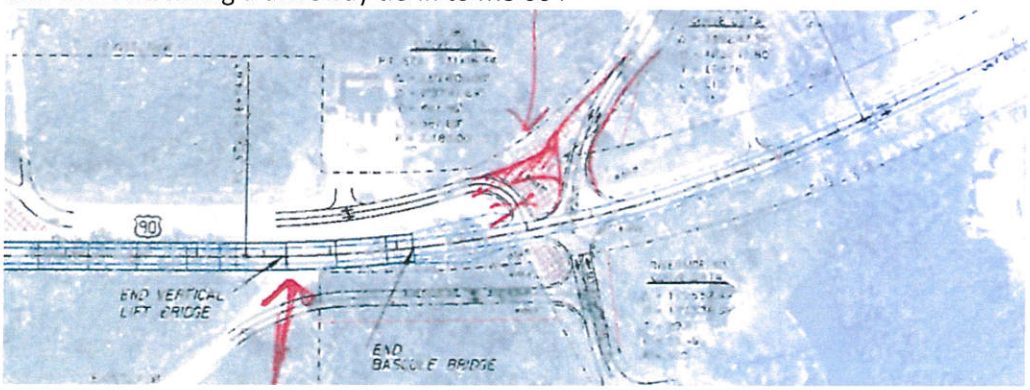
1. Fixed Bridge Alternative – Connecting US 90/MS 604 with a tee-intersection and installing two roundabouts on MS 604



2. Fixed Bridge Alternative – Connecting US 90/MS 604 with a tee-intersection and frontage road while installing one roundabout on MS 604



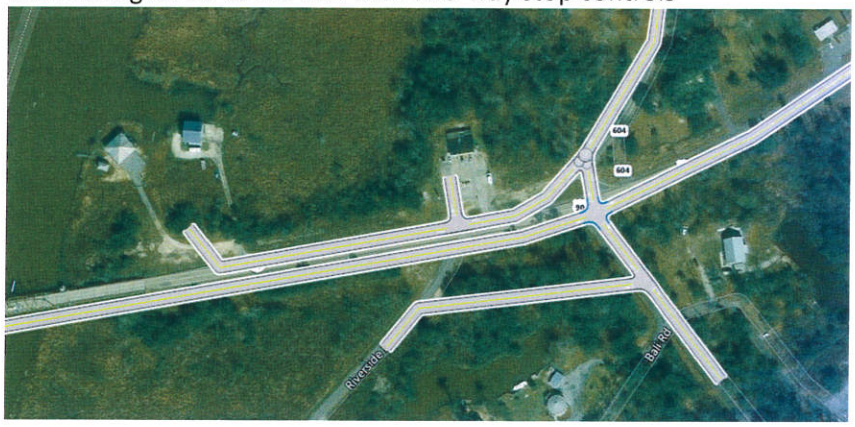
3. Moveable Bridge Alternatives – Connecting US 90/MS 604 with a four-legged intersection and while installing a driveway tie-in to MS 604



The turning movement count data taken in September 2017 was used to re-route vehicles according to the new alignments. The concepts were analyzed for existing year 2017 and future year 2044 conditions. All alternatives perform satisfactorily in 2017 with eastbound queues of approximately 40-feet during the p.m. peak hour. In 2044, the intersection experiences eastbound queues of approximately 80-feet during the p.m. peak hour. The complete Vistro reports are provided in **Appendix D**.

After collecting traffic data, the originally proposed concepts were modified to develop three new alternatives, including:

4. Connecting US 90 to MS 604 with two-way stop controls



5. Connecting US 90 to MS 604 with two-way stop controls and turn lanes



6. Connecting US 90 to MS 604 with a single-lane roundabout



The new concepts were analyzed at different locations east/west along US 90 because the bridge alternatives established in the parent project (H.000284) have varying lengths, and a determination has not yet been made for which bridge option is preferred. The east/west placement had little variance on

the overall intersection performance. The results below compare the worst case operational performance of a two-way stop controlled intersection, two-way stop controlled intersection with turn lanes, and a single-lane roundabout.

2044 PM Peak Analysis												
	Southbound			Eastbound (critical movement)			Westbound			Northbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
TWSC												
Queue (feet)	17.39	17.39	17.39	80.18	80.18	80.18	15.54	15.54	15.54	2.41	2.41	2.41
Delay (s/veh)	26.21	25.12	10.55	7.86	0	0	8.66	0	0	29.07	24.89	12.80
TWSC with Turn Lanes												
Queue (feet)	16.17	16.17	16.17	8.99	0	0	10.16	10.16	0	2.29	2.29	2.29
Delay (s/veh)	24.40	23.23	10.22	7.86	0	0	8.66	0	0	27.87	23.69	12.73
Roundabout												
Queue (feet)	6.97			90.53			15.26					
Delay (s/veh)	3.71			9.09			4.53					

2044 AM Peak Analysis												
	Southbound			Eastbound			Westbound			Northbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
TWSC												
Queue (feet)	6.68	6.68	6.68	5.63	5.63	5.63	7.05	7.05	7.05	0.72	0.72	0.72
Delay (s/veh)	10.75	11.15	9.24	7.53	0	0	7.35	0	0	10.84	10.88	8.66
TWSC with Turn Lanes												
Queue (feet)	6.57	6.57	6.57	1.84	0	0	5.78	5.78	0	0.72	0.72	0.72
Delay (s/veh)	10.64	11.05	9.17	7.53	0	0	7.35	0	0	10.83	10.88	8.66
Roundabout												
Queue (feet)	6.15			8.08			8.40					
Delay (s/veh)	3.59			3.52			3.66					

Based on the analysis, all options appear to have satisfactory operational performance throughout the future year. The eastbound movement is anticipated to experience under 100-feet of queueing.

Pros/Cons of Alternatives

A. Two-Way Stop Control (TWSC)
- Costs: If existing pavement can be re-used, this may be the lowest cost solution.
- Safety Concern: Left turns account for approximately 20% of the eastbound US 90 volume. If met with opposing traffic, vehicles must stop on the mainline to wait for a gap and may potentially be struck from behind or while turning.

- Queuing Concern: Left turning vehicles on US 90 eastbound must slow to a stop from an average travel speed of 55-60 mph and the deceleration/acceleration associated with this movement may affect following vehicles.

B. Two-Way Stop Control (TWSC) with turn lanes
   - Costs: Adding turn lanes would create a 3-lane section compared to the existing 2-lane section. Additional costs may be incurred for right-of-way acquisition and pavement widening.
   - Safety Benefit: Providing left turn lanes would separate drivers from the through movement and give them a safe refuge area for deceleration and queuing.
   - Queuing Benefit: The critical eastbound US 90 through movement could maintain its traveling speed.
   - Left Turn Warrant: Per **NCHRP Report 457** (see Appendix) guidelines, this intersection meets the criteria for adding a left-turn bay on the major road eastbound direction.

     "A left-turn bay effectively separates those vehicles that are slowing or stopped to turn from those vehicles in through traffic lanes. This separation minimizes turn-related crashes and eliminates unnecessary delay to through vehicles...

     2. *A left-turn lane should be provided on the unstopped approach of a high-speed rural highway when it intersects with other arterials or collectors.*
     3. *A left-turn lane is recommended on the unstopped approach of any intersection when the combination of intersection volumes intersect above or to the right of the appropriate trend line shown in Figure 2-5."*

     Construction of an eastbound left-turn lane would require a transitional taper area to widen the existing roadway. At that time, although westbound travel does not meet the left-turn warrant based on volumes, a turning lane could be included within the transitional taper area.

   - Right Turn Warrant: Per **NCHRP Report 457** guidelines, this intersection meets the criteria for adding a right-turn bay on the major road westbound direction.

C. Single-lane Roundabout
   - Costs: Additional costs may be incurred for right-of-way acquisition and pavement widening. For construction, this may be the highest cost solution.
   - Safety Benefit: The geometry of a roundabout will reduce the number of conflict points to only 8 versus a 4-leg intersection with 32, or a 3-leg tee intersection with 9. The speed reduction geometry may also reduce the severity of any crashes.
   - Queuing Concern: The 85th percentile speed is between 55-60 mph and installing a roundabout will require all vehicles on the mainline to decelerate to 15-20 mph which may cause queuing on the mainline.
   - Geometric Concern: Depending on which bridge alternative is selected from parent project H.000284, there may be a conflict with the approach grades at the intersection. The

AASHTO Policy on Geometric Design of Highways and Streets 2011 6th Edition recommends avoidance of grades in excess of 3% near an intersection.

> *"Grades steeper than 3% may need changes in several design elements to sustain operations equivalent to those on level roads. Most drivers are unable to judge the effect of steep grades on stopping or accelerating distances. Their normal deductions and reactions may thus be in error at a critical time. Accordingly, grades in excess of 3% should be avoided on the intersecting roads in the vicinity of the intersection."* Chapter 9-Intersections, Section 9.4.3 Profile

Summary

The intersection of US 90 and MS 604 will be impacted by the LADOTD bridge replacement project H.000284 and will require modifications in the future. Several intersection configurations and alignments were analyzed using Vistro software, including three original concepts developed in a previous phase of H.000284 and three additional concepts developed by LADOTD that focused more closely on the US 90/MS 604 intersection.

The results of the analyses indicate that a two-way stop controlled intersection, two-way stop controlled with turn lanes, or a single-lane roundabout will perform satisfactorily at the intersection regardless of placement east-west along the corridor. Minimal queues and delays are expected in 2017 and remain negligible through year 2044. In 2044, the two way stop control with turn lanes resulted in the shortest queues of under 10-feet while the other options resulted in queues less than 100-feet.

From the MDOT safety/crash history, five non-injury crashes occurred at the intersection from January 2013 through the end of December 2017. Based on the approach volumes and speeds in this area, if a two-way stop controls are used, adding a left-turn bay on the major road is warranted per **NCHRP Report 457** guidelines.

A roundabout may also potentially increase the safety of the intersection with its speed-reduction geometry and yield-principles, but may cause an increase in queuing along the mainline since all movements would be required to slow down from the traveling speed of 55-60 mph to 15-20 mph at the roundabout.

Other considerations for this portion of US 90 include making this corridor a future truck route and/or incident detour route in the event of closures on Interstate 10 to the north. Under these circumstances, a two-way stop controlled intersection with turn lanes may be the most beneficial option because it would provide greater traffic throughput at continuous speed. The other options would likely experience delays from speed reduction and turning maneuvers.

Conclusion

Installation of either a two-way stop controlled intersection with turn lanes or a single-lane roundabout to connect US 90 and MS 604 is recommended. The exact east/west placement of this intersection will depend on the bridge type that is selected in the parent project H.000284. These designs are expected to enhance mobility and safety along the corridor by allowing the major east-west movements to proceed unimpeded by turning vehicles.

Appendix A
Data Collection

MetroCount Traffic Executive
Class Speed Matrix

1703045 1 EB **HANCOCK COUNTY** **N30.24038 W89.60897**

Datasets:

Site: **[3045] !!C4127**
Attribute: 170
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 1
Survey Duration: 7:26 Friday, September 22, 2017 => 17:26 Friday, September 29, 2017,
File: 17030451B.ECO (Plus)
Identifier: E448CM7H MC56-L4 [MC55] (c)Microcom 19Sep03
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: East (bound), P = East, Lane = 0-16

	Class														
mph	CYCLE 1	PC 2	2A-4T 3	BUS 4	2A-6T 5	3A-SU 6	4A-SU 7	<5A DBL 8	5A DBL 9	>6A DBL 10	<6A MUL 11	6A MULT 12	>6A MUL 13	Total	
0- 5	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
5- 10	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
10- 15	1	.	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
15- 20	.	6	3	.	.	.	.	.	.	.	.	.	.	9	0.1%
20- 25	.	23	12	.	4	1	.	1	1	.	.	.	.	42	0.4%
25- 30	2	62	39	1	13	1	.	6	3	.	.	.	.	127	1.2%
30- 35	2	131	101	3	17	5	1	17	4	2	.	.	.	283	2.7%
35- 40	7	397	297	3	36	5	.	24	5	.	.	.	.	774	7.4%
40- 45	15	881	404	.	36	1	.	13	9	.	.	.	.	1359	13.0%
45- 50	36	1507	606	2	78	.	.	34	17	1	.	.	.	2281	21.8%
50- 55	44	1832	765	4	74	4	.	30	23	1	.	.	1	2778	26.5%
55- 60	37	1155	498	7	61	2	.	11	16	2	.	.	.	1789	17.1%
60- 65	20	499	227	2	25	.	.	1	2	2	.	.	.	778	7.4%
65- 70	4	110	55	.	2	.	.	.	.	.	.	.	.	171	1.6%
70- 75	1	28	15	.	2	.	.	.	.	.	.	.	.	46	0.4%
75- 80	1	12	7	.	.	.	.	.	.	.	.	.	.	20	0.2%
80- 85	.	3	4	.	.	.	.	.	.	.	.	.	.	7	0.1%
85- 90	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
90- 95	.	2	1	.	.	.	.	.	.	.	.	.	.	3	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	170	6648	3034	22	348	19	1	137	80	8	0	0	1	10468	
	1.6%	63.5%	29.0%	0.2%	3.3%	0.2%	0.0%	1.3%	0.8%	0.1%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive
Class Speed Matrix

1703045 2 WB **HANCOCK COUNTY** **N30.24038 W89.60897**

Datasets:

Site: **[3045] !C4127**
Attribute: 170
Direction: 4 - West bound, A trigger first. **Lane:** 2
Survey Duration: 7:26 Friday, September 22, 2017 => 17:26 Friday, September 29, 2017,
File: 17030452.eco (Plus)
Identifier: E448CM7H MC56-L4 [MC55] (c)Microcom 19Sep03
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: West (bound), P = West, Lane = 0-16

	Class													
	CYCLE	PC	2A-4T	BUS	2A-6T	3A-SU	4A-SU	<5A DBL	5A DBL	>6A DBL	<6A MUL	6A MULT	>6A MUL	Total	
mph	1	2	3	4	5	6	7	8	9	10	11	12	13		
0- 5	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
5- 10	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
10- 15	3	.	1	.	1	.	.	.	.	.	.	.	.	5	0.1%
15- 20	2	11	6	.	.	.	.	.	1	.	.	.	.	20	0.2%
20- 25	5	34	18	.	1	1	.	.	.	.	.	.	.	59	0.6%
25- 30	3	41	18	1	5	.	.	2	1	.	.	.	.	71	0.7%
30- 35	1	59	42	.	9	2	.	3	1	.	.	.	.	117	1.2%
35- 40	1	192	134	4	19	2	.	11	5	1	.	.	.	369	3.7%
40- 45	17	743	350	1	54	2	.	25	5	.	.	.	.	1197	12.1%
45- 50	24	1330	632	8	74	4	.	32	12	2	.	.	.	2118	21.4%
50- 55	38	1456	664	5	94	4	.	26	12	2	.	.	1	2302	23.3%
55- 60	31	1332	607	4	70	.	.	13	9	4	.	.	.	2070	20.9%
60- 65	20	681	304	.	33	1	.	5	2	2	.	.	.	1048	10.6%
65- 70	4	222	105	.	10	.	.	3	.	.	.	.	.	344	3.5%
70- 75	2	77	39	.	6	.	.	.	.	.	.	.	.	124	1.3%
75- 80	.	16	11	.	1	.	.	.	.	.	.	.	.	28	0.3%
80- 85	.	4	2	.	.	.	.	.	.	.	.	.	.	6	0.1%
85- 90	.	2	1	.	.	.	.	.	.	.	.	.	.	3	0.0%
90- 95	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	151	6200	2934	23	377	16	0	120	48	11	0	0	1	9881	
	1.5%	62.7%	29.7%	0.2%	3.8%	0.2%	0.0%	1.2%	0.5%	0.1%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive
Class Speed Matrix

1703046 1 NB **HANCOCK COUNTY** **N30.24053 W89.60998**

Datasets:

Site: **[3046] !C6567**
Attribute: 170
Direction: 5 - South bound A>B, North bound B>A. **Lane:** 1
Survey Duration: 7:27 Friday, September 22, 2017 => 17:32 Friday, September 29, 2017,
File: 17030461.eco (Plus)
Identifier: T567A5MJ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: North (bound), P = North, Lane = 0-16

	Class													
mph	CYCLE 1	PC 2	2A-4T 3	BUS 4	2A-6T 5	3A-SU 6	4A-SU 7	<5A DBL 8	5A DBL 9	>6A DBL 10	<6A MUL 11	6A MULT 12	>6A MUL 13	Total	
0- 5	1	1	.	.	.	.	.	.	.	.	.	.	.	2	0.0%
5- 10	8	1	.	.	.	.	.	.	.	.	.	.	.	9	0.2%
10- 15	3	2	1	.	.	.	.	.	.	.	.	.	.	6	0.1%
15- 20	4	9	6	4	2	2	.	.	.	.	.	.	.	27	0.6%
20- 25	3	51	45	1	10	2	.	3	2	.	.	.	.	117	2.8%
25- 30	.	280	272	5	47	2	.	18	4	.	.	.	.	628	15.0%
30- 35	3	683	522	2	70	1	.	27	5	1	.	.	.	1314	31.4%
35- 40	9	657	450	3	55	.	.	19	2	.	.	.	.	1195	28.5%
40- 45	8	390	234	1	25	.	.	10	1	.	.	.	.	669	16.0%
45- 50	5	107	59	.	13	.	.	2	.	.	.	.	.	186	4.4%
50- 55	.	25	6	.	3	.	.	.	.	.	.	.	.	34	0.8%
55- 60	.	2	1	.	.	.	.	.	.	.	.	.	.	3	0.1%
60- 65	1	.	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
65- 70	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
70- 75	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
75- 80	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
80- 85	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
85- 90	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
90- 95	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	45	2208	1596	16	225	7	0	79	14	1	0	0	0	4191	
	1.1%	52.7%	38.1%	0.4%	5.4%	0.2%	0.0%	1.9%	0.3%	0.0%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive
Class Speed Matrix

1703046 2 SB **HANCOCK COUNTY** **N30.24053 W89.60998**

Datasets:

Site: **[3046] !!C6567**
Attribute: 170
Direction: 3 - South bound, A trigger first. **Lane:** 2
Survey Duration: 7:27 Friday, September 22, 2017 => 17:32 Friday, September 29, 2017,
File: 17030462b.eco (Plus)
Identifier: T567A5MJ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: South (bound), P = South, Lane = 0-16

	Class														
mph	CYCLE 1	PC 2	2A-4T 3	BUS 4	2A-6T 5	3A-SU 6	4A-SU 7	<5A DBL 8	5A DBL 9	>6A DBL 10	<6A MUL 11	6A MULT 12	>6A MUL 13	Total	
0- 5	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
5- 10	7	3	.	.	.	.	.	.	.	.	.	.	.	10	0.2%
10- 15	2	1	2	.	.	.	.	.	.	.	.	.	.	5	0.1%
15- 20	3	8	3	3	.	1	.	1	1	.	.	.	.	20	0.5%
20- 25	1	35	16	1	2	1	.	.	6	.	.	.	.	62	1.5%
25- 30	1	116	98	.	9	3	.	6	6	.	.	.	.	239	5.7%
30- 35	10	446	379	2	53	4	.	37	7	.	.	.	.	938	22.5%
35- 40	14	821	647	4	92	.	.	31	.	.	.	.	.	1609	38.5%
40- 45	12	534	356	1	57	1	.	12	.	.	.	.	.	973	23.3%
45- 50	3	160	86	2	14	.	.	1	.	.	.	.	.	266	6.4%
50- 55	.	28	12	.	1	.	.	1	.	.	.	.	.	42	1.0%
55- 60	.	12	1	.	.	.	.	.	.	.	.	.	.	13	0.3%
60- 65	.	1	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
65- 70	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
70- 75	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
75- 80	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
80- 85	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
85- 90	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
90- 95	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	53	2165	1600	13	228	10	0	89	20	0	0	0	0	4178	
	1.3%	51.8%	38.3%	0.3%	5.5%	0.2%	0.0%	2.1%	0.5%	0.0%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive
Class Speed Matrix

1703047 1 EB **HANCOCK COUNTY** **N30.23948 W89.61240**

Datasets:

Site: **[3047] !C5356**
Attribute: 170
Direction: 6 - West bound A>B, East bound B>A. **Lane:** 1
Survey Duration: 7:26 Friday, September 22, 2017 => 17:37 Friday, September 29, 2017,
File: 17030471.eco (Plus)
Identifier: 12486R7P MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

Profile:

Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: East (bound), P = East, Lane = 0-16

	Class													
	CYCLE	PC	2A-4T	BUS	2A-6T	3A-SU	4A-SU	<5A DBL	5A DBL	>6A DBL	<6A MUL	6A MULT	>6A MUL	Total	
mph	1	2	3	4	5	6	7	8	9	10	11	12	13		
0- 5	1	.	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
5- 10	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
10- 15	.	1	2	.	.	.	.	.	.	.	.	.	.	3	0.0%
15- 20	1	3	4	.	.	.	.	.	.	.	.	.	.	8	0.1%
20- 25	1	9	9	.	1	1	.	.	.	.	.	.	.	21	0.2%
25- 30	.	17	11	.	2	.	.	2	.	.	.	.	.	32	0.3%
30- 35	3	67	29	.	7	.	.	21	2	.	.	.	.	129	1.3%
35- 40	16	285	125	.	7	2	.	36	7	1	.	.	.	479	4.7%
40- 45	26	782	367	1	60	1	.	40	10	2	.	.	1	1290	12.5%
45- 50	31	1562	763	6	90	.	.	39	22	2	.	.	1	2516	24.5%
50- 55	43	1795	821	3	95	2	.	20	23	1	.	.	.	2803	27.2%
55- 60	38	1227	540	9	68	3	.	7	9	1	.	.	1	1903	18.5%
60- 65	10	461	246	1	27	.	.	4	5	2	.	.	.	756	7.3%
65- 70	12	162	68	.	4	.	.	.	.	.	.	.	.	246	2.4%
70- 75	.	42	20	.	1	.	.	.	.	.	.	.	.	63	0.6%
75- 80	.	11	5	.	1	.	.	.	.	.	.	.	.	17	0.2%
80- 85	1	8	7	.	.	.	.	.	.	.	.	.	.	16	0.2%
85- 90	.	3	3	.	.	.	.	.	.	.	.	.	.	6	0.1%
90- 95	.	1	.	.	.	.	.	.	.	.	.	.	.	1	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	183	6436	3020	20	363	9	0	169	78	9	0	0	3	10290	
	1.8%	62.5%	29.3%	0.2%	3.5%	0.1%	0.0%	1.6%	0.8%	0.1%	0.0%	0.0%	0.0%		

MetroCount Traffic Executive
Class Speed Matrix

1703047 2 WB **HANCOCK COUNTY** **N30.23948 W89.61240**

Datasets:

Site: **[3047] !C5356**
Attribute: 170
Direction: 4 - West bound, A trigger first. **Lane:** 2
Survey Duration: 7:26 Friday, September 22, 2017 => 17:37 Friday, September 29, 2017,
File: 17030472.eco (Plus)
Identifier: 12486R7P MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm: Factory default axle (v5.01)
Data type: Axle sensors - Paired (Class/Speed/Count)

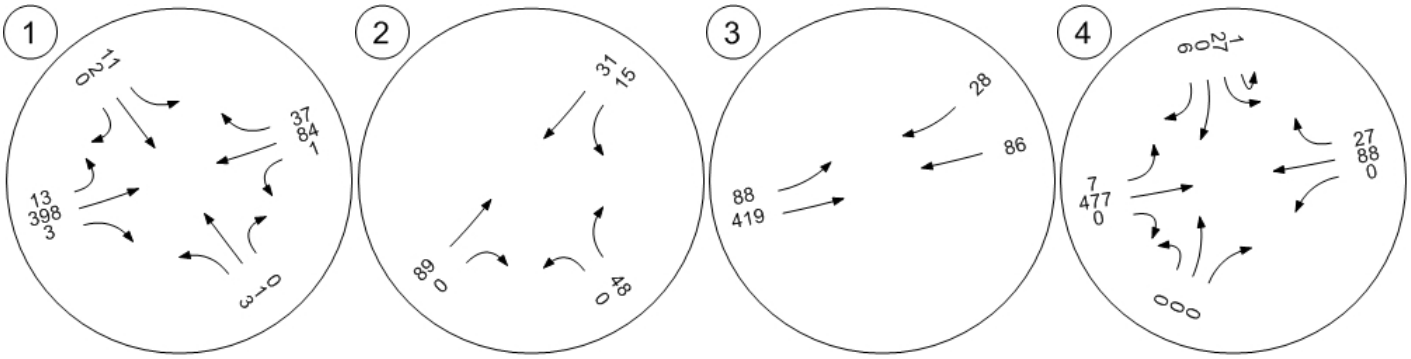
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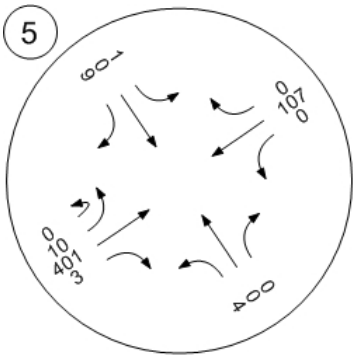
Filter time: **8:00 Friday, September 22, 2017 => 8:00 Friday, September 29, 2017 (7)**
Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
Speed range: 0 - 100 mph.
Direction: West (bound), P = West, Lane = 0-16

	Class													
	CYCLE	PC	2A-4T	BUS	2A-6T	3A-SU	4A-SU	<5A DBL	5A DBL	>6A DBL	<6A MUL	6A MULT	>6A MUL	Total	
mph	1	2	3	4	5	6	7	8	9	10	11	12	13		
0- 5	.	.	1	.	.	.	.	.	.	.	.	.	.	1	0.0%
5- 10	2	3	3	.	1	.	.	.	.	.	.	.	.	9	0.1%
10- 15	6	12	7	.	.	.	.	1	.	.	.	.	.	26	0.3%
15- 20	5	34	10	.	1	.	.	.	2	1	.	.	1	54	0.6%
20- 25	2	23	15	.	4	.	.	.	2	.	.	.	.	46	0.5%
25- 30	1	31	31	.	4	1	.	4	8	.	.	.	.	80	0.8%
30- 35	3	82	71	.	9	.	.	16	.	.	.	.	.	181	1.9%
35- 40	12	346	173	1	28	.	1	33	2	.	.	.	.	596	6.2%
40- 45	13	786	385	3	41	2	.	22	5	2	.	.	.	1259	13.0%
45- 50	41	1299	530	1	67	5	.	28	15	1	.	.	2	1989	20.5%
50- 55	40	1405	614	4	66	5	.	17	7	2	.	.	.	2160	22.3%
55- 60	26	1141	526	5	74	1	.	8	6	2	.	.	.	1789	18.5%
60- 65	17	654	311	.	32	.	.	7	1	2	.	.	.	1024	10.6%
65- 70	8	213	101	.	15	.	.	2	.	.	.	.	.	339	3.5%
70- 75	1	71	18	.	1	.	.	.	.	.	.	.	.	91	0.9%
75- 80	1	20	10	.	2	.	.	.	.	.	.	.	.	33	0.3%
80- 85	.	3	4	.	1	.	.	.	.	.	.	.	.	8	0.1%
85- 90	.	1	1	.	.	.	.	.	.	.	.	.	.	2	0.0%
90- 95	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
95-100	.	.	.	.	.	.	.	.	.	.	.	.	.	0	0.0%
Total	178	6124	2811	14	346	14	1	138	48	10	0	0	3	9687	
	1.8%	63.2%	29.0%	0.1%	3.6%	0.1%	0.0%	1.4%	0.5%	0.1%	0.0%	0.0%	0.0%		

Traffic Volume - Base Volume

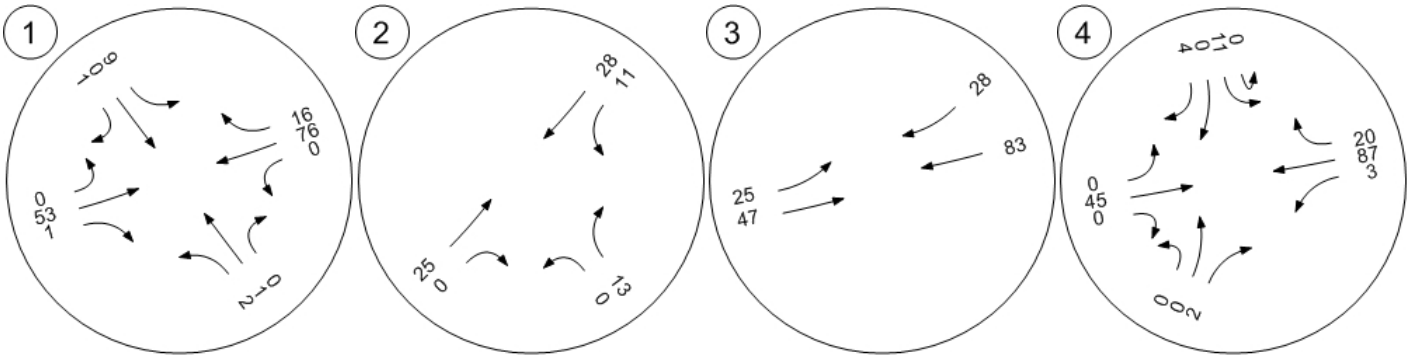






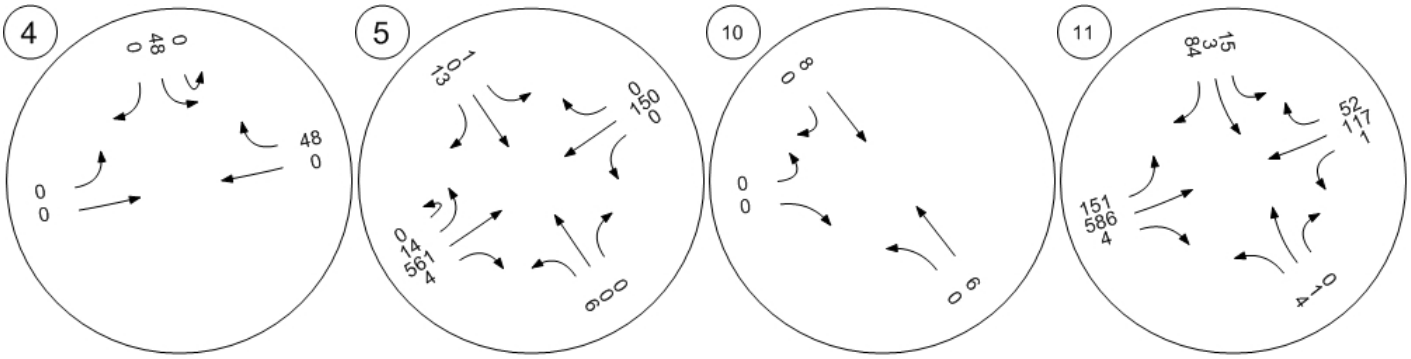
Traffic Volume - Base Volume





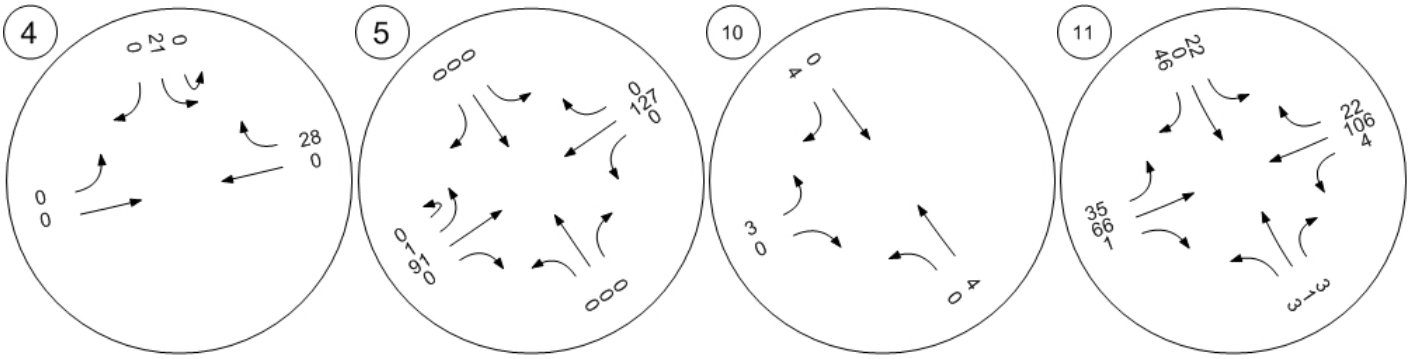
Traffic Volume - Base Volume





Traffic Volume - Base Volume





Traffic Noise Study: West Pearl River Addendum

State Project Nos. H.000284 & H.000286
Federal Project Nos. H000284 & H000286
US 90: Pearl River Bridges
St. Tammany Parish

December 2025

INTRODUCTION

The following traffic noise analysis was prepared as an addendum to the report submitted to the LADOTD by Bowlby & Associates, Inc. in July of 2017 (Appendix A) for the above-captioned project. The report analyzed the noise impacts associated with the proposed bridge replacement projects captioned above. LADOTD is updating the environmental document and has changed the vertical alignment of one of the bridges. The vertical clearance of the West Pearl River has changed from 50 feet to 20 feet, which allowed the height of the fixed span bridge option for this crossing to lower significantly, necessitating the re-evaluation of the noise study. This traffic noise study addendum focused on the noise impacts of the new lower fixed span design on adjacent properties. The Federal Highway Administration Traffic Noise Model (TNM 2.5) computer program was used to calculate predicted sound levels.

The study area of this noise addendum stretched along US 90 from approximately 1230 feet southwest of the existing West Pearl River Bridge west approach to approximately 950 feet northeast of the West Pearl River Bridge east approach (see Figure 1). In the original report, the fixed span bridge for the West Pearl River was approximately 60 feet in height to accommodate the 50-foot vertical clearance required for navigation. The original report also had alternatives for a bascule bridge and a vertical lift bridge for the US 90 West Pearl River crossing. These bridge alternatives were also proposed to be south of the existing alignment, so traffic would be maintained during construction. In the years since the noise study, the vertical clearance for the West Pearl River had lowered to 20 feet and the existing bridge had been closed due to structural damage. The new proposal for the West Pearl River Bridge was a 28-foot tall fixed span bridge on the existing alignment (since the existing bridge was closed). The modifications to the vertical alignment of the West Pearl River Bridge changed the sound profile of the corridor and necessitated the re-evaluation of sound levels. The plans for the current design can be viewed in Appendix B. This study focused on determining noise impacts for the new design, and would evaluate whether noise abatement methods were feasible and reasonable for this alternative if noise impacts were identified.

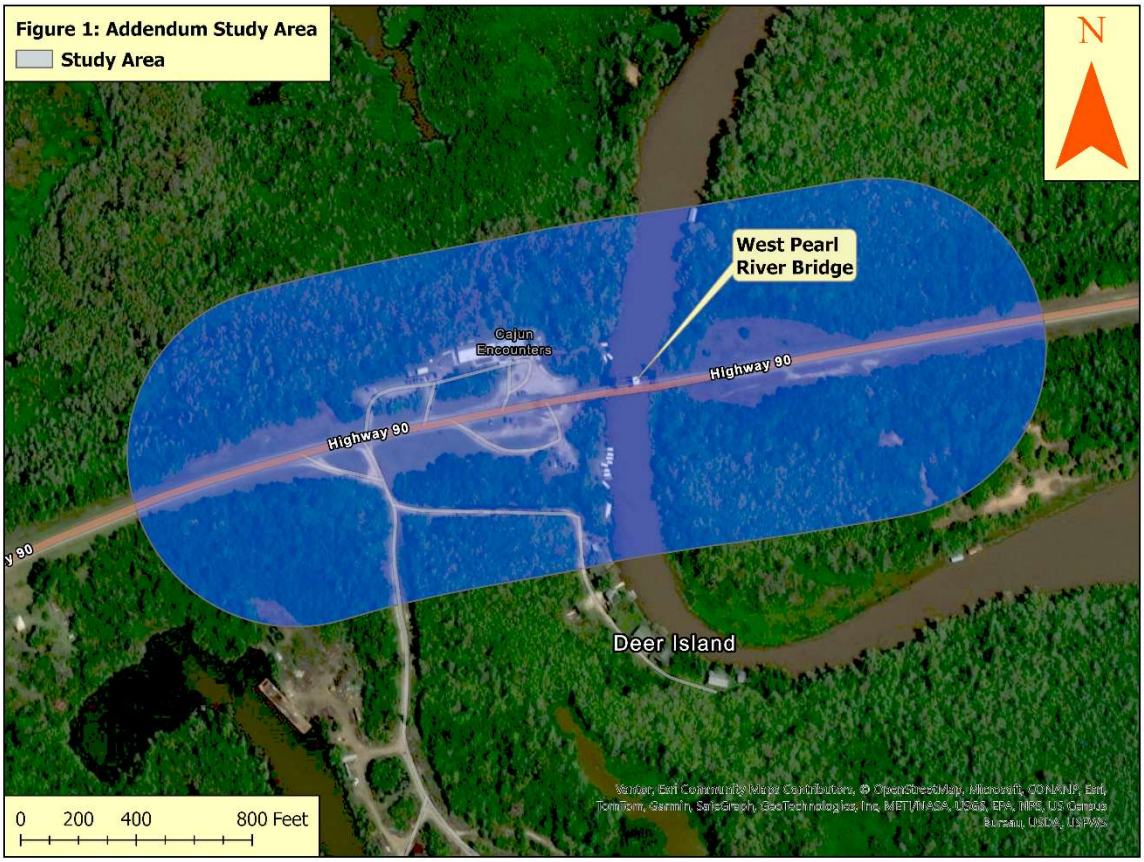


Figure 1: Noise Addendum Study Area

METHODOLOGY

This addendum compared the new design, the fixed span bridge with a 20-foot vertical clearance on the same horizontal alignment as the existing bridge, with the previous designs as proposed in the 2017 report. The traffic in this study was identical to the traffic used in the 2017 analysis. This study used the same receivers presented in the original 2017 noise analysis. Receivers 1, 2, 9, 10, 11, 12, and 13 were outside where changes in vertical alignment would occur, so they were omitted from this analysis. The receivers in this analysis were shown in Figure 2.

Noise impacts were determined by comparing predicted sound levels to a set of Noise Abatement Criteria (NAC) for different land use categories and by comparing existing noise levels to future noise levels. For the residential and recreational properties in the area, an impact would occur if the predicted sound level reached or exceeded 66 dBA or if a substantial increase in sound level occurred. A substantial increase in sound levels was when the future sound level was 10 decibels higher than the existing sound level. The year 2019 was used for existing conditions models and the year 2039 was used for future models.



Figure 2: Addendum Receivers

RESULTS

The TNM simulated the sound levels for the existing conditions and future conditions in this study area. In existing conditions, the sound levels of the receivers varied from 44 dBA to 55 dBA. The No Build model predicted a sound level range of 45 dBA to 56 dBA for these receivers. For Alternative 1: fixed span bridge with a 50-foot vertical clearance, the sound levels of the receivers varied from 47 dBA to 52 dBA. The sound levels for Alternative 2: bascule bridge model were from 48 dBA to 55 dBA. Similarly, the sound levels in Alternative 3: vertical bridge model varied from 48 dBA to 56 dBA. The Alternative 4: fixed span bridge with a 20-foot vertical clearance model predicted a sound level range of 47 dBA to 56 dBA. When compared to existing conditions results, the model for the fixed span bridge with 20-foot vertical clearance predicted an increase in sound levels, ranged from 1 dBA to 3 dBA. There were differences in sound levels from -1 dBA to 4 dBA when the fixed span bridge with a 20-foot vertical clearance results were compared to fixed span bridge with 50-foot vertical clearance results. None of the receivers was considered impacted due to a 10-dBA increase or due to sound levels approaching or exceeding the NAC. A summary of the results was displayed in Table 1 and the detailed results were presented in Appendix C.

Table 1: Noise Results Summary

Model	Noise levels (dBA)	Increase over Existing (dBA)	Increase over Alternative 1 (dBA)	Impacts
Existing	44 – 55	N/A	N/A	0
No Build	45 – 56	1	N/A	0
Alternative 1: Fixed Span (50-ft vertical clearance)	47 – 52	-3 – 3	N/A	0
Alternative 2: Bascule Bridge	48 – 55	-1 – 4	N/A	0
Alternative 3: Vertical Lift Bridge	48 – 56	-1 – 4	N/A	0
Alternative 4: Fixed Span (20-ft vertical clearance)	47 – 56	1 – 3	-1 – 4	0

EVALUATION OF NOISE ABATEMENT

In this analysis, noise impacts were not found in the study area, so noise abatement measures were not evaluated for impacted receivers.

CONCLUSION

The new fixed span bridge design with a 20-foot vertical clearance for the West Pearl River had similar or slightly higher predicted sound levels as existing conditions and the fixed span bridge design with a 50-foot vertical clearance. In the area examined in this report, no receivers were impacted due to sound levels approaching or exceeding the NAC or due to a substantial increase in sound levels. Noise abatement measures were not evaluated and will not be included in the project.

Appendix A

Original Noise Report (2017)

State Project No. H.000284 & No. H.000286
Federal Aid Project No. H000284 & No. H000286

US 90 Pearl River Bridges
Route US 90
St. Tammany Parish, Louisiana
and
Hancock County, Mississippi

Traffic Noise and Air Quality Analysis Technical Report
St. Tammany Parish, Louisiana

Prepared for:

Louisiana Department of Transportation and Development

Prepared by:

Bowlby & Associates, Inc.

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

U.S. Department of Transportation
Federal Highway Administration

July 2017

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Figure 1. Project Area 1

1.0 INTRODUCTION

This report documents the results of a noise and air quality analysis as part of the environmental process for the US 90 Pearl River Bridges project in St. Tammany Parish, Louisiana. Figure 1 shows the project area, which extends from US 190 to the west for approximately five miles to 7th Avenue/Kelly Road in Hancock County, Mississippi. For the length of the project, each of the five Pearl River Bridges will be rehabilitated or replaced on the existing or an offset alignment. Though the project area includes Louisiana and Mississippi, only the Louisiana portions of the project are detailed in this report. A separate report is available for the Mississippi portion of the project.

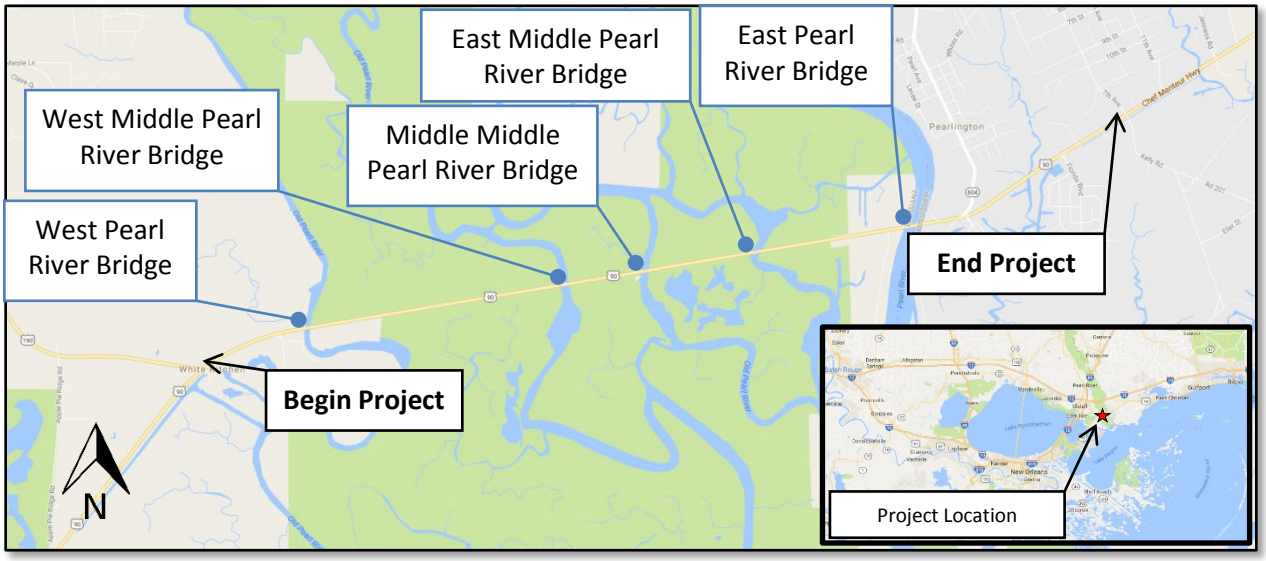


Figure 1. Project Area

The proposed alternatives for each bridge site are:

- No-Build
- Rehabilitation of Existing Bridges, with detour bridges
- Replace Bridges on Alignment, with detour bridges
- Replace bridges on Offset Alignment, maintain traffic on existing alignment

The three Build Alternatives that replace bridges on *offset* alignments and the No-Build Alternative are considered in this study. The Build Alternatives include:

- Alternative 1: Replacement of the bridges with "Fixed" long-span bridges
  - All five bridges
- Alternative 2: Replacement of the bridges with "Bascule" movable bridges
  - East Pearl River Bridge and West Pearl River Bridge only
- Alternative 3: Replacement of the bridges with "Vertical Lift" movable bridges
  - East Pearl River Bridge and West Pearl River Bridge only

These Build Alternatives would also include some changes to other local roads along the project corridor. Appendix C shows the Build Alternative alignments.

2.0 TRAFFIC NOISE ANALYSIS

This study has been prepared in accordance with the FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise*, *23 CFR 772* [1], and the Louisiana Department of Transportation and Development (DOTD) *Highway Traffic Noise Policy*, revised in 2011 [2]. The noise analysis included the following tasks:

1. Identification of noise-sensitive areas (NSA) and associated receptors (discrete or representative locations in an NSA for the land uses listed in 23 CFR 772) within 500 feet of the project;
2. Determination of existing noise levels at selected receptors to characterize the existing noise environment in the project area;
3. Prediction of future noise levels with and without the project at the receptors;
4. Determination of impacted receptors;
5. Evaluation of noise abatement for impacted areas;
6. Discussion of construction noise; and
7. Information for local officials.

Each of these analysis steps is discussed below, following a discussion of basic terminology and DOTD's criteria for determining noise impacts.

2.1 Traffic Noise Terminology

Traffic noise levels are expressed in terms of the hourly, A-weighted equivalent sound level in decibels (dBA). A sound level represents the level of the rapid air pressure fluctuations caused by sources such as traffic that are heard as noise. A decibel is a unit that relates the sound pressure of a noise to the faintest sound the young human ear can hear. The A-weighting refers to the amplification or attenuation of the different frequencies of the sound (subjectively, the pitch) to correspond to the way the human ear "hears" these frequencies.

Generally, when the sound level exceeds the mid-60 dBA range, outdoor conversation in normal tones at a distance of three feet becomes difficult. A 9-10 dBA increase in sound level is typically judged by the listener to be twice as loud as the original sound while a 9-10 dBA reduction is judged to be half as loud. Doubling the number of sources (i.e., vehicles) will increase the hourly equivalent sound level by approximately 3 dBA, which is usually the smallest change in hourly equivalent A-weighted traffic noise levels that people can detect without specifically listening for the change.

Because most environmental noise fluctuates from moment to moment, it is standard practice to condense data into a single level called the equivalent sound level (L_{eq}). The L_{eq} is a steady sound level that would contain the same amount of sound energy as the actual time-varying sound evaluated over the same time period. The L_{eq} averages the louder and quieter moments but gives much more weight to

the louder moments in the averaging. For traffic noise assessment purposes, L_{eq} is typically evaluated over the worst one-hour period and is written as $L_{eq}(h)$.

The term insertion loss (IL) is generally used to describe the reduction in $L_{eq}(h)$ at a location after a noise barrier is constructed. For example, if the $L_{eq}(h)$ at a residence before a barrier is constructed is 75 dB(A) and the $L_{eq}(h)$ after a barrier constructed is 65 dB(A), then the insertion loss would be 10 dB(A).

2.2 Criteria for Determining Impacts

Noise impacts are determined by comparing future "design year" project worst hour $L_{eq}(h)$ values at areas of frequent human use to: (1) a set of Noise Abatement Criteria (NAC) for different land use categories, and (2) existing $L_{eq}(h)$ values. The FHWA noise standards (23 CFR 772) and DOTD's noise policy state that when traffic noise impacts have been identified, then noise abatement should be considered.

Table 1 shows the land uses that are classified as Activity Categories A - G and the corresponding NAC.

Specifically, a receptor is impacted in either of two ways:

1. The predicted, worst hour, design year $L_{eq}(h)$ approaches or exceeds the NAC, even if there is not a substantial increase over the existing levels. "Approach" is defined by DOTD as 1 dBA less than the appropriate NAC. As an example, the NAC for Activity Category B and C land uses is 67 dBA. An impact would occur if the design year $L_{eq}(h)$ is predicted to be 66 dBA or higher at a point of frequent exterior human use for a land use in either category.

2. The predicted, worst hour, design year $L_{eq}(h)$ exceeds the existing $L_{eq}(h)$ by 10 dBA or more, even if the NAC is not approached or exceeded.

2.3 Identification of Noise-Sensitive Receptors

A review of available electronic mapping as well as field reconnaissance identified residences on both sides of US 90. A total of four (4) single-family residences are located within 500 feet of the proposed edge of roadway. The NAC for Activity Category B will apply to these residences. Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 66 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels.

There also are four public boat launch areas within 500 feet of the project: one boat launch is north of the intersection of US 190 and US 90, and three others exist at the West Pearl River Bridge, the "Middle Middle" Pearl River Bridge, and the East Pearl River Bridge. The NAC for Activity Category C will apply to this potentially noise-sensitive land uses. Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 66 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels.

Table 1. Noise Abatement Criteria in 23 CFR 772

Activity Category	Activity $L_{eq}(h)$	Evaluation Location	Activity Description
A	57	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[1]	67	Exterior	Residential
C [1]	67	Exterior	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E [1]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	–––	–––	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–––	–––	Undeveloped lands that are not permitted.

[1] Includes undeveloped lands that are permitted for this activity category.

During the field reconnaissance, exterior commercial land uses (Activity Category E uses) were noted at 55050 US 90 (the "Pearl River Eco-Tours" boat launch) and at several locations at 55345 US 90 (the Cajun Encounters Swamp Tour porch and boat launches). Noise impacts will be identified, and noise abatement will be evaluated if future noise levels are 71 dBA or higher, or if an increase of 10 dBA or more is predicted over existing noise levels. Other commercial properties were also noted during the field reconnaissance; however, those commercial properties did not have exterior uses and were not included as part of this study.

There are several tracts of undeveloped Activity Category G lands along the project. These undeveloped lands are not noise-sensitive and have not been included in the noise analysis. However, noise impacts could occur in the future if noise-sensitive land uses are constructed near US 90. A discussion of future noise levels and the need for noise-compatible land use planning is provided later in this report.

2.4 Measurement of Existing Noise Levels

Noise measurements were conducted at several DOTD approved noise-sensitive land uses in the project area on September 14 and 15, 2016. Table 2 summarizes the measured noise levels at each of the measurement locations. The figures in Appendix C show the noise measurement locations. The individual locations' noise measurement results are provided in Appendix A.

Short-term noise measurements at these locations were conducted by making a series of consecutive measurements in one-minute intervals for at least 15 minutes at each site during both a peak and an off-peak traffic period. Background noises (i.e., local traffic, dog barking, sirens, etc.) during these measurements were noted, and the corresponding one-minute measurement intervals were eliminated from the calculation of the measured noise level for the overall measurement period.

As indicated in Table 2, the existing noise levels at the exterior measurement locations were between 52 dBA and 64 dBA during peak traffic volumes. The lower noise levels were measured at the more distant locations from US 90 and the noise levels in the low 60 dBA range were recorded at the first-row residences closest to US 90.

Table 2. Existing Noise Levels at Measurement Locations

Address/Location	Distance to US 90 (ft)	Period	Measured L_{eq}(dBA)
55170 US 90	50	4:00-4:15 PM	64.0
		3:35-3:50 PM	63.4
55345 US 90 (Cajun Encounters boat launch deck)	225	4:59-5:14 PM	54.3
		10:40-11:00 AM	51.7
Residence "NM 3" *	75	5:30-5:45 PM	59.3
		10:12-10:27 AM	58.5

* Address could not be determined; located just west of the East Pearl River Bridge and north of US 90.

2.5 Model Validation

DOTD policy requires validation of the FHWA Traffic Noise Model (TNM 2.5) computer program that is used to calculate worst hour noise levels. Validation involves conducting noise measurements at a few representative locations near the existing roadway while making simultaneous vehicle classification counts of the traffic and estimating travel speed. Then, the traffic counts are factored up to be hourly volumes, and along with the speeds, are entered into a TNM 2.5 model that has been created for the existing highway situation. The modeled levels are compared to the measured levels, and if they are within 3 dB(A) of the measured levels, the model is considered to be validated.

The noise measurements conducted on September 14 and 15, 2016 included simultaneous traffic data collection. The locations are labeled with an "(M)" in the figures in Appendix C. Appendix A contains the detailed measurement results and traffic count data.

Table 3 lists the validation locations and presents the validation results. As shown in the table, the difference in the predicted and measured levels for the noise measurement locations are less than 3 dBA. Traffic counts were not possible at 55345 US 90 (Cajun Encounters boat launch deck) due to the poor vantage point and distance to US 90. Therefore, validation was not completed for this site.

Table 3. Model Validation Results

Location	Start Time	End Time	Measured L_{eq} (dBA)	Predicted L_{eq} (dBA)	Predicted - Measured Difference (dBA)
55170 US 90	4:00 PM	4:15 PM	64.0	63.6	-0.4
	3:35 PM	3:50 PM	63.4	63.0	-0.4
Residence "NM 3" *	5:30 PM	5:45 PM	59.3	58.4	-0.9
	10:12 AM	10:27 AM	58.5	57.0	-1.5

* Address could not be determined; located just west of the East Pearl River Bridge and north of US 90

2.6 Prediction of Existing and Future Noise Levels

The FHWA TNM 2.5 computer program was used to calculate worst hour noise levels for the receptors for the existing case and the future alternatives. These receptors included the measurement locations as well as numerous other locations.

Traffic data was provided by the DOTD Transportation Planning Section for use in the noise modeling. Average Daily Traffic projections, including classification counts, were provided for US 90 for the Base Year 2019 and Future Year 2039.

Each direction of travel was modeled as a separate TNM "roadway." For US 90, the posted speeds of 45 mph and 55 mph were used near the East and West Pearl River Bridges, respectively.

Receptors were modeled by TNM "receiver" points at areas of frequent human use of a property. For single-family residences, that area could be the front or back yard.

Large buildings were modeled as noise barriers to properly account for the shielding of the traffic noise that they provide to the receptor. Given the low density of buildings, the single-family houses and other buildings were modeled as individual noise barriers to account for the shielding that they would provide. Significant terrain features were also modeled. The default ground surface of lawn grass was used, with any large areas of paved ground or water specifically modeled accordingly.

Appendix C provides tables of predicted results and figures showing the Build Alternatives, modeled receiver points, and noise impact designations.

A summary of predicted noise levels and impacts is shown in Table 4 below, and the resulting impacts are discussed in the following section.

2.6.1 Existing Year 2016

The TNM model that was developed for the validation testing was used to predict worst hour noise levels for the Existing Year conditions at the noise-sensitive land uses in the project area, including the measurement locations. For US 90, the posted speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

As shown in Table 4, predicted worst noise hour L_{eq} (h) for the Existing Year 2016 case ranged from 44 dBA to 62 dBA at the residences closest to the US 90.

None of the Category B residences are impacted in the Existing Year 2016. Additionally, no Activity Category C or E impacts are predicted.

2.6.2 Build Year 2039

The noise levels for the three Build Alternatives were determined by modeling the proposed US 90 geometry and traffic within TNM and then calculating the L_{eq}(h) for each TNM receiver. Anticipated future speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

The predicted L_{eq}(h) for the three Build Alternatives ranged from 46 dBA to 61 dBA. Though there are differences in geometry for the three Build Alternatives, those differences do not produce any significant changes in the predicted noise levels when the alternatives are compared.

Changes in existing noise levels for the three Build Alternatives range from a 7 dB decrease (the decrease is caused by the shifting of the new alignment away from existing receptors) to a 7 dB increase.

None of the Category B residences are impacted by the Build Alternatives. Additionally, no Activity Category C or E impacts are predicted.

2.6.3 No-Build Year 2039

The TNM model that was used for the Existing case was modified to predict worst noise hour noise levels for the No-Build Year 2039 conditions at the noise-sensitive land uses in the project area, including the measurement locations. The posted speeds of 45 mph (near the East Pearl River Bridge) and 55 mph (west of the East Pearl River Bridge) were used.

As shown in Table 4, predicted worst noise hour L_{eq} (h) for the No-Build Year 2039 case ranged from 45 dBA to 62 dBA.

None of the Category B residences are impacted under the No-Build Alternatives. Additionally, no Activity Category C or E impacts are predicted.

2.7 Noise Impact Summary

An impact assessment was completed for the Existing, Build and No-Build cases. As noted previously, a receptor is impacted in two ways:

1. The predicted, worst hour, design year L_{eq}(h) approaches or exceeds the NAC. DOTD defines "approach" as 1 dB(A) less than the NAC. These levels apply at areas of frequent human use.

2. The predicted, worst hour, design year L_{eq}(h) exceeds the existing L_{eq}(h) by 10 dBA or more.

As shown in Table 4, there will be a total of zero impacted residential properties (Activity Category B), for each of the three Build Alternatives. None of the residential properties are predicted to approach or exceed the NAC, and none are predicted to have a substantial increase of 10 dBA over the Existing noise level.

Table 4. Noise Impact Summary

Prediction Case	Range of Predicted L_{eq}(h) (dBA)	Range of Increases over Existing L_{eq}(h) (dB)*	Impacts
Existing (2016)	44 - 62	N/A	0 residences
Build Alternative 1 (2039) – All five bridges	46 - 61	(7) - 6	0 residences
Build Alternative 2 (2039) - East Pearl River Bridge and West Pearl River Bridge only	46 – 61	(4) - 7	0 residences
Build Alternative 3 (2039) - East Pearl River Bridge and West Pearl River Bridge only	46 - 61	(4) - 7	0 residences
No-Build Alternative (2039)	45 - 62	1	0 residences

* Parentheses around value indicates a negative value (i.e., noise levels are reduced with the project)

2.8 Noise Abatement Evaluation

In accordance with criteria in the DOTD noise policy, noise abatement will be considered when traffic noise impacts are identified. Since impacts were not identified, abatement was not considered.

2.9 Construction Noise

The construction of the project would result in temporary noise increases for the residences and noise-sensitive land uses along US 90. Any other noise-sensitive land uses that are located farther from the project area would likely experience little, if any, increase in noise levels because of the background noise of the US 90 traffic, traffic on other roads, and other community noise sources. The construction noise would be generated primarily from heavy equipment used in hauling materials and accomplishing the widening of the roadway.

The construction contractor has the responsibility for protection of the general public in all aspects of construction throughout the life of the project. All construction equipment will be required to comply with OSHA Regulations as they apply to the employees' safety, and in accordance with the DOTD Standard Specifications. All construction equipment used in the construction phase of the project should be properly muffled and all motor panels should be shut during operation. In order to minimize the potential for impacts of construction noise on the local residents, the contractor should only operate, whenever possible, between the hours of 7:00 AM and 5:00 PM.

2.10 Information for Local Officials

DOTD encourages local communities and developers to practice noise compatibility planning in order to avoid future noise impacts. Two guidance documents on noise compatible land use planning are available from FHWA. [3, 4]

Table 5 presents future predicted noise levels based on an assumed at-grade situation for areas along US 90 where vacant and possibly developable lands exist. Noise predictions were made at several distances from centerline of closest travel lane of US 90 for the design year 2039 PM peak hour. The results showed exterior residential activities would be considered to be impacted in terms of a level of 66 or more dBA out to a distance of roughly 25 feet from edge of pavement of the nearest travel lane of US 90.

Table 5. Design Year (2039) Predicted Noise Levels for Undeveloped Areas

Distance*	L_{eq} (1h) (dBA)
25 feet	66
50 feet	64
75 feet	63
100 feet	61
125 feet	59
150 feet	57

* Perpendicular distance to the centerline of the nearest travel lane of US 90.

The values in Table 5 do not represent predicted levels at every location at a particular distance back from the roadway. Noise levels will vary with changes in terrain and other site conditions. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

3.0 AIR QUALITY

This report section summarizes the results of an analysis of the potential air quality effects of the project. The purpose of this analysis is, first, to address the potential for the project to affect air quality standards including transportation conformity requirements; and second, to address the potential Mobile Source Air Toxics (MSATs) effects of the project.

3.1 National Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has established allowable concentrations and exposure limits called the National Ambient Air Quality Standards (NAAQS) for various "criteria" pollutants. These pollutants include carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur oxides (SO_x), and lead (Pb).

In accordance with the Clean Air Act Amendments of 1990 (CAAA of 1990), EPA identified those areas that did not meet the NAAQS for the criteria pollutants and designated them as "nonattainment" areas. Once a nonattainment area meets the NAAQS, it is redesignated as a "maintenance" area.

St. Tammany Parish is currently not a nonattainment or maintenance area for any criteria pollutant.

3.2 Transportation Conformity

Transportation conformity is a process required of Metropolitan Planning Organizations (MPOs) pursuant to the Clean Air Act Amendments of (CAAA) of 1990. CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration (FHWA) be in conformity with the State Implementation Plan (SIP), which represents the State's plan to either achieve or maintain the NAAQS for a particular pollutant.

The proposed project is not located in a nonattainment or maintenance area, so conformity does not apply to this project.

3.3 Carbon Monoxide (CO)

Transportation projects have the potential to affect air quality by changing the number of vehicles at specific locations. Tailpipe emissions from vehicles could result in increases in ambient concentrations of carbon monoxide (CO) near the project.

Carbon monoxide (CO) is a colorless, odorless gas that interferes with the delivery of oxygen to a person's organs and tissues. The health effects of CO exposure depend on the duration and intensity of exposure as well as a person's health. CO concentrations are usually higher during the winter months because vehicles emit higher CO emissions in cold weather due to the characteristics of internal combustion engines.

The state of Louisiana is in attainment for CO. Project CO concentrations are not anticipated to cause or contribute to an exceedance of the CO NAAQS.

3.4 Mobile Source Air Toxics (MSATs)

On February 3, 2006, the FHWA released "*Interim Guidance on Air Toxic Analysis in NEPA Documents.*" This guidance was superseded on September 30, 2009, December 6, 2012 and most recently on October 18, 2016 by FHWA's "*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*" [5]. The purpose of FHWA's guidance is to advise on when and how to analyze Mobile Source Air Toxics (MSAT) in the NEPA process for highways. This guidance is interim, because MSAT science is still evolving. As the science progresses, FHWA will continue to revise and update the guidance.

The qualitative analysis presented below provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The assessment is derived in part from a study conducted by the FHWA entitled *"A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives"* (Claggett, 2006) [6]. Appendix D provides additional MSAT information.

FHWA's Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and
- Projects with Higher Potential MSAT Effects.

FHWA's Updated Interim Guidance provides examples of "Projects with Low Potential MSAT Effects." These projects include minor widening projects and new interchanges, such as those that replace a signalized intersection on a surface street, or where design year traffic projections are less than 140,000 to 150,000 average annual daily traffic (AADT).
The Build Alternatives include the improvement of US 90 bridges and meet the definition of a "Project with Low Potential MSAT Effects" as the highest design year AADT on US 90 is substantially lower than the FHWA criterion.

For the No-Build and Build Alternatives, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The estimated VMT for the Build Alternative is essentially the same as the VMT for the No-Build Alternative. Therefore, it is expected that there would be no appreciable difference in overall MSAT emissions between the No-Build and Build Alternatives.

EPA's MOVES2014 model indicates that emissions of all of the priority MSAT decrease as speed increases. Travel speeds for the Build Alternative may be higher than for the No-Build Alternative although the project is not adding through capacity, so any changes would be small.

Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The alignment changes contemplated for the Build Alternative may have the effect of moving some traffic closer to nearby sensitive land uses; therefore, under the Build Alternative there may be localized areas where ambient concentrations of MSAT could be higher than under the No-Build Alternative.

Finally, the magnitude and the duration of any potential increases compared to the No-Build Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts.

In sum, the localized level of MSAT emissions for the Build Alternative could be slightly higher in some locations relative to the No-Build Alternative but may be lower in other locations where the alignment shifts farther away. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Substantial construction related MSAT emissions are not anticipated for this project as construction is not planned to occur over an extended building period. However, construction activity may generate temporary increases in MSAT emissions in the project area.

4.0 REFERENCES

[1] *Procedures for Abatement of Highway Traffic and Construction Noise*, 23 CFR 772, Federal Highway Administration.

[2] *Highway Traffic Noise Policy*, Louisiana Department of Transportation and Development, July 2011.

[3] *The Audible Landscape: A Manual for Highway Noise and Land Use*, FHWA, November, 1974. http://www.fhwa.dot.gov/environment/audible/index.htm

[4] *Entering the Quiet Zone: Noise Compatibility Land Use Planning*, FHWA, May, 2002. http://www.fhwa.dot.gov/environment/noise/quietzon

[5] Claggett, M., et. al., "*A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives,"* Federal Highway Administration Resource Center, May 4, 2006.

[6] Federal Highway Administration (FHWA), *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*, October 18, 2016.

Appendix A – Noise Measurement Results and Traffic Counts

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site NM1

Area

Address 55170

Site Sketch

see other sketch

Weather

Temp

Wind occas. gusts to 6-8 mph

Direction fr. south

Other

Notes

RION/LD/N121#

Cal@ previous cal Cal Check= 16:16 -0.12

file 1638.010

#	Time Start	Description
1	16:00	A-7, A-72
2	1	
3	2	(wind gust to 8 mph from S)
4	3	A-63, lull @ 40 (background) -15 secs
5	4	pickup-73
6	5	
7	6	A-70
8	7	lull @ 40-42; @ 38 lull
9	8	
10	9	A-69
11	10	
12	11	A's ~70, A-69
13	12	
14	13	A's - 67
15	14	MT- 80, A-69, A's ~70
16	#	
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Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM1, 55170 US90 (peak), LA**
Description:	**Residential; 90°F; occasional gusts from south**
SLM Filename:	**1638 LxT_1638.010**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	4:00:00 PM	64.1	72.9		
2	4:01:00 PM	63.6	74.4		
3	4:02:00 PM	59.4	68.6		
4	4:03:00 PM	55.2	65.6		
5	4:04:00 PM	66.3	74.2		
6	4:05:00 PM	65.9	74.2		
7	4:06:00 PM	63.4	70.8		
8	4:07:00 PM	52.4	64.8		
9	4:08:00 PM	62.8	69.9		
10	4:09:00 PM	68.6	81.7		
11	4:10:00 PM	61.8	74.0		
12	4:11:00 PM	62.9	70.3		
13	4:12:00 PM	60.0	70.3		
14	4:13:00 PM	59.6	67.8		
15	4:14:00 PM	68.3	79.4		
~~16~~	~~4:15:00 PM~~	~~43.8~~	~~44.7~~	x	stop measure at 16:15
	Leq	**64.0**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site 55170 Hwy 90 NM1

Area

Address 55170 Hwy 90

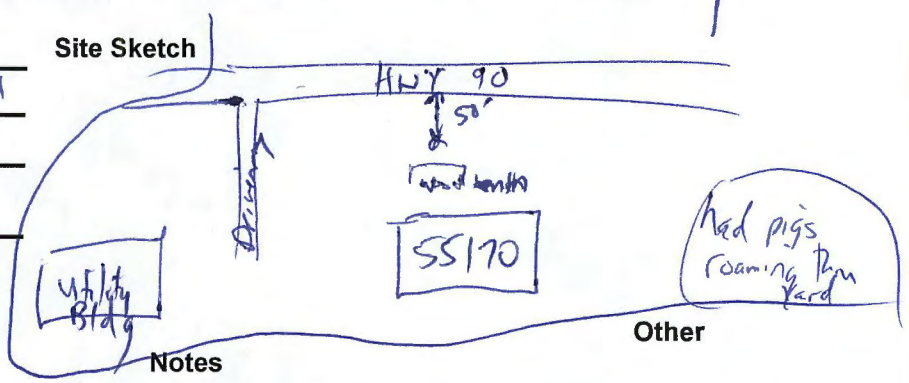
Weather

Temp 90°

Wind gusts from S

Direction from south

Site Sketch



RION/LD/N121#

Cal@ 15:31 +0.00 Cal Check= 0

fil 1638.004

55mph

#	Time Start	Description
1	15:35	Airplane audible - Auto 70
2	36	A-64; Bull - SLM 44
3	37	Pickup-71, Pickup-65 A-67 Pickup 67
4	38	HT-76 < Bull 42; faint gunshots audible, SLM 40
5	39	A-68
6	40	Pickup-?
7	41	NO NOTES
8	42	
9	43	HT-75 Pickup 71
10	44	A-64, HT-?
11	45	
12	46	AS-71 MC 75
13	47 X	GA audible @ 47
14	48	Pickup-68
15	49	2 autos-67
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Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM1, 55170 US90 (offpeak), LA**
Description:	**Residential; 90°F; occasional gusts from south**
SLM Filename:	**1638 LxT_1638.009**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	3:35:00 PM	62.7	71.0		
2	3:36:00 PM	61.2	71.0		
3	3:37:00 PM	61.8	71.7		
4	3:38:00 PM	64.5	76.9		
5	3:39:00 PM	61.5	70.9		
6	3:40:00 PM	62.8	73.8		
7	3:41:00 PM	60.3	69.3		
8	3:42:00 PM	63.4	74.7		
9	3:43:00 PM	66.3	74.2		
10	3:44:00 PM	63.6	73.1		
11	3:45:00 PM	58.9	70.8		
12	3:46:00 PM	66.0	75.4		
~~13~~	~~3:47:00 PM~~	~~61.7~~	~~70.7~~	x	GA audible ~47
14	3:48:00 PM	61.6	68.7		
15	3:49:00 PM	65.8	75.4		
~~16~~	~~3:50:00 PM~~	~~59.8~~	~~60.4~~	x	stop measure at 15:49
	Leq	**63.4**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site Boat Launch Pier (S of Cajun Encounter)

Area

Address S of Cajun Tours

Weather

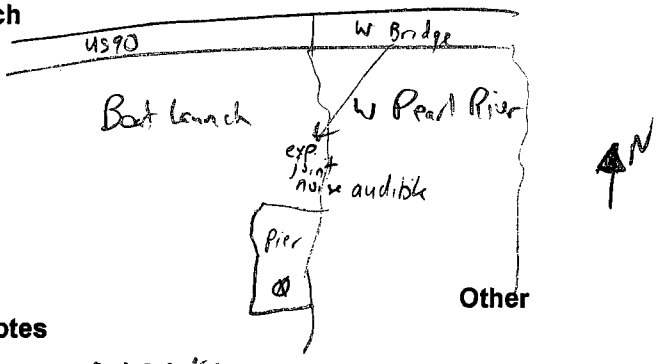
Temp 85-90

Wind N/A

Direction

RION/LD/N121#

Site Sketch



Notes

Cal@ +0.15 @ 16Hz Cal Check=

#	Time Start		Description
1	16:45		
2	46		
3	47		A_S -62, A_S -57
4	48		A-56, MT + A-58 MT-60
5	49	X	A_S-60 } men next to mic
6	50	X	A_S -60 }
7	51	X	
8	52	X	
9			stop @ 16:53 excessive talking (file 1638.011 – don't use
10			
11	1659		start @ pier/deck (exp joint audible)
12	1700	X	tour guides talking / start boat engine / leave site
13	1		A + MT - 62
14	2		MC-? >60
15	3		faint aircraft -45
16	4	X	" - 49
17	5		A-57 lull ↓ 45
18	6		A_S -57, seedas - 48
19	7	X	engine noise to south + local door slam
20	8		A -49, A_S -56
21	9	X	aircraft -50 (15 secs) lull ↓ 42
22	10		Bus -53
23	11		MT-60, seedas - 54 (10 secs)
24	12		A_S -60
25	13		
26	14		stop meas (file 1638.012
27			
28			
29			
.30			

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM2, Cajun deck (peak), LA**
Description:	**Commercial; 85-90°F**
SLM Filename:	**1638 LxT_1638.012**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	4:59:00 PM	53.1	61.0		
~~2~~	~~5:00:00 PM~~	~~50.4~~	~~58.1~~	x	tour guide talking; boat engine
3	5:01:00 PM	57.7	64.7		
4	5:02:00 PM	51.6	56.7		
5	5:03:00 PM	55.0	61.6		
~~6~~	~~5:04:00 PM~~	~~55.2~~	~~60.0~~	x	aricraft ~49
7	5:05:00 PM	52.0	57.3		
8	5:06:00 PM	50.3	57.3		
~~9~~	~~5:07:00 PM~~	~~53.7~~	~~58.7~~	x	engine noise to south & local door slam
10	5:08:00 PM	53.1	58.9		
~~11~~	~~5:09:00 PM~~	~~52.2~~	~~58.9~~	x	aircraft ~50
12	5:10:00 PM	52.8	58.2		
13	5:11:00 PM	56.8	61.8		
14	5:12:00 PM	55.0	60.5		
15	5:13:00 PM	53.2	58.4		
~~16~~	~~5:14:00 PM~~	~~44.1~~	~~48.0~~	x	stop at 17:14
	Leq	**54.3**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15

Site

Area

Address (Southern) Cajun Tour Pier

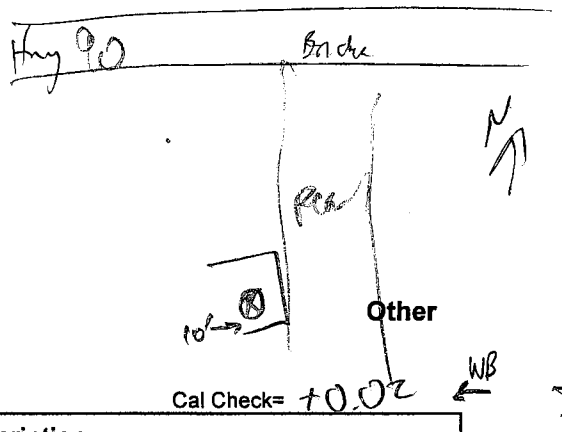
Weather

Temp 85-90

Wind 0-4 mph

Direction N/A (rustling, plants, trees)

Site Sketch



Notes

Other

RION/LD/N121#

Cal@

Cal Check= +0.02

#	Time Start		Description
1	10:40		secadas-50 (15 secs)
2	41		As-58-60, secadas (10-15 secs), As 59
3	42		HT-65 wb, MT-61
4	43		
5	44		
6	45	X	Boat tour passby
7	46	X	
8	47	X	
9	48	X	
10	49	X	
11	50		Secadas 49 (all ↓ 42-44)
12	51		A-56, secadas 50
13	52		As-56, A-58, A-57, secadas-51
14	53		(all ↓ 42-44) :55 → As + MT-58
15	54		A-51
16	55		A-54, secadas-43
17	56		As-57, A-54
18	57		A-54 A-57
19	58		A-57 (faint-plane ambient) (all ↓ 41)
20	59		As-55, A-61 (secadas-50)
21			
22			
23			
24			fl# 1638.020
25			
26			
27			
28			
29			
.30			

A MT / 7 1 (or A MT / 3 1)

stop (dam)

reset (wrong) count

A A MT / 4 4 1

A A MT / 11 9 1

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM2, Cajun deck (offpeak), LA**
Description:	**Commercial; 85-90°F; 0-4 mph winds**
SLM Filename:	**1638 LxT_1638.020**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	10:40:00 AM	50.8	56.6		
2	10:41:00 AM	53.4	60.0		
3	10:42:00 AM	56.7	65.5		
4	10:43:00 AM	52.2	57.2		
5	10:44:00 AM	49.8	54.4		
~~6~~	~~10:45:00 AM~~	~~56.6~~	~~63.6~~	x	Boat tour passby
~~7~~	~~10:46:00 AM~~	~~55.0~~	~~62.0~~	x	Boat tour passby
~~8~~	~~10:47:00 AM~~	~~53.6~~	~~60.6~~	x	Boat tour passby
~~9~~	~~10:48:00 AM~~	~~52.3~~	~~60.8~~	x	Boat tour passby
~~10~~	~~10:49:00 AM~~	~~48.8~~	~~57.0~~	x	Boat tour passby
11	10:50:00 AM	44.5	49.9		
12	10:51:00 AM	49.6	56.7		
13	10:52:00 AM	53.4	58.5		
14	10:53:00 AM	51.2	59.6		
15	10:54:00 AM	49.2	57.5		
16	10:55:00 AM	47.7	54.5		
17	10:56:00 AM	51.4	57.1		
18	10:57:00 AM	51.7	58.1		
19	10:58:00 AM	48.5	57.0		
20	10:59:00 AM	53.1	61.0		
~~21~~	~~11:00:00 AM~~	~~41.9~~	~~42.1~~	x	stop measure at 11:00
	Leq	**51.7**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16

Site NM3

Area

Address just west of E Pearl River

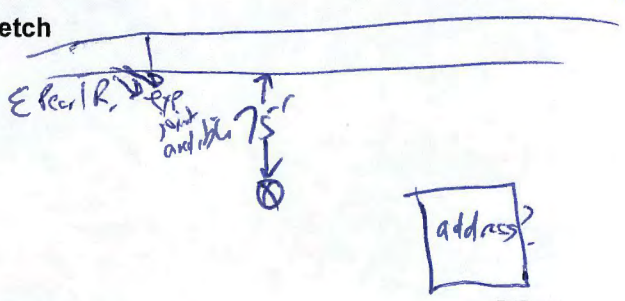
Weather

Temp 85

Wind occ. gusts to 8mph

Direction From S

Site Sketch



Other

Notes

RION/LD/N121#

Cal@ +.03 17:26 Cal Check= -0.04

#	Time Start		Description
1	17:30		A-62
2	31		AS-67 SL 39
3	32	X	MT-63 dogs barking
4	33	X	Quiet ↓ 39 " "
5	34		MT-59 Quiet ↓ 40 AS 66
6	35		A-68 AS 67
7	36		AS-65
8	37		AS-68, mult AS-?
9	38		mult AS-?
10	39		A-66; Quiet ↓ 40-41 (15-20 secs), MT-65
11	40		mult. AS-68
12	41		A-64 Quiet ↓ 40-43
13	42		A-64
14	43		multiple Autos-66, A-65
15	44		A-61
16			stop @ 17:45
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
.30			

file 638.013

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM3, ## US90 (peak), LA**
Description:	**Residential; 85°F; occasional gusts to 8 mph from south**
SLM Filename:	**1638 LxT_1638.013**
Date:	**9/14/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	5:30:00 PM	58.7	67.5		
2	5:31:00 PM	56.3	65.5		
~~3~~	~~5:32:00 PM~~	~~56.5~~	~~63.5~~	x	dogs barking
~~4~~	~~5:33:00 PM~~	~~50.8~~	~~61.5~~	x	dogs barking
5	5:34:00 PM	56.9	66.5		
6	5:35:00 PM	61.9	68.4		
7	5:36:00 PM	55.1	65.1		
8	5:37:00 PM	62.1	69.2		
9	5:38:00 PM	62.1	67.4		
10	5:39:00 PM	58.6	68.9		
11	5:40:00 PM	59.5	68.2		
12	5:41:00 PM	53.2	65.0		
13	5:42:00 PM	56.0	63.6		
14	5:43:00 PM	61.4	67.4		
15	5:44:00 PM	58.1	65.8		
~~16~~	~~5:45:00 PM~~	~~66.1~~	~~68.1~~	x	stop at 17:45
	Leq	**59.3**			

Noise Measurement Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/15

Site

Area

Address unknown (W of E Pearl River Bridge)

Site Sketch

see other sketch

Weather

Temp 85°

Wind 4-8 mph gusts

Direction from NE

Other

Notes

RION/LD/N121#

Cal@ +0.01 10:07 Cal Check= -0.10

#	Time Start		Description
1	10:12		A-? A-61 A-68 (pickup)
2	13		A-65 A-64 A-64 A-67
3	14		A-65 A-64 ; A-69
4	15		A-? A-64 ;
5	16		lull ↓ 38
6	17		A-? A-65? lull ↓ 40-43 (insects
7	18		lull 38 , A-64 , A-65
8	19		A-67
9	20		A-61
10	21	X	A-66 lull ↓ 39 , A-61 (boat engine) 50
11	22		A-63
12	23		HF-71
13	24		A-64 3 MCs - 76 (eastbound)
14	25		(MCs still loud :15) (lull ↓ 42) Secadas-49
15	26		Secadas - 50
16			
17			
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22			
23			
24			
25			
26			
27			
28			
29			
.30			



File 10 38.019

Noise Measurement Data Sheet

Project Name:	**US90 Pearl River Bridges**
Site:	**NM3, ## US90 (off peak), LA**
Description:	**Residential; 85°F; gusts to 4-8 mph from northeast**
SLM Filename:	**1638 LxT_1638.019**
Date:	**9/15/2016**

Period #	Time Start	Leq	Lmax	Delete?	Notes
1	10:12:00 AM	57.8	68.9		
2	10:13:00 AM	59.1	67.8		
3	10:14:00 AM	59.8	69.4		
4	10:15:00 AM	56.0	64.9		
5	10:16:00 AM	50.4	62.0		
6	10:17:00 AM	57.7	65.6		
7	10:18:00 AM	56.1	65.5		
8	10:19:00 AM	55.5	66.7		
9	10:20:00 AM	54.7	64.0		
~~10~~	~~10:21:00 AM~~	~~55.2~~	~~66.4~~	x	boat engine ~50
11	10:22:00 AM	58.3	70.9		
12	10:23:00 AM	59.5	71.7		
13	10:24:00 AM	65.4	76.8		
14	10:25:00 AM	47.1	51.5		
15	10:26:00 AM	54.5	64.7		
~~16~~	~~10:27:00 AM~~	~~43.3~~	~~43.6~~	x	stop measure at 10:27
	Leq	**58.5**			

Vehicle Count Data Sheet

Louisiana DOTD, US 90 (St. Tammany Parish, LA and Hancock County, MS)

Date 9/14/16 **Name:** RW

Site _____

Roadway	Hwy 90	**Roadway**	Hwy 90
Direction	WB	**Direction**	EB

"Running Count"

Time Start	Auto	MT	HT	Bus	MC	Auto	MT	HT	Bus	MC
5570 Hwy 90 1535 -1540	10	1	1	0	0	13	0	0	0	0
1540 -1545	19	2	3	0	0	25	1	0	0	0
1545 -1550	27	2	4	0	1	43	1	0	0	0
1600 -05	7	0	0	0	0	15	2	0	0	0
05 -10	15	6	0	0	0	30	4	0	0	0
10 -15	25	0	1	0	0	44	5	0	0	0
Cajun Tour deck boat launch 1659 -1704	9	0	0	0	1	7	2	0	0	0
04 -09	16	0	0	0	0	24	3	0	0	0
09 -14	22	1	0	1	1	36	4	0	0	1
"NM3" no address 1730 -1735	8	1	0	0	0	7	1			
35 -40	17	1	0	0	0	31	2			
40 -45	26	2	0	0	0	41	4			
9/15 "NM3" ~~Cajun deck boat launch~~ 10:12 -17	9	0	0	0	0	6	0	0	0	0
17 -22	13	0	0	0	0	14	0	0	0	0
22 -27	16	0	0	0	0	19	0	1	0	3
9/15 ~~"NM3"~~ Cajun Tour ~~no address~~ 10:40 -45	7	1	1	0	0	3	1	0	0	0
45 -50	~~Stop count~~									
50 -55	11	1	1	0	0	7	2	0	0	0
55 - 11:00	18	1	1	0	0	12	2	0	0	0

Notes:

US90 Pearl River Bridges - St. Tammany Parish, LA

Traffic Counts during Noise Measurements

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM1, 55170 US90 (peak), LA	16:00	10	1	1	0	0	13	0	0	0	0
	16:05	9	1	2	0	0	12	1	0	0	0
	16:10	8	0	1	0	1	18	0	0	0	0
	Total	27	2	4	0	1	43	1	0	0	0
	Calc 1-Hr Volume	**108**	**8**	**16**	**0**	**4**	**172**	**4**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM1, 55170 US90 (offpeak), LA	15:35	7	0	0	0	0	15	2	0	0	0
	15:40	8	0	0	0	0	15	2	0	0	0
	15:45	10	0	1	0	0	14	1	0	0	0
	Total	25	0	1	0	0	44	5	0	0	0
	Calc 1-Hr Volume	**100**	**0**	**4**	**0**	**0**	**176**	**20**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM2, Cajun deck (peak), LA	16:59	9	0	0	0	1	7	2	0	0	0
	17:04	7	0	0	0	0	17	1	0	0	0
	17:09	6	1	0	1	0	12	1	0	0	1
	Total	22	1	0	1	1	36	4	0	0	1
	Calc 1-Hr Volume	**88**	**4**	**0**	**4**	**4**	**144**	**16**	**0**	**0**	**4**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM2, Cajun deck (offpeak), LA	10:40	7	1	1	0	0	3	1	0	0	0
	10:50	4	0	0	0	0	4	1	0	0	0
	10:55	7	0	0	0	0	5	0	0	0	0
	Total	18	1	1	0	0	12	2	0	0	0
	Calc 1-Hr Volume	**72**	**4**	**4**	**0**	**0**	**48**	**8**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM3, ## US90 (peak), LA	17:30	8	1	0	0	0	7	1	0	0	0
	17:35	9	0	0	0	0	24	1	0	0	0
	17:40	9	1	0	0	0	10	2	0	0	0
	Total	26	2	0	0	0	41	4	0	0	0
	Calc 1-Hr Volume	**104**	**8**	**0**	**0**	**0**	**164**	**16**	**0**	**0**	**0**

		US90 WB					US90 EB				
Site	**Time**	**Auto**	**MT**	**HT**	**Bus**	**Moto**	**Auto**	**MT**	**HT**	**Bus**	**Moto**
NM3, ## US90 (off peak), LA	10:12	9	0	0	0	0	6	0	0	0	0
	10:17	4	0	0	0	0	8	0	0	0	0
	10:22	3	0	0	0	0	5	0	1	0	3
	Total	16	0	0	0	0	19	0	1	0	3
	Calc 1-Hr Volume	**64**	**0**	**0**	**0**	**0**	**76**	**0**	**4**	**0**	**12**

Appendix B – Traffic Data for TNM Modeling

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
TRANSPORTATION PLANNING SECTION
P. O. BOX 94245
BATON ROUGE, LOUISIANA 70804-9245
(225) 379-1925

TRAFFIC ASSIGNMENT

DATE:	11-Aug-16
PROJECT NO.	H.000284
NAME:	US 90 Pearl River Bridges
DESCRIPTION:	
ROUTE:	US 90
FUNCTIONAL CLASS:	Rural Minor Arterial
PARISH:	St. Tammany

2019 ADT =	2,300	2900 ANN. GROWTH	1.0%
2039 ADT =	2,800		

D =	55%
K =	10%
T =	15%

AXLE DISTRIBUTION

VEHICLE TYPE	PERCENT	2019 ADT	2039 ADT	MEDIAN YEAR
1 MOTORCYCLES	0.20%	5	6	5
2 PASSENGER CARS	53.90%	1,240	1,509	1,374
3 2A-4T SINGLE UNIT	29.90%	688	837	762
4 BUSES	0.70%	16	20	18
5 2A-6T SINGLE UNIT	6.70%	154	188	171
6 3A SINGLE UNIT	1.00%	23	28	26
7 4A SINGLE UNIT	0.20%	5	6	5
8 4A SINGLE TRAILER	1.90%	44	53	48
9 5A SINGLE TRAILER	4.60%	106	129	117
10 6A SINGLE TRAILER	0.60%	14	17	15
11 5A MULTI-TRAILER	0.10%	2	3	3
12 6A MULTI-TRAILER	0.10%	2	3	3
13 7A MULTI-TRAILER	0.10%	2	3	3
TOTALS		2,300	2,800	2,550

The above traffic data is an estimate based on data available at the time of preparation.

SUBMIT TO:	Catherine Mastin	SECTION:	34
COPY TO:	Jeff Lambert	SECTION:	67
PREPARED BY:	John Spragio	SECTION:	85

Classification Count Summary	
Road:	**US 90 Pearl River Bridges**
County:	**St. Tamany, LA**

Classification	Total	%
1. Motorcycles	6	0.21%
2. Cars	1,509	53.85%
3. Pick-Up, Panel, Van	837	29.87%
Sub-total Passenger Vehicles	2,352	84%
4. Buses	20	0.71%
5. Dual Rear	188	6.71%
6. 3-Axle Truck	28	1.00%
7. 4-Axle Truck	6	0.21%
Sub-total Single-Unit Trucks	242	9%
8. 2S-1, 3S-1, 2S-2	53	1.89%
9. 3S-2, 2S-3	129	4.60%
10. 3S-3, 3S-4	17	0.61%
Sub-total Combination Trucks	199	7%
11. 2S-1-2	3	0.11%
12. 2S-2-2, 3S-1-2	3	0.11%
13. Any 7 Axle	3	0.11%
Sub-total Twin Trailers	9	0.32%
Total Combinations	208	0%
Total Trucks	450	16.06%
TOTAL ALL VEHICLES	2,802	

TNM Vehicle Types	Total	%	% of Trucks
Autos	2,346	83.7%	n/a
MTs	236	8.4%	52%
HTs	214	7.6%	48%
Motorcycles	6	0.2%	n/a
Total	2,802	100.0%	n/a

Project:	**US 90 Pearl River Bridges**
County	**St. Tammany Parish, LA**
Description:	**Future Build**
Design Year:	**2039**

K	10%
D	55%
%MT of T	52%
%HT of T	48%

							55%				45%			
Road	***From***	***To***	***Average Daily Traffic (ADT)***	***Design Hour Volume (DHV)***	***AADT Trucks***	***DHV Trucks***	***Total***	***Autos***	***MTs***	***HTs***	***Total***	***Autos***	***MTs***	***HTs***
US 90	Hwy 190	Hwy 604	2,800	280	15%	10%	154	139	8	7	126	113	7	6
US 90	Hwy 604	east	4,776	478	15%	10%	263	236	14	12	215	193	11	10
Hwy 604	US 90	north	1,767	177	15%	10%	97	87	5	5	79	72	4	4

Build 2039 growth rate: based on LA Traffic (west of Hwy 604)		
	Year	AADT
Future Year	2039	2,800
Base Year	2019	2,300
Annual Growth rate is 1%	**1.0%**	

Project:	**US 90 Pearl River Bridges**
County	**St. Tammany Parish, LA**
Description:	**Existing**
Design Year:	**2016**

K	10%
D	55%
%MT of T	52%
%HT of T	48%

							55%				45%			
Road	***From***	***To***	***Average Daily Traffic (ADT)***	***Design Hour Volume (DHV)***	***AADT Trucks***	***DHV Trucks***	***Total***	***Autos***	***MTs***	***HTs***	***Total***	***Autos***	***MTs***	***HTs***
US 90	Hwy 190	Hwy 604	2,233	223	15%	10%	123	111	6	6	100	90	5	5
US 90	Hwy 604	east	3,809	381	15%	10%	209	189	11	10	171	154	9	8
Hwy 604	US 90	north	1,409	141	15%	10%	77	70	4	4	63	57	3	3

Build 2039 growth rate: based on LA Traffic (west of Hwy 604)		
	Year	AADT
Future Year	2039	2,800
Base Year	2019	2,300
Annual Growth rate is 1%	**1.0%**	

Existing 2016 Traffic, US 90 (west of Hwy 604)		
	Year	AADT
Future Year	2019	2,300
Desired Year	2016	2,233

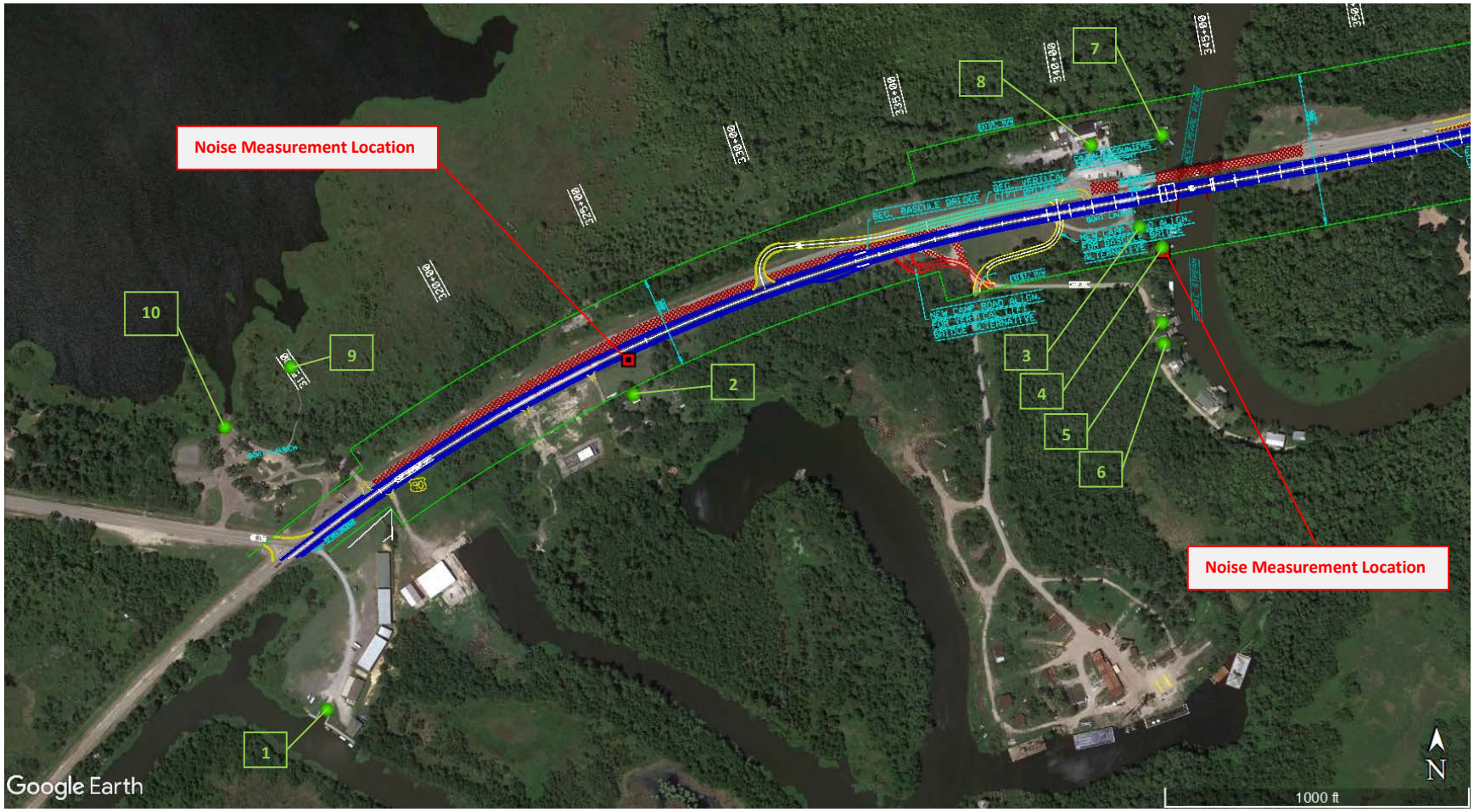
Appendix C – Noise Prediction Results and Impacts

Receptor Number	Receiver Name	Dwelling Units	NAC	NAC Approach Impact Level	Existing	Design Year 2039 Sound Levels, dBA*						
						No Build	Alternative 1: Fixed Span Bridge		Alternative 2: Bascule Bridge		Alternative 3: Vertical Lift Bridge	
							Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing
1	Storage and Boat Tour	0	E	71	47	48	49	2	49	2	49	2
2	55170 US90	1	B	66	55	56	61	6	61	7	61	7
	55170 US90 (M)	0	N/A	N/A	62	63	68	6	68	6	68	6
3	Boat Launch - south (Cajun Encount)	0	E	71	54	55	52	(2)	55	1	56	2
4	Cajun Encounters (boat dock) (M)	0	E	71	52	53	52	0	53	2	55	3
5	Residence at Camp Rd**	1	B	66	47	48	50	3	51	4	51	4
6	43637 Camp Rd	1	B	66	44	45	47	3	48	3	48	3
7	Boat Launch - north (Cajun Encount)	0	E	71	55	56	52	(3)	54	(1)	54	(1)
8	Cajun Encounters - patio	0	E	71	55	56	52	(3)	54	(1)	54	(1)
9	Pier (near US190)	0	C	66	45	46	46	2	46	2	46	2
10	Boat Launch (near US190)	0	C	66	45	46	46	2	46	2	47	2
11	Middle Pearl boat launch***	0	C	66	62	62	57	(4)	N/A***		N/A***	
12	Residence “NM 3”**	1	B	66	50	51	50	0	52	2	52	2
	Residence “NM 3” (M)**	1	N/A	N/A	59	60	51	(7)	58	(1)	59	0
13	Boat Launch	0	C	66	53	54	48	(5)	55	2	56	3

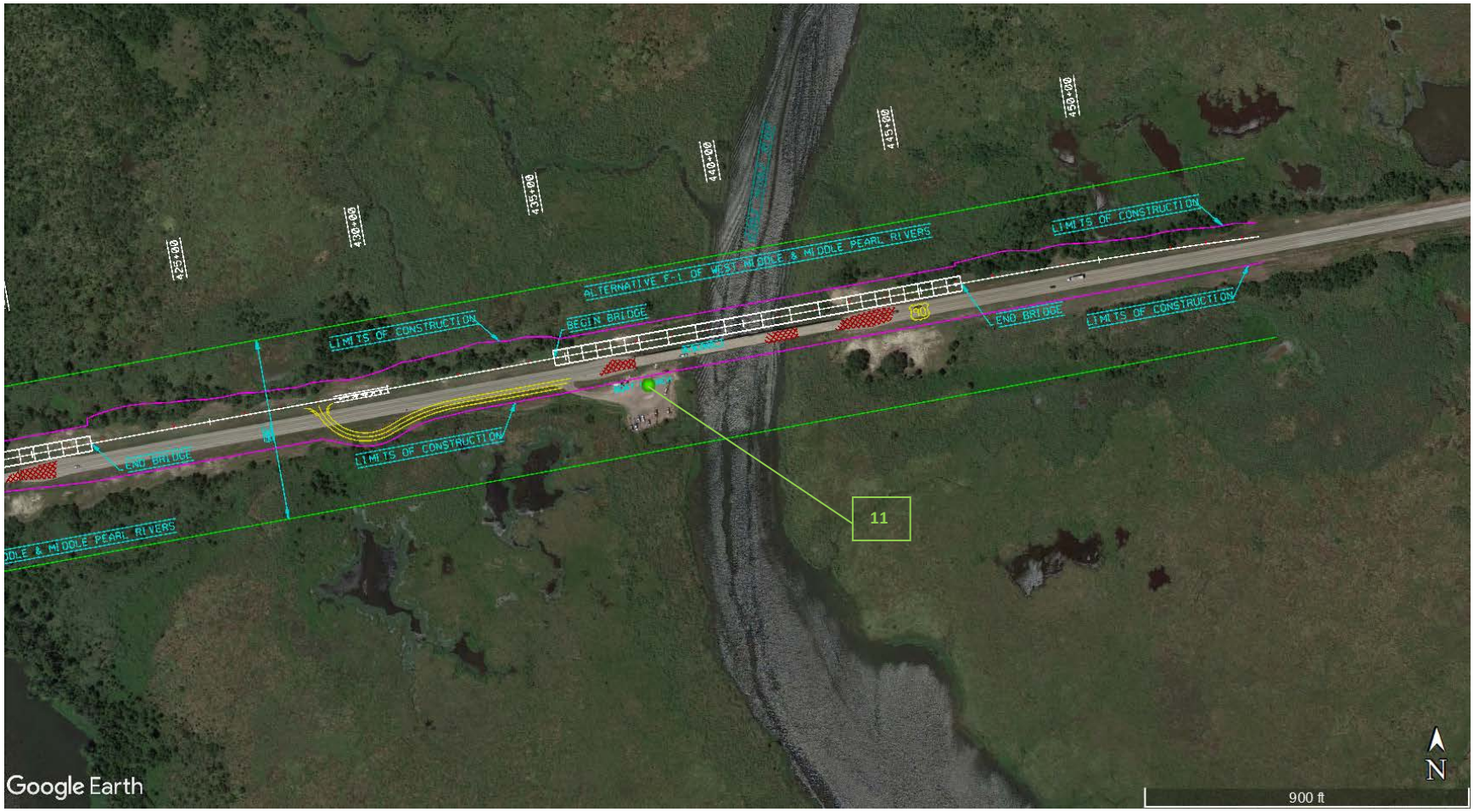
* Parentheses around value indicates a negative value (i.e., sound levels are reduced with the project)

** Address could not be determined

*** There is no Bascule or Vertical Bridge Alternative for the Middle-Middle Pearl River Bridge



West Pearl River Bridge Receptor Locations (numbered) and Noise Measurement Locations (red squares)



Middle-Middle Pearl River Bridge Receptor Location (numbered)



East Pearl River Bridge Receptor Locations (numbered) and Noise Measurement Location (red square)

Appendix D – MSATs Background Information

MOBILE SOURCE AIR TOXICS (MSATS)

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS).[1] In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA).[2] These are *1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.* While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide,[3] EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

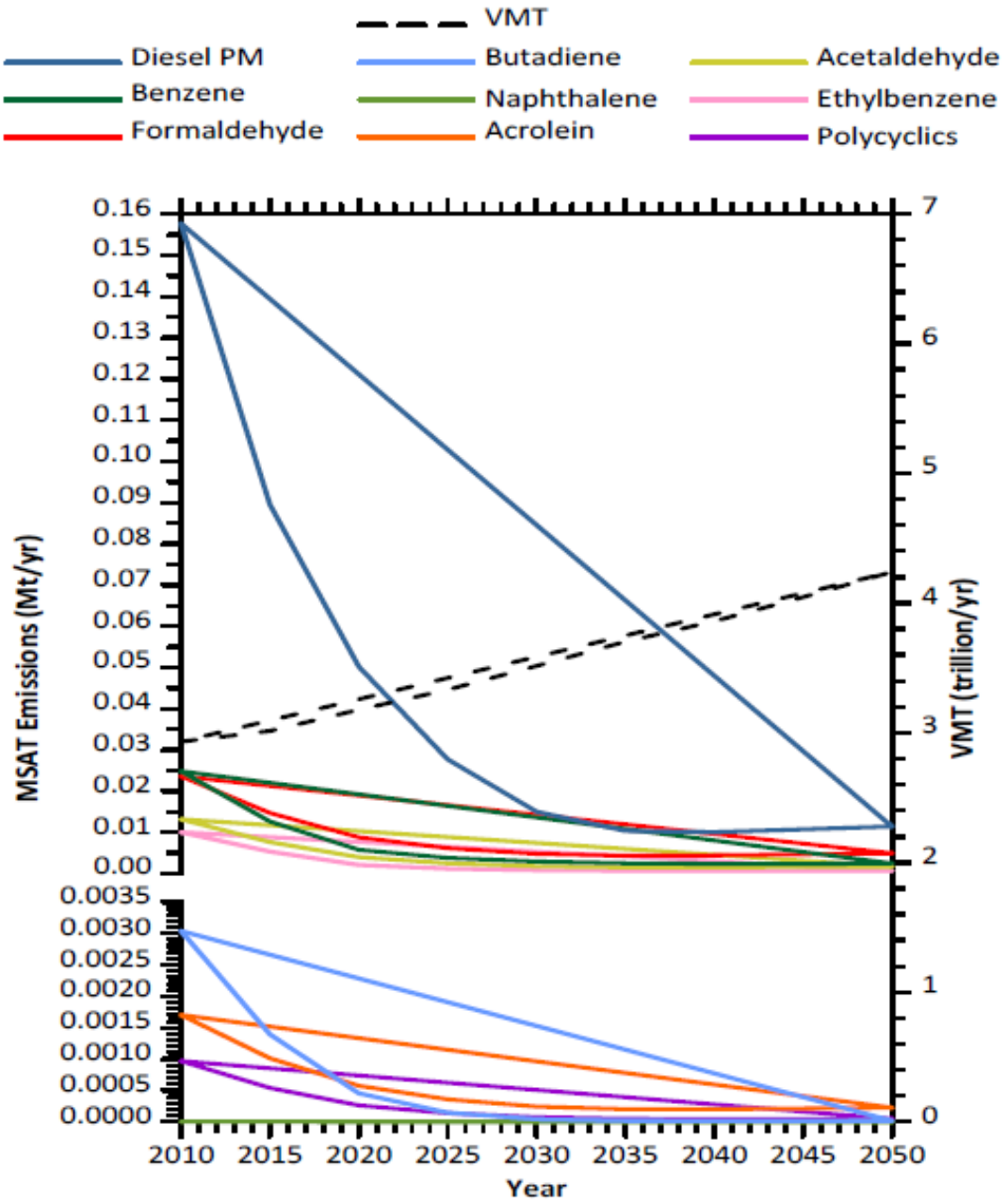
Using EPA's MOVES2014a model, as shown in Figure 1, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

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[1] https://www.epa.gov/iris
[2] https://www.epa.gov/national-air-toxics-assessment
[3] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NNR0.txt

Figure 1
FHWA PROJECTED NATIONAL MSAT EMISSION TRENDS 2010 - 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOVES2014a MODEL



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

NEPA Context

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals, and that Federal agencies use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment (42 U.S.C. 4332). In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest (23 U.S.C. 109(h)). The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, https://www.epa.gov/iris/). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). A number of HEI studies are summarized in Appendix D of FHWA's Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report

16, https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special Report 16, https://www.healtheffects.org/publication/mobile-source-air-toxics-criticalreview-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (https://www.epa.gov/iris)."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD5985257800050C9DA/$file/07-1053-1120274.pdf).

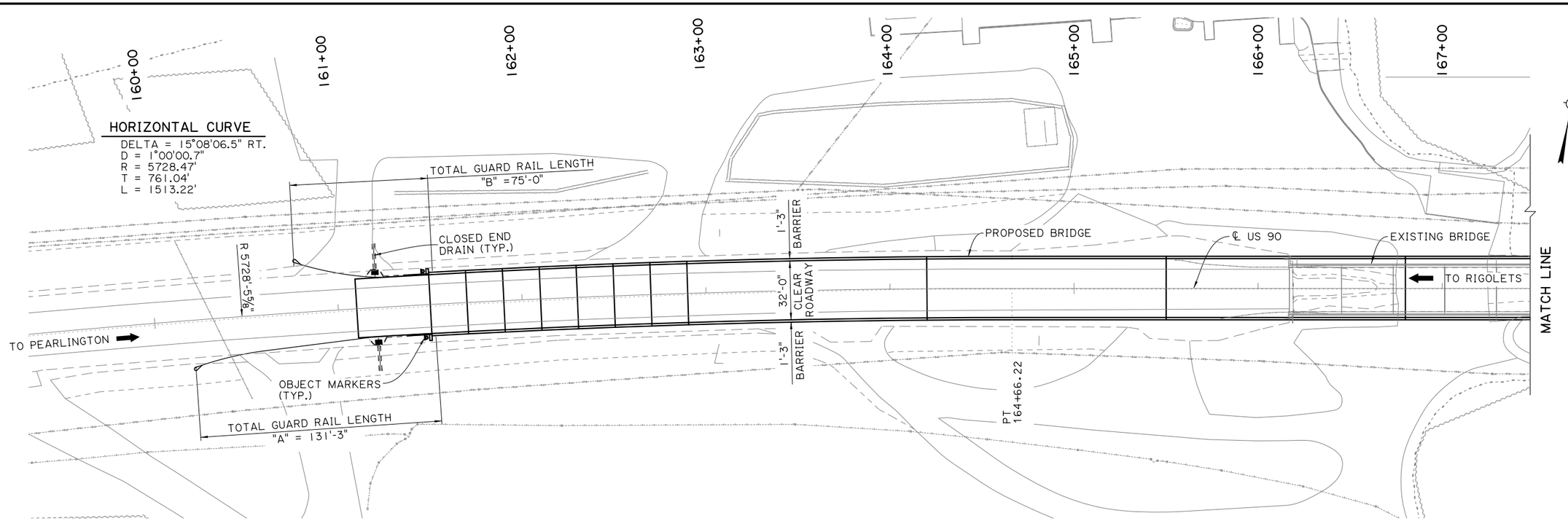
Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion such as the example provided in this Appendix (reflecting any local and project-specific circumstances), should be included regarding incomplete or unavailable information in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)]. The FHWA Headquarters and Resource Center staff, Victoria Martinez (787) 771-2524, James Gavin (202) 366-1473, and Michael Claggett (505) 820-2047, are available to provide guidance and technical assistance and support.

Appendix B

Alternative 4 Plans: Fixed Span Bridge With 20-foot Vertical Clearance

60% Preliminary Plans
LADOTD_Corp\Headquarters\H.000100 thru H.000999\H.000284\Bridge-Facilities\Bridge-Structural\Plans\103 West Pearl General Plan.1 of 1.dgn 8/31/2025 11:02

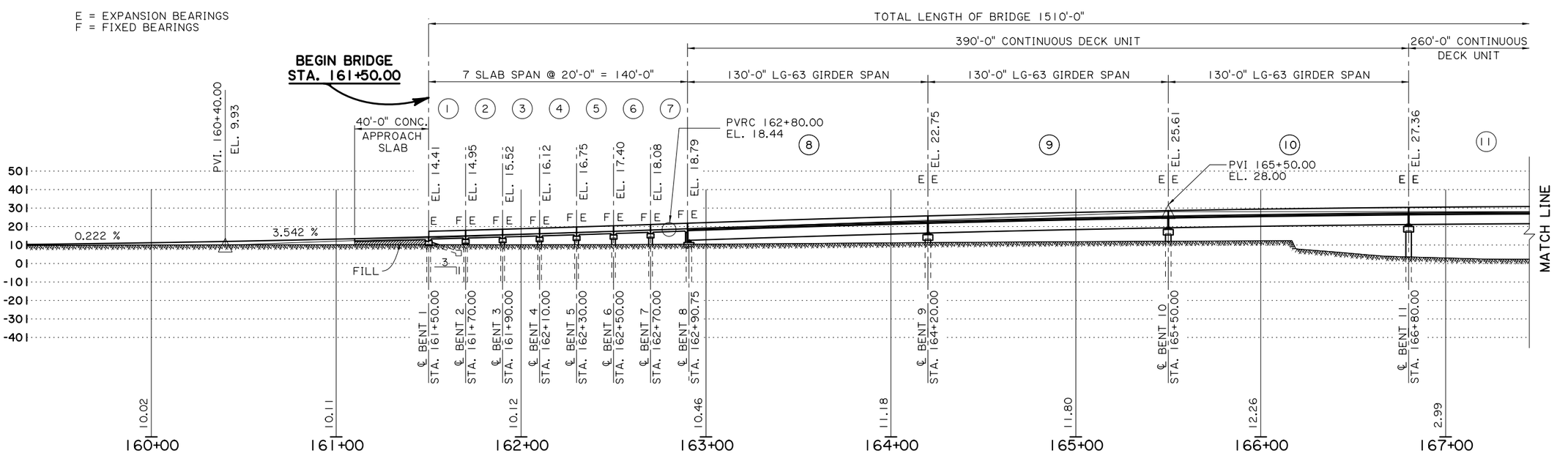


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A	14:1	118.75	13.036	22.929	37'-6"	68'-9"	25'-0"
B	14:1	62.5	21.07	30.964	37'-6"	12'-6"	25'-0"

480'-0"
VERTICAL CURVE
P.V.I STA. 160+40.00
P.V.I ELEV. 9.93

540'
VERTICAL CURVE
P.V.I STA. 165+50.00
P.V.I ELEV. 28.00

SCALE: 30 = 1'-0"



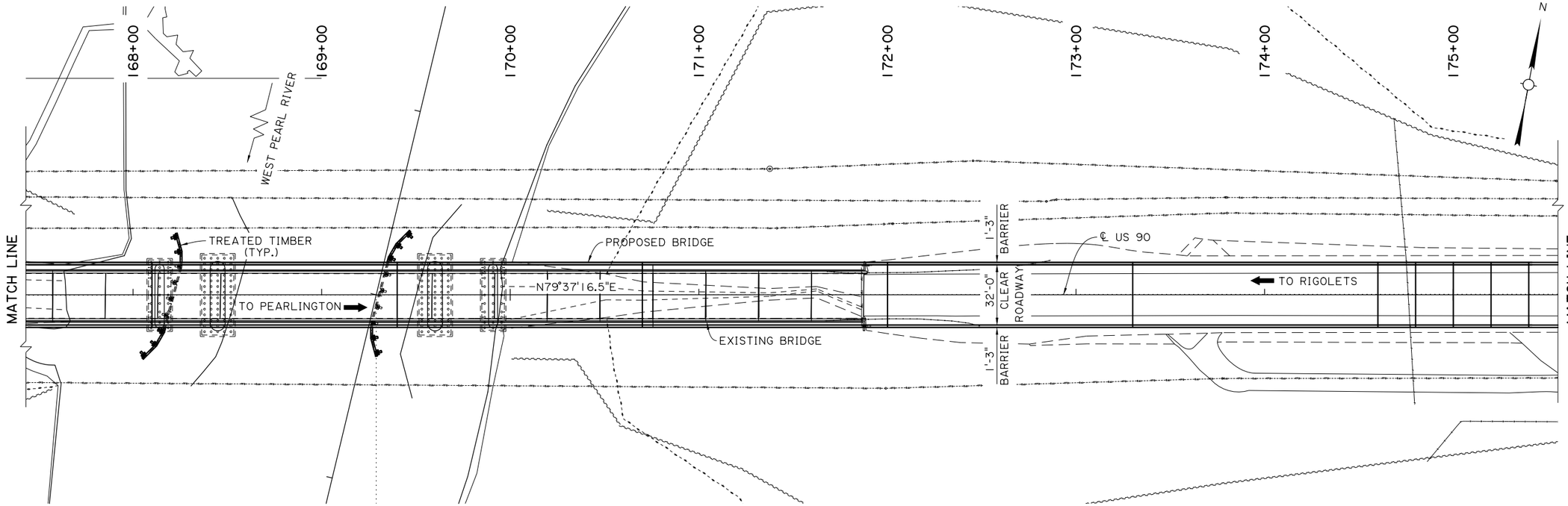
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PARISH	ST. TAMMANY
CONTROL SECTION	006-07
STATE PROJECT	H.000284
DESIGN	A. MICHAEL
CHECK	
DETAIL	A. BURNOS
CHECK	A. MICHAEL
REVIEW	
SERIES #	1 OF 3

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

BRIDGE GENERAL PLAN
WEST PEARL RIVER BRIDGE
PEARL RIVER BRIDGES

DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE AND STRUCTURAL DESIGN

60% Preliminary Plans
LADOTD_Corp\Headquarters\H.000100 thru H.000999\H.000284\Bridge-Facilities\Bridge-Structural\Plans\104 West Pearl General Plan. 2 of 3.dgn 8/13/2025 11:02

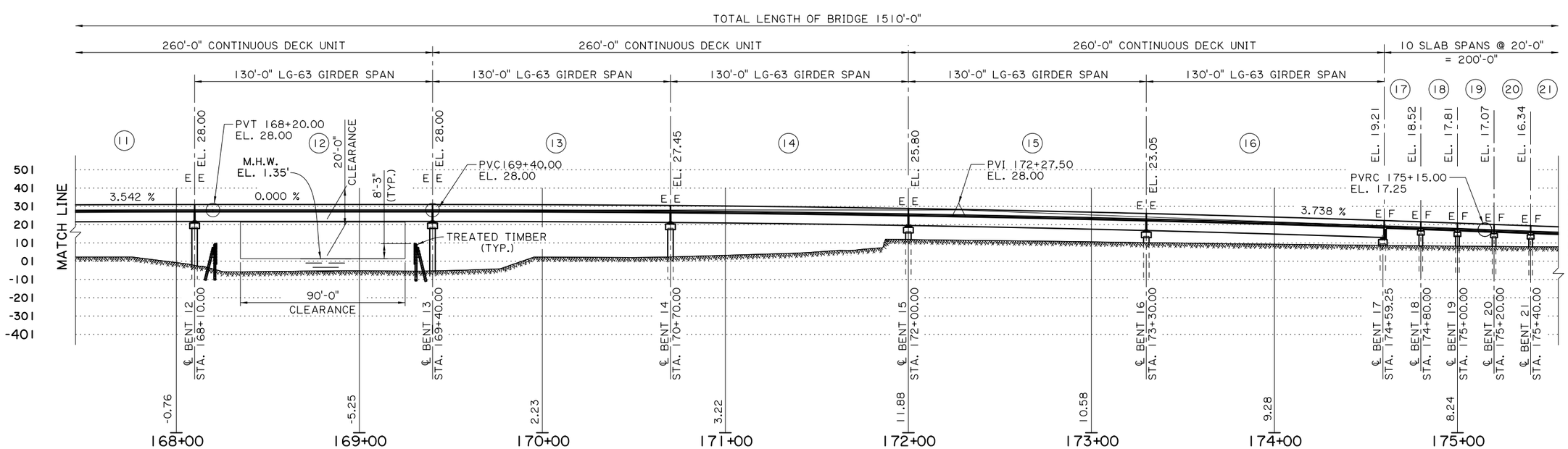


SCALE: 30 = 1'-0"

540'-0"
VERTICAL CURVE
P.V.I STA. 165+50.00
P.V.I ELEV. 28.00

E = EXPANSION BEARINGS
F = FIXED BEARINGS

575'-0"
VERTICAL CURVE
P.V.I STA. 172+27.50
P.V.I ELEV. 28.00



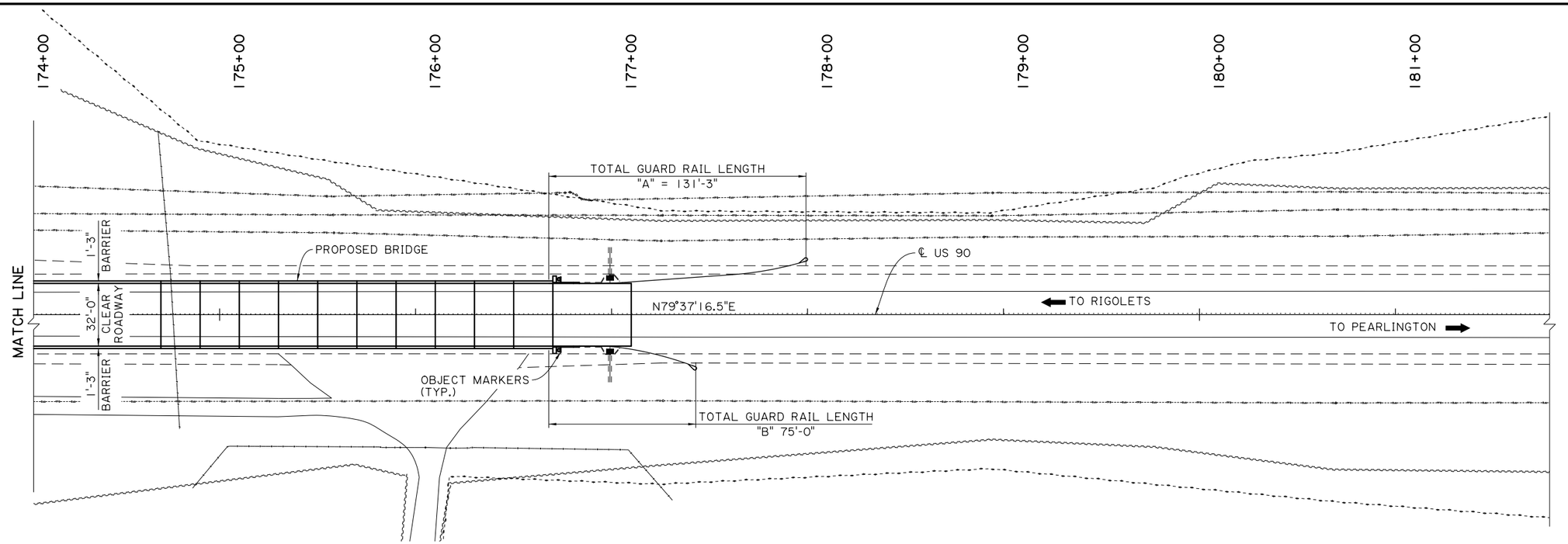
SHEET NUMBER	103
PARISH	ST. TAMMANY
CONTROL SECTION	006-07
STATE PROJECT	H.000284
DESIGN	A. MICHAEL
CHECK	
DETAIL	A. BURNOS
CHECK	
REVIEW	
SERIES #	2 OF 3

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

BRIDGE GENERAL PLAN
WEST PEARL RIVER BRIDGE
PEARL RIVER BRIDGES

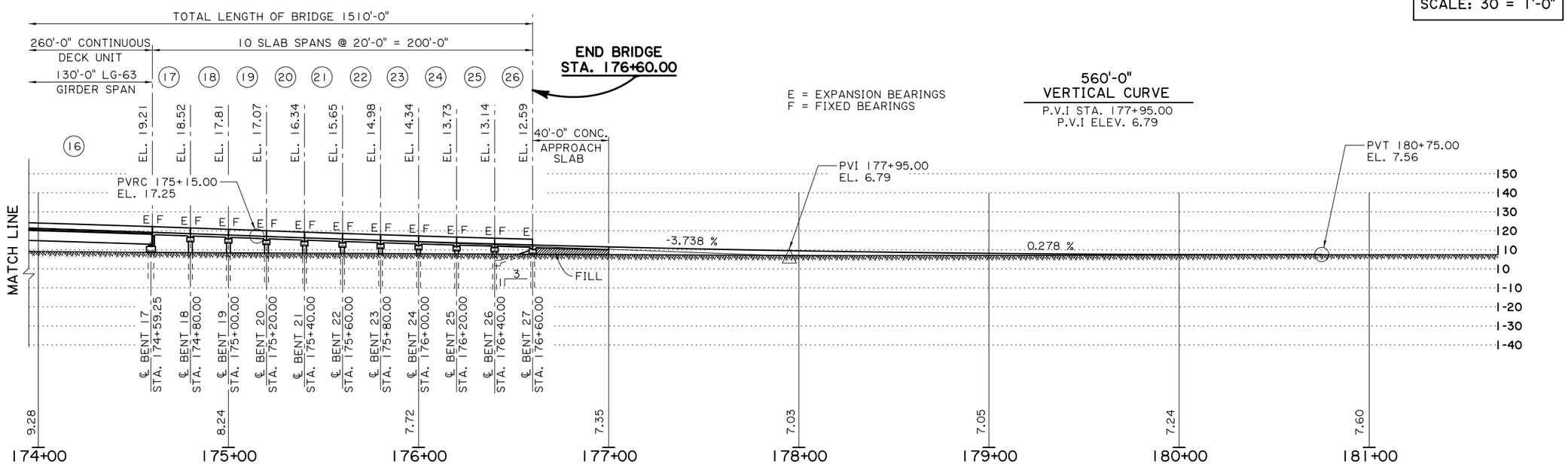
DOTD
LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT
BRIDGE AND STRUCTURAL DESIGN

60% Preliminary Plans
LADOTD_Corp\Headquarters\H.000100 thru H.000999\H.000284\Bridge-Facilities\Bridge-Structural\Plans\105 West Pearl River General Plan 11/3/2023 11:02 AM.dgn



GUARD RAIL DATA							
	a/b	X	Y	Z	704-11-00100	704-03-00100	704-08-00200
A	14:1	118.75	13.036	22.929	37'-6"	68'-9"	25'-0"
B	14:1	62.5	21.07	30.964	37'-6"	12'-6"	25'-0"

SCALE: 30 = 1'-0"



SHEET NUMBER 104

PARISH	CONTROL SECTION	STATE PROJECT
ST. TAMMANY	006-07	H.000284

DESIGN	CHECK	DETAIL	CHECK	REVIEW	SERIES
A. MICHAEL		A. BURNOS			3 OF 3

NO.	DATE	REVISION OR CHANGE ORDER DESCRIPTION	BY

STATE OF LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

BRIDGE GENERAL PLAN

WEST PEARL RIVER BRIDGE

PEARL RIVER BRIDGES

DOTD LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

BRIDGE AND STRUCTURAL DESIGN

Appendix C

Results

Appendix C-1

Alternative 4 AM Results

LADOTD 4 December 2025
JNM TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: H.000284
RUN: Fixed Span (20ft vertical cl) AM
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
Boat Launch - south (Cajun Encount)	3	1	54.0	55.3	71	1.3	10	----	55.3	0.0	5	-5.0
Boat Launch - south (Cajun Encount) (M)	4	1	52.0	52.8	71	0.8	10	----	52.8	0.0	5	-5.0
43629 Camp Rd	5	1	47.0	48.9	66	1.9	10	----	48.9	0.0	5	-5.0
43637 Camp Rd	6	1	44.0	46.7	66	2.7	10	----	46.7	0.0	5	-5.0
Boat Launch - north (Cajun Encoun)	7	1	55.0	56.1	71	1.1	10	----	56.1	0.0	5	-5.0
Cajun Encounters - patio	8	1	55.0	56.3	71	1.3	10	----	56.3	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	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

Appendix C-2

Alternative 4 PM Results

LADOTD 4 December 2025
JNM TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: H.000284
RUN: Fixed Span (20ft vertical cl) PM
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
Boat Launch - south (Cajun Encount)	3	1	54.0	55.3	71	1.3	10	----	55.3	0.0	5	-5.0
Boat Launch - south (Cajun Encount) (M)	4	1	52.0	52.7	71	0.7	10	----	52.7	0.0	5	-5.0
43629 Camp Rd	5	1	47.0	48.8	66	1.8	10	----	48.8	0.0	5	-5.0
43637 Camp Rd	6	1	44.0	46.7	66	2.7	10	----	46.7	0.0	5	-5.0
Boat Launch - north (Cajun Encoun)	7	1	55.0	56.1	71	1.1	10	----	56.1	0.0	5	-5.0
Cajun Encounters - patio	8	1	55.0	56.3	71	1.3	10	----	56.3	0.0	5	-5.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	6	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

Appendix C-3

Results Table

Receptor Number	Receiver name	Dwelling Units	NAC	Level	Existing	No Build		Alternative 1: Fixed Span Bridge (50ft		Alternative 2: Bascule Bridge		Alternative 3: Vertical Lift Bridge		Alternative 4: Fixed Span Bridge (20ft vertical clearence)		
						Sound Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing	Build Levels	Change from Existing	Change from Alt. 1
3	Boat Launch - south (Cajun Encount)	1	E	71	54	55	1	52	-2	55	1	56	2	55	1	3
4	Boat Launch - south (Cajun Encount) (M)	1	E	71	52	53	1	52	0	53	2	55	3	53	1	1
5	43629 Camp Rd	1	B	66	47	48	1	50	3	51	4	51	4	49	2	-1
6	43637 Camp Rd	1	B	66	44	45	1	47	3	48	3	48	3	47	3	0
7	Boat Launch - north (Cajun Encoun)	1	E	71	55	56	1	52	-3	54	-1	54	-1	56	1	4
8	Cajun Encounters - patio	1	E	71	55	56	1	52	-3	54	-1	54	-1	56	1	4
				Min	44	45	1	47	-3	48	-1	48	-1	47	1	-1
				Max	55	56	1	52	3	55	4	56	4	56	3	4