87-01

To: David Seyfarth
District 6 Special Projects Engineer
16-10

Popps Ferry Road, Riverview Drive to Pass Road, Biloxi, Harrison County, Mississippi

FINAL
ENVIRONMENTAL ASSESSMENT
For ALTERNATIVE "E"

Project No.: STPD-9376-00(004)/104384-811000

Submitted to
MDOT
FHWA

Pursuant to
42 U.S.C. 4332 (2) (c)
and 49 U.S.C. 303 (if applicable)

for the purpose of obtaining a Finding of No Significant Impact (FONSI)

by the

City of Biloxi
Brown and Mitchell, Inc.
Neel-Schaffer, Inc.
Pickering, Inc.

RECEIVED
AUG 19 2010
GULF COAST REGIONAL OFFICE
FHWA/FDOT

JUNE 2010

Melinda L. McGrath
Deputy Executive Director/
Chief Engineer

Brenda Znachko
Deputy Executive Director/
Administration

MDOT
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

Larry L. "Butch" Brown
Executive Director

Steven K. Edwards
Director
Office of Intermodal Planning

Willie Huff
Director
Office of Enforcement

P. O. Box 1850 / Jackson, Mississippi 39215-1850 / Telephone (601) 359-7001 / FAX (601) 359-7110 / GoMDOT.com

16499 Highway 49, Saucier, Mississippi 39574-9740

September 7, 2010

RECEIVED
SEP 0 8 2010
By

Honorable A.J. Holloway
Mayor, City of Biloxi
P.O. Box 429
Biloxi, MS 39533

RE: Finding of No Significant Impact (FONSI) Approval
Popp's Ferry Road and Bridge from Pass Road to Riverview Drive
STPD-9376-00(004)LPA/104384-811000

Dear Mayor Holloway,

Attached is the approved environmental document for the above referenced project for your records. Once you have published (one time) a legal notice indicating the approval action and the availability of the FONSI, you may proceed with the project.

Enclosed is an example of the legal notice as well as mailing list. Please provide a copy of the FONSI for the remaining attached contacts. Please note that the enclosed list is not a complete list but reflects the minimum requirements for FONSI distribution.

Should you need additional information, contact my office at 228-832-0682.

Sincerely,

David H. Seyfarth, PE, PS
Special Projects Engineer

cc: Project File 16-10 w/ attachments
Damon Torcelli
Jill High

Melinda L. McGrath
Deputy Executive Director/
Chief Engineer

Brenda Znachko
Deputy Executive Director/
Administration

MDOT
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

Larry L. "Butch" Brown
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Director
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Willie Huff
Director
Office of Enforcement

P. O. Box 1850 / Jackson, Mississippi 39215-1850 / Telephone (601) 359-7001 / FAX (601) 359-7110 / GoMDOT.com

Inter-Departmental Memorandum

Date: August 5, 2010

To: Mr. David Seyfarth
District 6 LPA Coordinator

From: Mrs. Kim Thurman KDT
Environmental Division Administrator

Subject: Popp's Ferry Road and Bridge from Pass Road to Riverview Drive
STPD-9376-00(004) / 104384-811000
Harrison County
Finding of No Significant Impact (FONSI) Approval

We are enclosing one copy of the Federal Highway Administration's (FHWA) Finding of No Significant Impact (FONSI) for the subject project. Once you have published (one time) a Legal Notice indicating the approval action and the availability of the FONSI, you may proceed with the project.

Enclosed is an example of a Legal Notice as well as a mailing list. Please provide a copy of the FONSI for the remaining attached contacts. Please note that the enclosed mailing list is not a complete list. It reflects only the minimum requirements for distribution of a FONSI.

If you have any questions or need further information, please contact Ms. Kim Thurman or Mr. Brad Johnson at telephone number (601) 359-7920.

KDT:DBJ:tbs

Attachment

cc: District 6 Engineer (with attachments)
Roadway Design Division (with attachments)
Construction Division (Attn: Leroy Crisco with attachments)
Right of Way (with attachments)
Bridge Division (with attachments)
Contract Administration (with attachments)
Statewide LPA Coordinator (with attachments)

LEGAL NOTICE FOR AVAILABILITY
PROJECT #: STDP-9736-00(004) – 104384/811000
Popp's Ferry Road and Bridge, Gulfport, Harrison County, Mississippi

A project to provide for improvements to Popp's Ferry Road and Bridge between Pass Road and Riverview Drive in Gulfport, MS, a distance of approximately 2.4-miles.

Harrison County, Mississippi

On July 30, 2010, after review of the Environmental Assessment on Project #: STDP-9736-00(004)–104384/811000 in Harrison County, Mississippi, the Federal Highway Administration issued a "Finding of No Significant Impact" (FONSI). The proposed project is for improvements to Popps Ferry Road and Bridge, between Pass Road and Riverview Drive, a distance of approximately 2.4 miles.

The FONSI is available for public inspection at the Mississippi Department of Transportation Administrative Office Building, Environmental/Location Division, 401 Northwest Street, Jackson, MS; Federal Highway Administration, 100 West Capitol Street, Suite 1062, Jackson, MS; Donal-Snyder Community Center, 2520 Pass Rd., Biloxi, MS; the Margaret Sherry Library, 2141 Popps Ferry Road, Biloxi, MS; Biloxi City Hall.

Prepared for the City of Biloxi
Kreg Overstreet, P.E., Project Manager
Brown and Mitchell, Inc., Biloxi, MS

9-3-2010
These will receive a copy of the FONSI Approval and Legal Notice as requested by Kim, to fulfill minimum requirements for distribution of a FONSI.

Mr. Anthony R. Lobred
MDOT Liaison
U.S. Army Corps of Engineers
Vicksburg District, Regulatory Branch
4155 Clay Street
Vicksburg, MS 31983

Ms. Sandie Kilpatrick
Fish and Wildlife Biologist
MDOT Liaison
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, MS 39213

Mr. Sam Polles
Mississippi Department of Wildlife Fisheries and Parks
1505 Eastover Drive
Jackson, MS 39211-6322

Mr. H.T. Holmes
Mississippi Department of Archives and History
200 North Street
Jackson, MS 39201

Ms. Trudy Fisher, Executive Director
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, MS 39204

FEDERAL HIGHWAY ADMINISTRATION

FINDING OF NO SIGNIFICANT IMPACT
FOR
Project STPD-9376-00(004) 104384
Popp's Ferry Road and Bridge, Gulfport, Harrison County, Mississippi

A project to provide for improvements to Popp's Ferry Road and Bridge between Pass Road and Riverview Drive in Gulfport, MS, a distance of approximately 2.4-miles.

The Federal Highway Administration has determined that this project's Proposed Action and selected Alternative "E", as described in the project's *Environmental Assessment*, will have no significant impact on the human or natural environment. *This Finding of No Significant Impact* is based on the attached *Environmental Assessment*, which has been independently evaluated by the Federal Highway Administration and determined to adequately and accurately discuss the needs, environmental issues, and impacts of the proposed project and mitigation measures. It provides sufficient evidence and analysis for determining that an Environmental Impact Statement is not required. The Federal Highway Administration takes full responsibility for the accuracy, scope, and content of the attached Environmental Assessment and its attachments.

July 30, 2010
Date

for Andrew H. Hughes, Division Administrator, FHWA

Environmental Assessment
Finding of No Significant Impact

for Alternative E

Proposed Improvements to Popp's Ferry Road
From Riverview Drive to Pass Road

Project No. STPD-9376-00(004)/104384-811000
Harrison County

Submitted to
US Department of Transportation
Federal Highway Administration

RECEIVED
AUG 19 2010
GULF COAST REGIONAL OFFICE
GULFPORT

Submitted by
Mississippi Department of Transportation

APPROVAL: July 30 '11
Date

for Andrew H. Hughes, P.E.
Division Administrator
Federal Highway Administration

MDOT Commitments to Environmental Excellence

Project No: STPD-9376-00(004)/104384-811000 **Highway:** Popps Ferry Road and Bridge **Revision Date:** 6-17-2010
Final Environmental Assessment **County:** Harrison **Total pages:** 5

***Value Engineering Study Recommended** ☐ Yes X No

Commitments/Requirements	Source of Commitment	Responsible Office	Place on Plans	Requires A Special Provision	Status of Commitment/Requirement
*REMOVAL OF OLD BRIDGE: After construction of 2 new lanes of bridge, the old one will be demolished and removed using an end-to-end and/or "top-down" strategy. USACE Contact: Tony Lobred, (601) 631-5470 MDMR Contact: Jan Boyd, (228) 297-5216 Kerwin Cuevas – Artificial Reef Program NMFS Contact: Mark Thompson 850-234-5061	USACE NOAA USFWS USEPA MDMR MDWFP MDEQ NMFS Final EA – pg. 74, 79	City of Biloxi MDOT FHWA MDMR MDEQ, MDOT Design and Construction Divisions	Yes	Yes	To be handled during Design & Construction
*4(f) PROPERTY: *de minimus* determination will be prepared during the EA phase. Secretary of State's concurrence letter is included in App. 10. Contractors will use Best Management Practices to avoid damaging impacts to the 4(f) property. BARGE USE: Construction equipment used at or beyond the shoreline will be contained on floating barges to avoid damage to existing shoreline, marsh, and marine habitat. Staging Areas and use of barges for construction activities shall be employed in a way that avoids impacts to submerged and emergent vegetation.	FHWA USACE NOAA MDMR USFWS Final EA – pg. 71, 87 App. 10	City of Biloxi MDOT FHWA – will prepare *De Minimus* statement	No	No	*De minimus* determination will be completed during Environmental Assessment phase. Activities related to construction will be handled during Design & Construction

*ESSENTIAL FISH HABITAT: Barges will be used as the construction platform for holding and transporting equipment to minimize disturbance and/or damage to the water column or water bottom. NMFS Contact: Mark Thompson 850-234-5061	NMFS Final EA pg. 85	City of Biloxi MDOT Roadway and Construction Divisions, Environmental, USFWS, NMF	yes	no	To be handled during Design & Construction
*CAUSEWAY PARK: Will remain open to the public during construction. No impediment or interference with any functions of the park will occur during construction.	Final EA pg. 78	City of Biloxi MDOT Design and Construction Divisions	Yes	No	During construction
The contractor must maintain Navigational Lights on the existing structures during all phases of the work. Any floating equipment that is used in conjunction with the work must be moved outside the navigational channel at night and lighted according to the Navigation Rules.	USCG	City of Biloxi MDOT FHWA	Yes	Yes	To be handled during Design & Construction
*CAUSEWAY HEIGHT: To avoid detrimental effects to marsh beds from shading, the causeway will be built at least 13 ft. above existing causeway height at lowest chord. Approach roadway will be inclining above existing grade to insure bridge abutment and first spans are above existing height and inclining to 13ft. above existing causeway height.	NMFS Final EA pg. 80 Fig. 4.1	City of Biloxi MDOT FHWA	yes	yes	To be handled during Design & Construction
*COAST GUARD COORDINATION: The contractor will coordinate with the United States Coast Guard (USCG) on the construction means & methods and obtain their approval. Construction means & methods should contain a description of the equipment that may occupy the waterway and an explanation of how the equipment may affect navigation as well as a detailed work schedule. USCG Contacts: David M. Frank (504) 671-2128 Phil Johnson (504) 671-2128	USCG Final EA pg. 74,79	City of Biloxi MDOT FHWA	Yes	Yes	To be handled during Design & Construction

*City of Biloxi will provide the USCG with a set of Construction Plans and Proposals prior to construction.	USCG	City of Biloxi MDOT FHWA	No	No	To be handled during Design & Construction
* THREATENED AND/OR ENDANGERED SPECIES: The contractor shall instruct all personnel associated with the project of the potential presence of threatened or endangered species and that there are civil and criminal penalties for harming, harassing or killing species protected under the Endangered Species Act.	NOAA USFWS NMFS MDWFP Final EA pg. 76-77	City of Biloxi MDOT FHWA	No	No	To be handled during Design & Construction
*THREATENED AND/OR ENDANGERED SPECIES: If any protected species (i.e., gulf sturgeon, sea turtles, manatees, etc.) are injured, killed, or found already dead, the contractor will notify NOAA and USFWS immediately. NMFS: Mark Thompson 850-234-5061 NOAA: (727) 824-5312 USFWS: (601) 965-4900	NOAA USFWS NMFS MDWFP Final EA pg. 76-77	City of Biloxi MDOT FHWA	no	no	To be handled during Design & Construction
*THREATENED AND/OR ENDANGERED SPECIES: will confer with agencies if habitat or species of concern are found. Construction will be planned to avoid seasonal occurrences of sensitive species.	Final EA pg. 76-77 Appendix 7, USFWS, MSNHP	City of Biloxi MDOT Roadway and Construction Divisions, Environmental, USFWS, MSNHP, NMFS	No	No	During construction
*Use of Best Management Practices as referenced in the Mississippi Standard Specifications for Road & Bridge Construction and the Mississippi DEQ Planning & Design Manual for the Control of Erosion, Sediment, and Stormwater will be employed	MDEQ USFWS USACE MDWFP Final EA pg. 67	City of Biloxi MDOT FHWA	No	No	To be handled during Design, Construction, & Maintenance
*STORMWATER: Design proper drainage during and post-construction for road and bridge	Final EA pg. 63, 71 Appendix 7 DEQ	City of Biloxi MDEQ, MDOT Design and Construction Divisions	Yes	No	During design phase

*WETLA[illegible]S and MARSH: Marsh habitats will be specifically protected from equipment, barges, etc., and contractors will be instructed to avoid any damage, intrusion, or disturbance of these areas. NMFS Contact: Mark Thompson 850-234-5061	Final EA pg. 80 Fig. 3.4	City of Biloxi MDOT Roadway and Construction Divisions, Environmental, USFWS, NMFS	yes	no	During Construction
*TRAFFIC: two lanes will remain open to provide a safe route during construction. Bridge will remain useable during construction.	Final EA pg. 68, 72-73	City of Biloxi MDOT Roadway Design and Construction Divisions, Third District	No	No	During design and construction phases
*AIR POLLUTION will be reduced by the use of properly maintained equipment and the use of tarps and covers on trucks transporting construction materials and waste products.	Final EA pg. 70	City of Biloxi MDEQ, MDOT Design and Construction Divisions	yes	no	During Construction
*SAFETY OF CHILDREN will include the use of fencing, barriers, warning signs, and limitations on access to certain areas. Access to the project areas would be restricted during construction.	Final EA pg. 77	City of Biloxi MDOT Roadway Design and Construction Divisions, Third District	yes	no	During Construction
*NOISE CONTROL will include limiting certain construction activities or equipment use during the evenings, weekends, or holidays; locating storage and staging areas away from noise-sensitive sites; and shielding stationary equipment.	Final EA pg. 69	City of Biloxi MDOT Roadway Design and Construction Divisions, Third District	yes	no	During design and construction phases
*Construction limits will be staked and enforced. Phased clearing and grubbing, silt screens, staked straw wattles, shell and gravel filters, and temporary sedimentation basins will be installed.	Final EA pg. 69	MDEQ City of Biloxi MDOT Roadway Design and Construction Divisions, Third District	yes	no	During design and construction phases
*COASTAL ZONE: Obtain MDMR permit for bridge improvements during Pre-construction phase per Jan Boyd. CZM contact: Willa Henrickson 228-374-5000	MDMR, USACE Final EA pg. 84	City of Biloxi MDOT Design and Construction Divisions, MDMR Coastal Zone Management Office	No	Yes	To be obtained during PreConstruction

*ARCHAEOLOGICAL SITES OR HAZARDOUS MATERIALS: Will stop construction and notify agency if an undocumented site is found, MDAH will be contacted immediately so they may offer comments under 36 CFR 800.13. An archaeologist will be scheduled by the contractor to monitor activities. The portion of the remaining midden beneath the Popps Ferry Bridge as well as the site 22Hr520/551 outside our study boundaries will be set aside as a no-work area during bridge construction. MDAH Contact: Jim Woodrick 601-576-6955	Final EA pg. 70 Appendix 7, 8	City of Biloxi MDOT Right-of-Way and Construction Divisions, MDEQ, MDAH	No	No	During construction
PROPERTY IMPACTS: Affected residents will be treated according to the Uniform Act of 1970.	Federal Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (Public Law 91-646). Final EA – Appendix 19 Conceptual Stage Relocation Plan	City of Biloxi MDOT Right-of-Way Division	No	No	Relocation Plan established during EA phase. During Right of Way acquisition phase

All practical and standard procedures and measures, including Best Management practices will be implemented to avoid or minimize impacts.

- These commitments should be carried throughout each phase of the project development including Design, Right of Way, Construction, and Maintenance.

*Value Engineering (VE) Studies are recommended for projects on the NHS System and/or an Intermodal Connector with estimated project costs approaching $25 Million

TABLE OF CONTENTS

Page

Chapter 1: PROJECT DESCRIPTION

1.1 Description of Proposed Action 1
1.2 Study Area Description 1
1.2.1 Location and Section Definitions 1
1.2.2 Topography 3
1.2.3 Land Use 3
1.3 Project Purpose and Need 6
1.3.1 History 7
1.3.2 Goals 8
1.3.3 Proposed Improvement Project Status 8
1.3.4 Transportation Demand and Recommendations 9
1.4 Safety 10
1.5 Roadway Deficiencies/Improvements 11

Chapter 2: ALTERNATIVES

2.1 Design Criteria 12
2.2 No Build Alternative 19
2.3 Build Alternatives 19

2.3.1 **Northern Section** 22
2.3.1.1 Alternative A – No Build 22
2.3.1.2 Alternative B – Northern Section
Symmetrical Widening 22
2.3.1.3 Alternative C – Northern Section
Hold West ROW, Widen East 23
2.3.1.4 Alternative D – Northern Section
Follow Center to Ashwood, transition to East 23
2.3.1.5 Alternative E – Northern Section (preferred)
Follow Center to Ashwood, transition East to Sabrina, transition to Center 24

2.3.2 **Causeway-Bridge Section** 25
2.3.2.1 Alternative A – No Build 25
2.3.2.2 Build Alternatives Discussion for Causeway-Bridge 25
2.3.2.3 Alternative B – Causeway-Bridge
4-Lane Center Alignment, 65-foot Drawbridge 26
2.3.2.4 Alternative C – Causeway-Bridge
4-Lane Highrise 27
2.3.2.5 Alternative D – Causeway-Bridge
Twin Bridges – 2-lanes each, merge into 1 bascule 28
2.3.2.6 Alternative E – Causeway-Bridge (preferred)
4-Lane Eastern Alignment, 65-foot Drawbridge 29

2.3.3 **Southern Section** 30
2.3.3.1 Alternative A – No Build 30
2.3.3.2 Alternative B – Southern Section
Symmetrical Widening 30
2.3.3.3 Alternative C – Southern Section
Hold West ROW, Widen East 31
2.3.3.4 Alternative D – Southern Section
Hold East ROW, Widen West 31
2.3.3.5 Alternative E – Southern Section (preferred)
Follow Center to Old Bay (Atkinson), transition West 32

TABLE OF CONTENTS

2.4 Alternatives Eliminated from Further Consideration 33
2.5 Traffic Analysis 34
2.6 Construction Costs 34

Chapter 3: AFFECTED ENVIRONMENT 36
3.1 Existing Study Area 36
3.2 Current Land Use 38
3.3 Social and Economic Characteristics 39
3.3.1 Demographics 39
3.3.1.1 Population 39
3.3.1.2 Age 41
3.3.1.3 Race 43
3.3.2 Economics 44
3.4 Cultural Features and Community Facilities 45
3.4.1 Church 45
3.4.2 Library 45
3.4.3 Emergency Medical Services 47
3.4.4 Parks and Recreation 47
3.5 Transportation and Utilities 47
3.5.1 Pedestrian and Bicycle Facilities 47
3.5.2 Utilities 47
3.6 Air Quality 48
3.7 Noise 48
3.8 Geologic Resources 49
3.8.1 Soils 49
3.9 Water Resources 50
3.9.1 Surface Water 50
3.9.2 Ground Water 52
3.10 Floodplains 52
3.11 Wild and Scenic Rivers 53
3.12 Coastal Zone and Coastal Barriers 53
3.13 Wetlands and Marsh 53
3.14 Vegetation and Wildlife 57
3.14.1 Vegetative Communities 57
3.14.2 Wildlife 59
3.14.3 Threatened and Endangered Species 60
3.14.4 Essential Fish Habitat 61
3.15 Cultural Resources 62
3.16 Hazardous Materials 63
3.16.1 Federal and State Regulatory Agency Review 63

Chapter 4: ENVIRONMENTAL CONSEQUENCES (No-Build and Build Alternatives)
4.1 Relocations 64
4.2 Visual Impacts 66
4.3 Water Quality 67
4.3.1 Stormwater 67
4.4 Construction Impacts 68
4.4.1 Northern and Southern Sections 68
4.4.2 Causeway/Bridge Sections 71
4.4.2.1 Avoidance and Minimization of Impacts 71
4.5 Noise Study 75
4.6 Social and Economic Impacts 75

TABLE OF CONTENTS

4.7 Protection of Children from Health and Safety Risks 76
4.8 Environmental Justice Issues 77
4.9 Considerations Relating to Pedestrians and Bicyclists 78
4.10 Permitting 79
4.11 Wetland Impacts 80
4.11.1 Shading Effect 80
4.12 Water Body Modification and Wetland Impacts 82
4.13 Floodplain Impacts 83
4.14 Coastal Zone 84
4.15 Threatened or Endangered Species 85
4.15.1 Essential Fish Habitat 85
4.16 Land Use 86
4.17 Historic and Archaeological Preservation/4(f) Lands 86
4.18 Hazardous Waste Sites 87
4.19 Energy Impacts 88
4.20 Secondary and Cumulative Impacts 89
4.21 Wild and Scenic Rivers 90
4.22 Air Quality 90
4.23 Farmland 90
4.24 Joint Development 90
4.25 Coastal Barriers 90

Chapter 5: LIST OF PREPARERS 91

Chapter 6: DISTRIBUTION 92

Chapter 7: AGENCY COORDINATION AND PUBLIC INVOLVEMENT
7.1 Agency Coordination 95
7.1.1 Kickoff Meeting and Scoping Meeting 95
7.1.2 Coordination with FHWA and MDOT 95
7.1.3 Solicitation of Views 95
7.2 Joint Application for Debris Removal and Dredging 95
7.3 Coordination with the City of Biloxi and Residents 96
7.3.1 Presentation to Biloxi City Council 96
7.4 Public Involvement 97
7.4.1 Public Meeting #1 97
7.4.1.1 Invitations 89
7.4.1.2 Brochure 98
7.4.1.3 Comment Card 98
7.4.1.4 Exhibits and Discussion 99
7.4.2 Anatole Bay Homeowners Association Meeting 99
7.4.3 Public Meeting #2 100
7.4.3.1 Summary of Public Hearing including Written and Verbal Comments 100
7.4.4 Coordination with American Indian Tribes 105

Chapter 8: REFERENCES 106

TABLE OF CONTENTS
LIST OF TABLES, FIGURES AND APPENDICES

Table:

1: Definitions of Sections within Study Area 3
2: Goals for the Proposed Improvement Project 8
3: Design Criteria for Roadway Improvements 13
4: Preliminary Cost Estimates 35
5: Population Data 40
6: Yearly Population Estimates for Harrison County 40
7: Census Tract Population and Density 41
8: Population by Age by Census Tract 41
9: Population by Age 42
10: Minority Population 43
11: Poverty Data 44
13: Noise Abatement Criteria 49
14: Soil Series found in Study Area 50
15: Representative Sample of Vegetation found in Study Area 58
16: Prevalent Plant Species found near or within Causeway-Bridge Section 58
17: Summary of Anticipated Relocations by Alternatives 65

Figure:

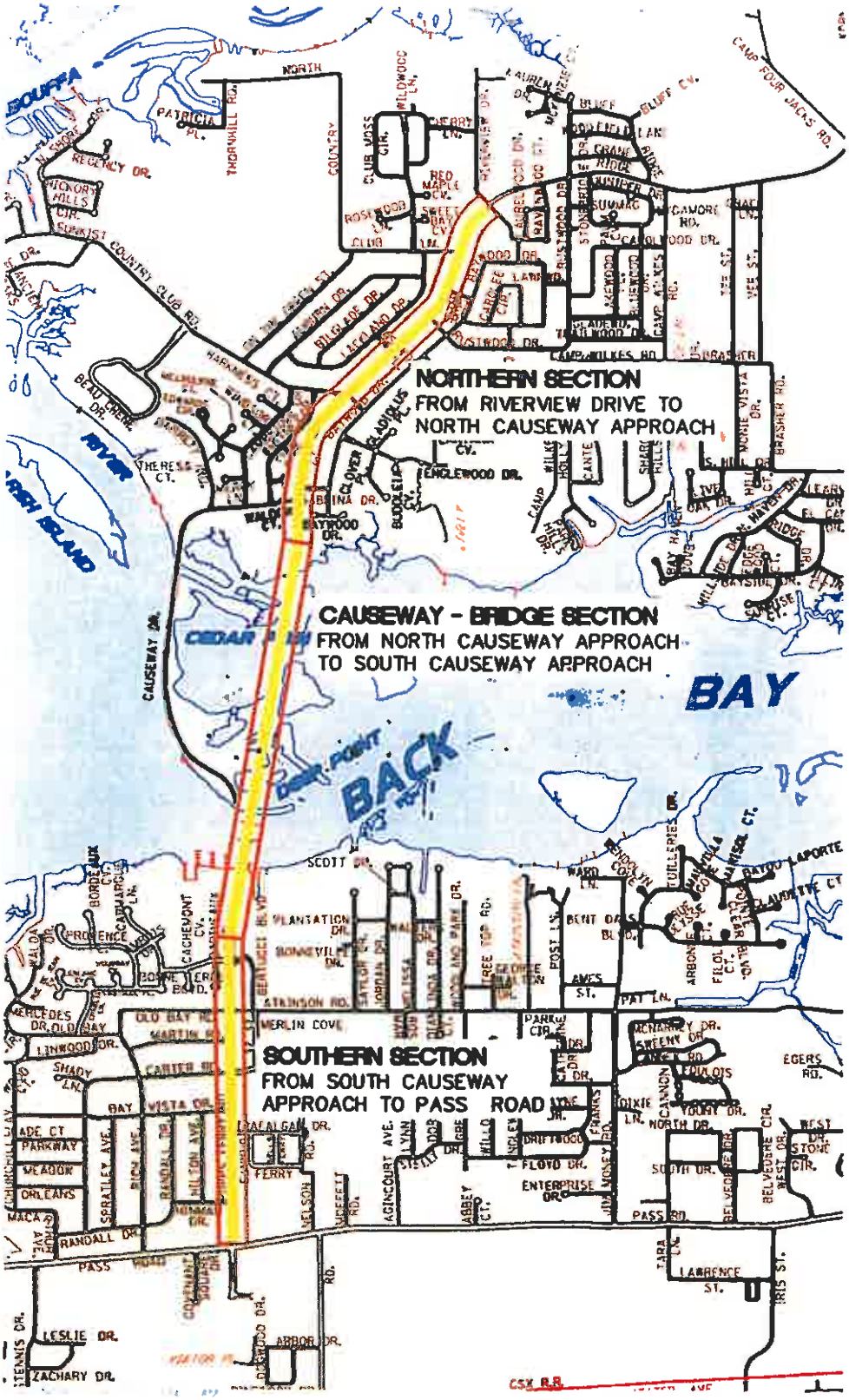
1.1 Study Area and Section Divisions 2
1.2 Topography Map of Study Area 4
2.1 Typical Sections for Road and Bridge, "Birds-Eye View" of Preferred Alt. 14-18
2.2 Anticipated Relocations for Preferred Alternative 20-21
3.1 Community Facilities Location Map 46
3.2 303d Streams Map 51
3.3 100-Year Floodplain Map 54
3.4 Marsh Areas and Dredge Plan 56
4.1 Conceptual Drawing Comparison between Old and New Bridge/Causeway Height 81

Appendix:

1: Alternatives Traffic Assessment
2: Traffic Noise Investigation
3: Soil Map and Descriptions
4: Wetland Delineation and Photos
5: DMR Rubble Acceptance Letter and Application and Notification for Bridge Construction
6: Threatened and Endangered Species List
7: Solicitation of Views Letter, Mailing List, Responses
8: Letter to American Indians and Cultural Resources Report
9: Hazardous Materials Summary Report
10: Statement of No-Impact from Secretary of State
11: Kickoff Meeting Agenda
12: Scoping Meeting Agenda and Meeting Notes
13: Information Packet presented to Mayor and Council
14: Exhibits Used in Public Involvement
15: Proof of Public Announcements for Public Hearing
16: Sign In Sheet for Public Hearing
17: Comment Cards Submitted at Public Hearing
18: Verbal Comments Transcribed by Court Reporter
19: Conceptual Stage Relocation Report
20: Mississippi Department of Environmental Quality BMP's for Water Quality

Figure 1.1

STUDY AREA and SECTION DIVISIONS



POPPS FERRY ROAD AND BRIDGE ENVIRONMENTAL ASSESSMENT
Study Area

BASE MAP CREATED
BY NEEL-SCHAFFER, INC.

BROWN & MITCHELL, INC.
Consulting Engineers
798 Vieux Marche, 2nd Floor Biloxi, MS 39530
Ph (228) 436-7612 Fax 436-7878 Web: brownandmitchell.com

OCTOBER 2008

Table 1: Definitions of Sections within Study Area

Northern Section	The segment of Popp's Ferry Road beginning at the north terminus of the project at the signalized intersection of Popp's Ferry Road/Riverview Drive, and ending at the north causeway abutment.
Causeway-Bridge Section	The mid-section of the study area, beginning at the north causeway abutment and ending at the south causeway abutment.
Southern Section	The segment of Popp's Ferry Road between the south causeway abutment and ending at the south terminus of the project at the Popp's Ferry/Pass Road intersection.

1.2.2 Topography

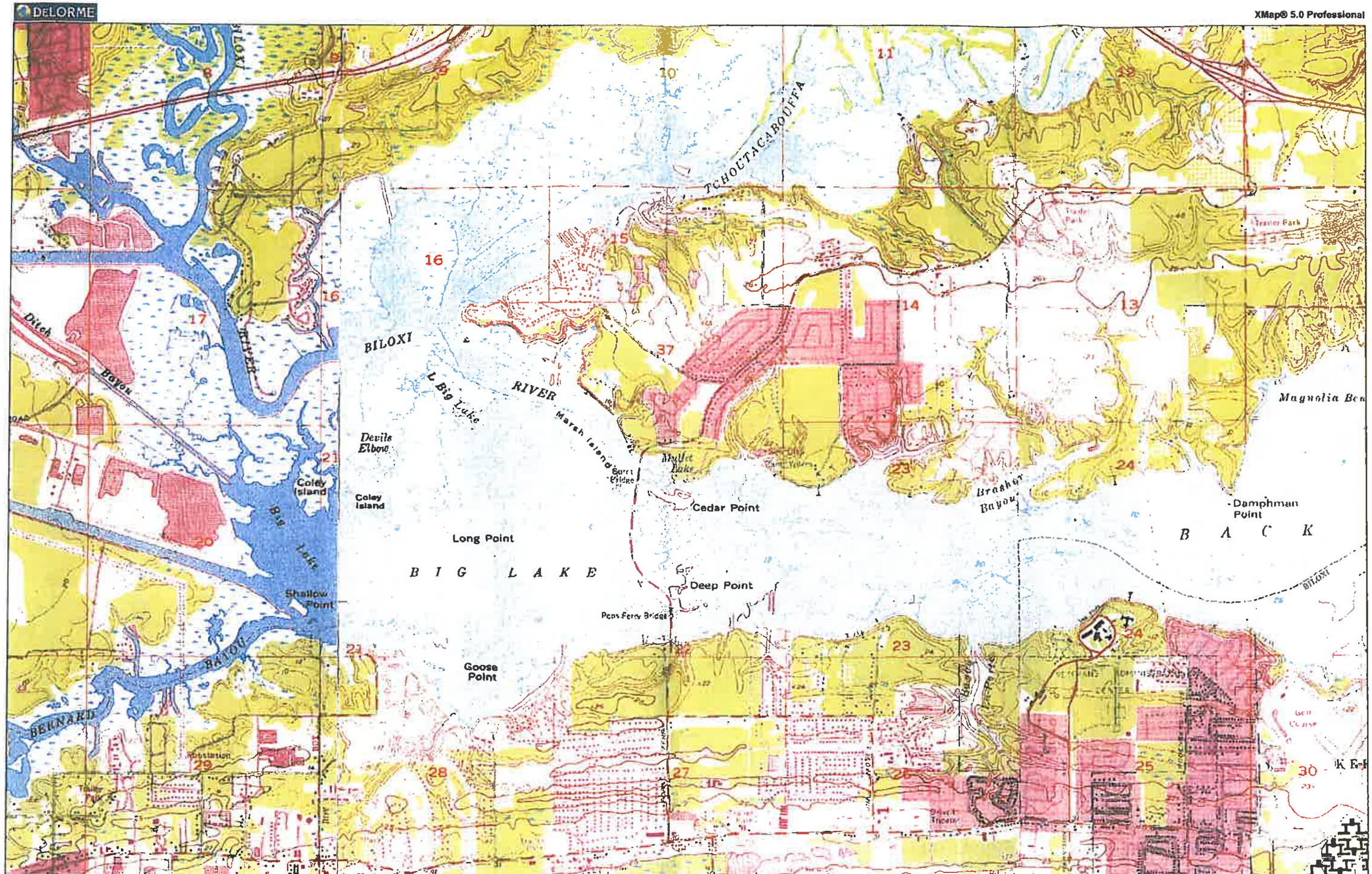
As defined by the Mississippi Department of Wildlife Fisheries and Parks (MDWFP) *Comprehensive Wildlife Conservation Strategies Plan*, the study area is located in the East Gulf Coastal Plain EcoRegion. (Mississippi Museum of Natural Science, 2005). Most of the City of Biloxi is situated on a peninsula surrounded by the Mississippi Sound to the south, Biloxi Bay to the east, and the Back Bay of Biloxi to the north. The project area extends approximately 1 mile north of the Back Bay of Biloxi. Some changes in topography are found in this area, which ranges from 5 to 25 feet above sea level (Figure 1.2).

1.2.3 Land Use

The **Northern Section** is an urbanized residential area. The Margaret Sherry Library and a Biloxi Fire Station are located in the study area at Riverview Drive.

Figure 1.1

STUDY AREA
AND
SECTION DIVISIONS



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www.delorme.com

The **Causeway-Bridge Section** spans marsh habitat which is commingled with tidal waters and a navigable waterway. A public park is located west of and beneath the causeway, and is generally used for sight-seeing from a boardwalk over the marsh beds. Within the recreational portion of the park, a two-lane road provides access to a two-ramp boat launch, and a small road-bridge is used for fishing. Directly under the Popp's Ferry drawbridge is a navigable waterway channel controlled by the U.S. Coast Guard, and used primarily by commercial barges and personal watercraft.

Popp's Ferry Road serves as the primary evacuation route for Biloxi residents west of Keesler Air Force Base during hurricane or other storm events. These conditions not only limit Popp's Ferry Road's effectiveness as an evacuation route, but also add to the congestion of other evacuation routes, particularly Interstate 110 and MS 605.

In addition, Biloxi's vibrant tourism industry brings tens of thousands of tourists to the City each year, as well as workers to support that industry. Popp's Ferry Bridge is a vital link for this trade. As Biloxi grows, more residents will live north of the Back Bay and commute to the City centers of tourism and other commercial activity.

Maritime traffic passing through the navigational channel at Popp's Ferry Bridge delivers items necessary to support many industries in the region, such as Mississippi Power, Northrup Grumman, and Trinity Yachts. These and others depend on barge deliveries as the primary carrier for their supplies.

The **Southern Section** is an urbanized residential community, including a sidewalk within the right-of-way. A church and an eye clinic are also located in the Southern Section. South of Hinman Drive, continuing to the terminus at Pass Road, commercial properties dominate.

1.3 Project Purpose and Need

Current traffic volumes along Popp's Ferry Road are near the upper limits of capacity of a two-lane roadway. Improving Popp's Ferry Road and bridge, thus creating a controlled access road, would increase daily efficiency and safety along this corridor, by eliminating the bottleneck which occurs during peak hours. Additionally, a new drawbridge will allow the majority of marine traffic to pass under the bridge without opening, providing efficient traffic flow. These improvements would also promote community cohesiveness and exercise by providing sidewalks and bike lanes.

Widening Popp's Ferry Road to a four-lane divided facility with an improved, higher bridge over the Back Bay is needed to accommodate future growth forecasted through Year 2030, decrease traffic delays due to bridge openings and improve evacuation efficiency. With the need for additional hurricane evacuation routes; reducing traffic congestion, both north and south of the Popp's Ferry Causeway; improving, upgrading, and enhancing traffic patterns and flow; and being sensitive to the needs and wishes of the immediate community, the City feels this project is of utmost importance. The end result would provide a more functional, safe, and aesthetically pleasing travel way for the City and its visitors.

1.3.1 History

Until the Popp's Ferry Causeway and Bridge was built in the early 1980's, access across the Back Bay of Biloxi was by ferry or barge. Construction of this bridge enhanced tourism, commercial business, and local and residential travel efficiency. The road, causeway, and bridge provided approximately 5 miles of north/south lanes, and a pedestrian path along the bridge. Traffic congestion has increased on the causeway as a result of the growth to the north and south sides of the Back Bay.

As a result, future economic growth within the City is largely dependant on the transportation facilities, and Popp's Ferry Road and bridge provides a vital link to the southwestern portions of Biloxi. Within the last 10 years, portions of Popp's Ferry Road, north of our study area, have been widened to five lanes to accommodate traffic volumes. However, our study area remains a two-lane section, meaning five lanes of traffic must merge into two lanes in order to cross the Back Bay of Biloxi via the Popp's Ferry causeway and bridge. Additionally, the drawbridge averages approximately 10 openings a day for marine traffic creating significant delays for travelers.

Popp's Ferry Road and Bridge is one of only 2 north/south corridors available for evacuation routes in Biloxi, MS.

Recognizing the need for a 5-6 lane roadway within the city boundaries, the City and MDOT have undertaken the task of investigating and proposing a project on the existing Popp's Ferry Road and bridge which strives to provide a dependable, safe, and efficient evacuation route and thoroughfare for the community. Popp's Ferry Road provides the most direct access from I-10 to the Mississippi Coast Coliseum, but is underutilized due

to its ability to convey traffic efficiently. This adds to congestion of local roads and U.S. Highway 90 during events held at the coliseum.

1.3.2 Goals

In the interest of the public, transportation, and safety, the ultimate goals of this improvement project are as follows:

Table 2: Goals for the Proposed Improvement Project

Goal 1	To provide a safe and effective evacuation route.
Goal 2	To allow 90% of the current and anticipated marine traffic to pass under the Popp's Ferry Bridge without opening the drawbridge.
Goal 3	To promote better traffic flow during peak hours.
Goal 4	To plan a roadway capable of accommodating future transportation systems connecting Interstate 10 and the Gulf Coast.
Goal 5	To improve the aesthetic quality and enjoyment of this area.

1.3.3 Proposed Improvement Project Status

Prior to any major construction project, an Environmental Assessment (EA) must be completed. The preparation of this EA was approved by the Biloxi City Council in October 2007 and the process began immediately. In late December 2007 a scoping meeting involving MDOT, FHWA, the City and the 3 partnering agencies met to discuss the schedule and strategy for the EA.

An informational public meeting was held in March 2008 to explain the EA process and possible impacts of improvements to stakeholders. Nearly 12,000 residents of 3 wards received invitations by mail. Of the approximately 200 people in attendance, the

response was positive, understanding that widening and improvement of this portion of Popp's Ferry Road and bridge is a must for the City.

Additionally, Anatole Bay Townhomes Homeowners Association requested a meeting with Brown and Mitchell, Inc. to discuss the roadway, causeway, and bridge alternatives and impacts. This meeting was also well received and residents seemed willing to cooperate with the City during this project. These meetings are discussed in more detail in Chapter 7.

1.3.4 Transportation Demand and Recommendations

This EA investigates the need for improvements to Popp's Ferry Road and bridge. The widening of Popp's Ferry Road to a four-lane divided roadway between Riverview Drive and Pass Road is needed to improve the existing roadway delays and capacity deficiencies. The interaction of the existing drawbridge with commuting traffic, emergency service response times, and hurricane evacuations is significantly degrading the operation of marine and automobile traffic. Current volumes are near the upper limits of capacity of a two-lane roadway. Widening Popp's Ferry Road to a four-lane divided facility with an elevated bridge over the Back Bay is desperately needed to accommodate future growth and evacuation routes. The limited alternative access routes to the Biloxi peninsula create excessive pressure on Popp's Ferry Road. Parallel corridors of Cowan-Lorraine Road (Hwy 605) and Interstate 110 are both 4-lane roadways with drawbridges that are operating near capacity.

Widening to four lanes will provide the capacity needed to accommodate the growth forecast through Year 2030. Alternatives B through E provides the necessary capacity, while Alternate A is the no-build condition. The elimination of driveways that directly access the roadway will significantly improve the traffic operations of the corridor by decreasing the number of conflict points. The elimination of private driveways in the northern corridor is recommended, as well as, removal of the residences that directly access this roadway. Widening Popp's Ferry Road will increase the travel speeds and move the roadway closer to these existing homes, increasing the potential for errant automobiles to strike the adjacent residences. Therefore, acquisition of the residences in the corridor north of the Back Bay is recommended.

An eastbound left turn lane and protected/permitted left turn phasing are recommended to be constructed on Sunkist Country Club Drive at Popp's Ferry Road to alleviate the delays anticipated for left turning traffic at this location (See Appendix 1 for Alternatives Traffic Assessment).

1.4 Safety

Along the 2.4 mile-long corridor of this project, the existing Popp's Ferry Road has virtually no access control except at four signalized intersections. Of the four signalized intersections, two are located within the project study area and the remaining two are at the project termini. Their specific locations are as follows:

- Riverview Road Intersection (northern terminus)
- Old Bay (a.k.a. Atkinson Road) Intersection
- Sunkist Country Club Boulevard Intersection
- Pass Road Intersection (southern terminus)

A total of 63 individual homes have driveways directly accessing this section of Popp's Ferry Road. Additionally, residents and visitors of the 60 townhomes at Anatole Bay Townhomes must access their property via *one* driveway at the south abutment of the Popp's Ferry causeway. An eye clinic, church, and school also access this section of Popp's Ferry Road via non-signalized intersections. Reports on traffic accidents can be found in the Traffic Study/Operational Deficiencies portion of this report.

Improvements, including additional lanes and shoulders, to this section of roadway will relieve the traffic congestion which develops during peak traffic occurrences, bridge openings, evacuations, and accidents. Controlling the access of the improved roadway will significantly reduce the number and danger of vehicles entering and exiting Popp's Ferry Road.

By replacing and improving the design standards of the causeway and bridge sections, the potential for vehicle conflicts and crashes will diminish. The pedestrian walkway on the bridge will be designed with safe and aesthetically pleasing guardrails and barriers to promote usage and safety for the public.

1.5 Roadway Deficiencies/ Improvements

The total design of this portion of Popp's Ferry Road and bridge will change with these improvements. Where local roads access or cross Popp's Ferry Road, the intersections will be upgraded to the standards for the projected traffic and vehicle turning capacity. The addition of medians will provide green space as well as visual impact. Pedestrian sidewalks will also be added along the corridor.

Chapter 2

ALTERNATIVES

This study evaluated both No Build and Build Alternatives. The No Build would retain the existing roadway and bridge network. The four Build Alternatives considered for the Northern and Southern Sections as well as the three Build Alternatives considered for the Causeway-Bridge Section include varied levels of construction. The Build Alternatives have been developed with considerable input from citizens and local officials. Care was also taken to develop Build Alternatives which minimize impacts on the human and natural environments while considering the safety and efficiency for travelers.

2.1 Design Criteria

A Policy on Geometric Design of Highways and Streets 2004, Fifth Edition (Green Book) was used to develop the design criteria and geometric standards for the Build Alternatives. The Green Book is published by the American Association of State Highway and Transportation Officials (AASHTO), which is the voice of transportation, speaking on behalf of the highway and transportation departments in the 50 states, the District of Columbia, and Puerto Rico. In addition, the Build Alternatives satisfy the MDOT criteria contained in Table 14-2G Geometric Design Criteria for Urban Arterials (New Construction/Reconstruction) of the 2001 MDOT Roadway Design Manual.

Table 3 depicts the design criteria used for the roadway alternatives. Popp's Ferry Road is classified by MDOT as an "other principal arterial." These criteria will be considered

during reconstruction of the existing arterial to a multi-lane facility with curb and gutter and a closed drainage system as well as for the Causeway-Bridge Section (Figure 2.1)

Table 3: Design Criteria for Roadway Improvements

DESIGN CRITERIA ITEM	AASHTO/MDOT DESIGN VALUE
Design Speed	45 mph
Lane Width	12 feet
Outside Shoulder Width, Usable	6 feet min.
Travel Lane Cross Slope	2 %
Shoulder Cross Slope	2 %
Roadside Clear Zone (Obstruction)	1.5 feet
Stopping Sight Distance	325 feet
Maximum Horizontal Curve	9.50 Degrees
Superelevation Rate	6 % max.
Maximum Grade (Level Terrain)	6.5 %
Vertical Curve K Factor (Crest)	80
Vertical Curve K Factor (Sag)	69
Center Two-Way Left Turn Lane Width	12 feet
Auxiliary Lane Width	12 feet
Auxiliary Lane Shoulder Width	2 feet
New and Reconstructed Bridges - Structural Capacity	HL-93
New and Reconstructed Bridges - Minimum Width	Based on Study

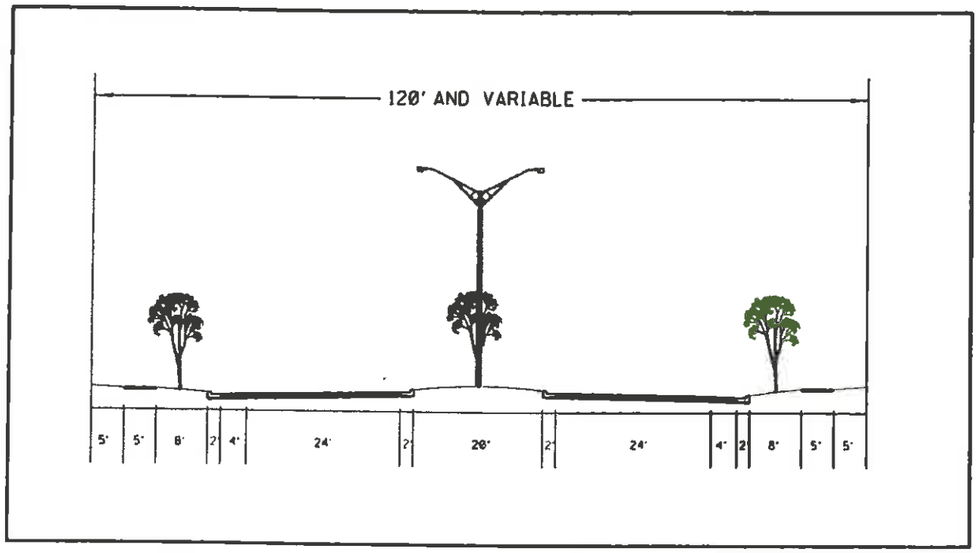
Source: MDOT Roadway Design Manual, 2001
AASHTO Policy on Geometric Design of Highway and Street, 2004 Edition
AASHTO-LRFD Bridge Design Specifications, 4th edition, 2007

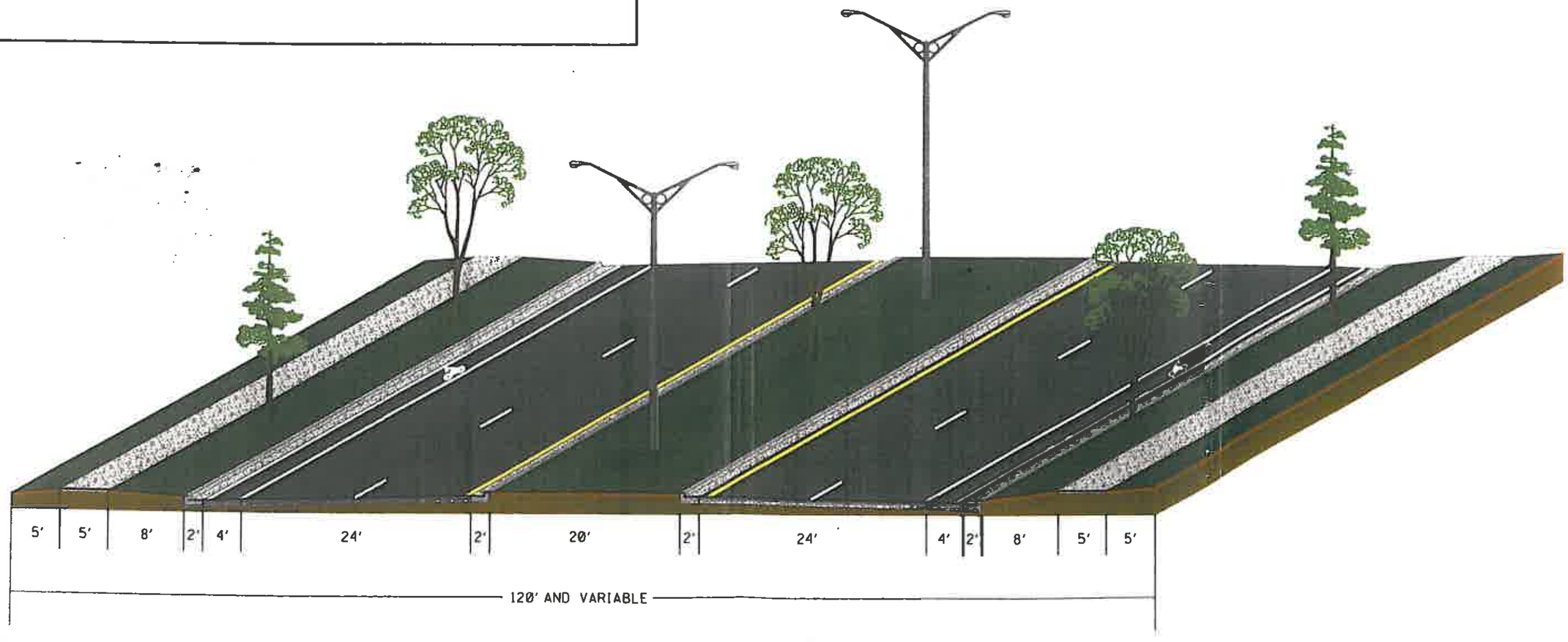
As of October 1, 2007, MDOT requires that bridge designs must follow specifications set forth in the AASHTO-LRFD Bridge Design Specifications, 4th edition, 2007. The Popp's Ferry Road and Bridge EA contract was executed on October 7, 2007; therefore, the bridge design will follow the October 2007 specifications.

Figure 2.1

TYPICAL SECTIONS
FOR ROAD AND BRIDGE

"BIRDS-EYE-VIEW" OF PREFERRED ALTERNATIVE





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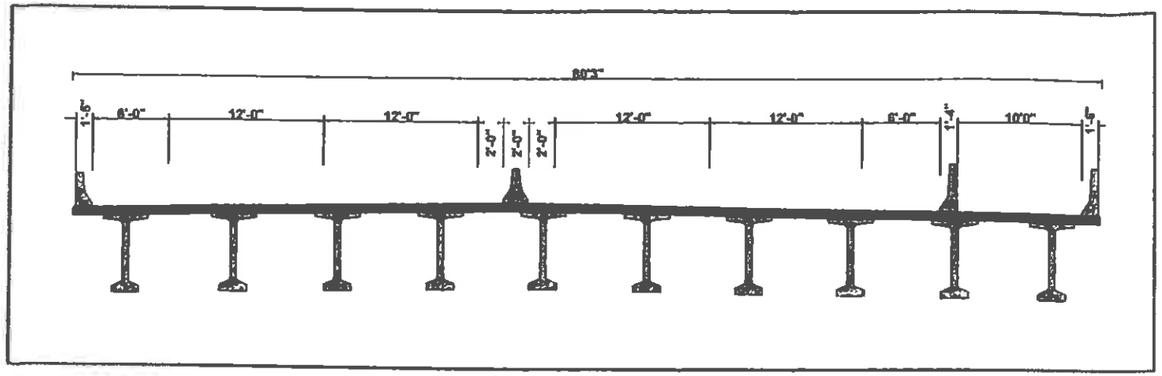
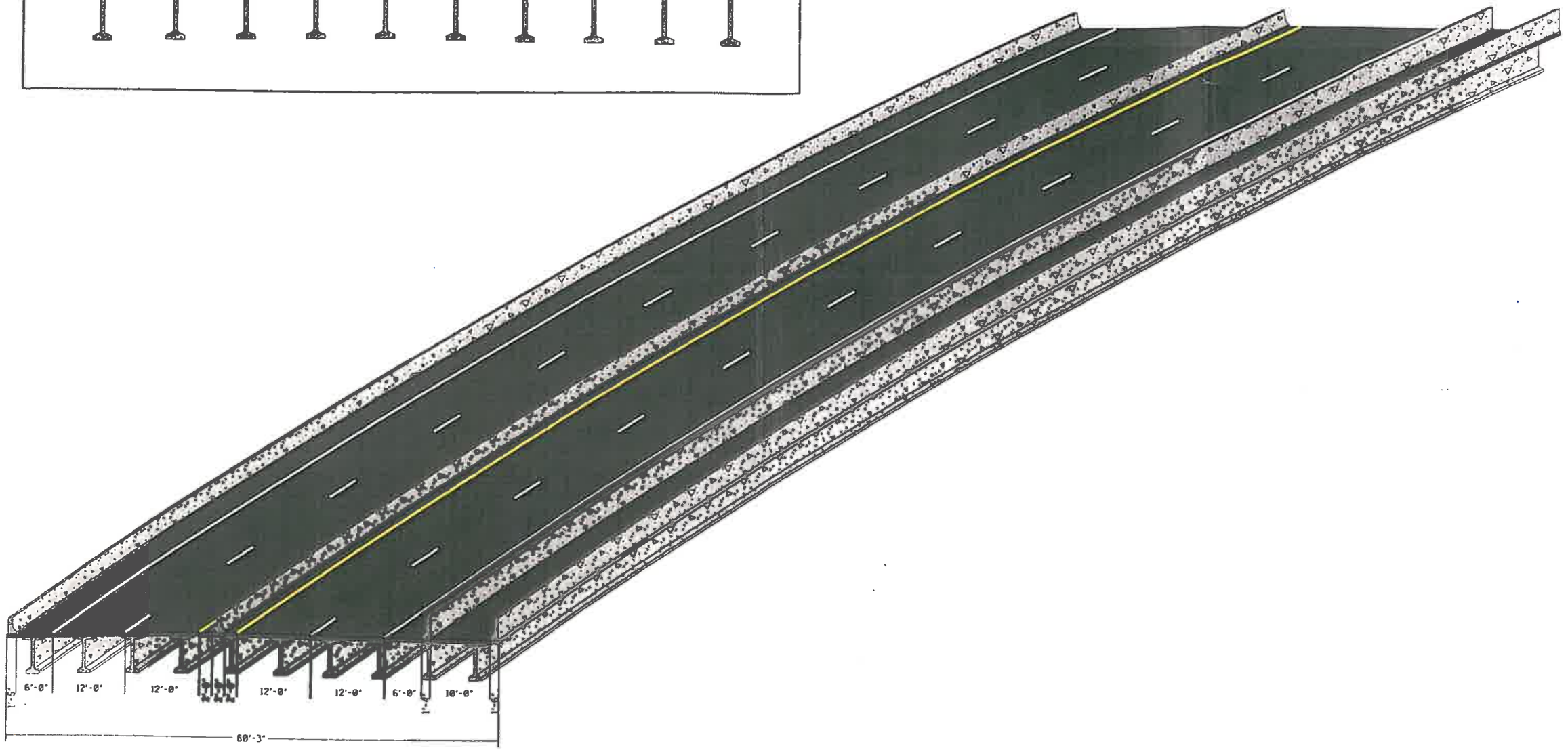
POPPS FERRY ROAD
ENVIRONMENTAL ASSESSMENT

TYPICAL ROAD SECTION

FIGURE
2.1





PICKERING, INC. NEEL-SCHAFFER Solutions you can build upon	POPPS FERRY ROAD ENVIRONMENTAL ASSESSMENT	TYPICAL CAUSEWAY-BRIDGE SECTION (ALT. E PREFERRED)	FIGURE 2.1

NOTICE TO DRAWING HOLDER

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REVISIONS			
NO.	DATE	BY	DESCRIPTION

DRAWING INFORMATION	
N-S PROJECT NO.: 02-6825-01	
FILENAME: 6825_R006.dgn	
SCALE: N.T.S.	
SURVEYED BY:	
DSGN:	DATE:
DRWN: D.S	DATE: 08/2008
CHKD:	DATE:
QA/QC:	DATE:

Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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ALTERNATE E (PREFERRED)
NORTHERN SECTION

Figure 2.1

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REVISIONS			
NO.	DATE	BY	DESCRIPTION

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SURVEYED BY:	
DSGN:	DATE:
DRWN: DLS	DATE: 08/2008
CHKD:	DATE:
QA/QC:	DATE:

Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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ALTERNATE E (PREFERRED) BRIDGE-CAUSEWAY SECTION

Figure 2.1

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REVISIONS				DRAWING INFORMATION	
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				SURVEYED BY:	
				DSGN:	DATE:
				DRWN: DLS	DATE: 08/2008
				CHKD:	DATE:
				QA/QC:	DATE:

Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

NEEL-SCHAFFER
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ALTERNATE E (PREFERRED)
SOUTHERN SECTION

Figure 2.1

2.2 No Build Alternative

Alternative A, the No Build Alternative, leaves the roadway and bridge in its existing condition. The existing lane and bridge configuration would be maintained; therefore, no increase in traffic capacity would be realized. Although it is necessary to include this alternative for consideration, it does not address the need to add lanes for increased traffic volume, or the need to improve access control at intersecting streets and driveways. The No Build Alternative would not satisfy the purpose and need of the proposed project.

2.3 Build Alternatives

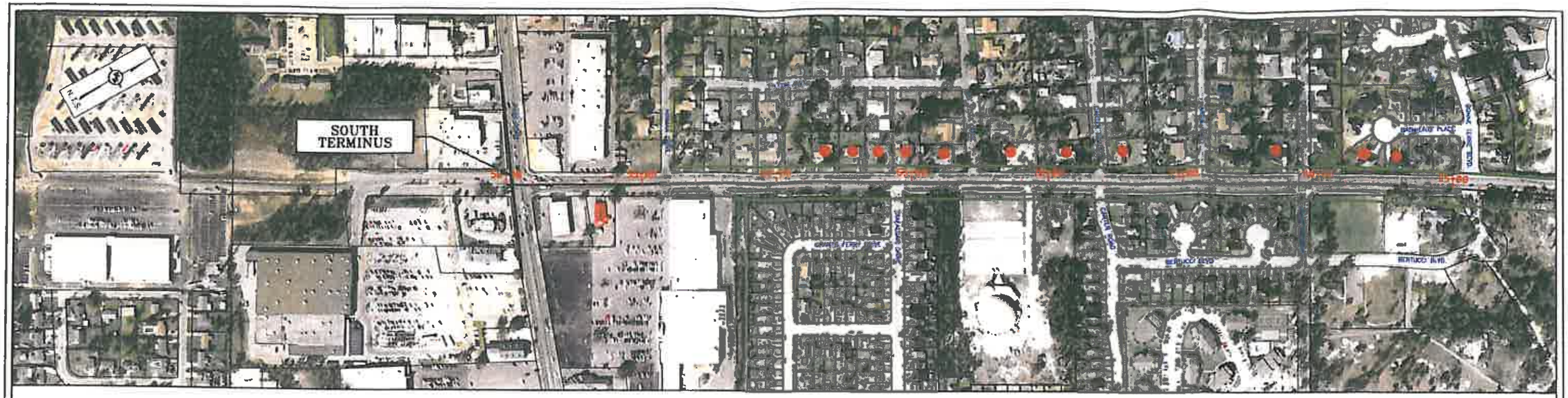
The proposed study area is comprised of three sections for ease of discussion and evaluation: Northern, Causeway-Bridge, and Southern Sections (described in Chapter 1.2.1 and Figure 1.1).

The Build Alternatives all share the same existing right-of-way (ROW) corridor, but they differ in the amount of area that will be required to the east and west of Popp's Ferry Road. The variation in area required by each alternative is a result of the alternative's variation in its widened and reconstructed sections.

Each Build Alternative is independent of one another; therefore, providing multiple alternatives for the study corridor. However, the Preferred Alternative (named Alternative E throughout the corridor) is the suggested combination of alternatives with all aspects considered (Figures 2.1 and 2.2).

Figure 2.2

ANTICIPATED RELOCATIONS
FOR PREFERRED ALTERNATIVE



ALTERNAT E (PREFERRED) SOUTHERN SECTION

WEST 11
EAST 0

POPPS FERRY ROAD AND BRIDGE ENVIRONMENTAL ASSESSMENT		ALTERNATE E (PREFERRED)	FIGURE 2-2

ALTERNATE E (PREFERRED) NORTHERN SECTION WEST 22 EAST 36

ALTERNATE E (PREFERRED) -- 65' DRAWBRIDGE

POPPS FERRY ROAD AND BRIDGE ENVIRONMENTAL ASSESSMENT	ALTERNATE E (PREFERRED)	ALTERNATE E (PREFERRED)	FIGURE 2-2

Each Build Alternative discussed below incorporates a 120-foot wide ROW (unless noted otherwise) to construct a 4-lane divided boulevard section. The improvements will improve safety and increase traffic capacity, as well as, provide aesthetic appeal throughout the corridor.

Relocation of residences is unavoidable with each of the Build Alternatives. The Relocation Report (Appendix 19) details the comparable housing for the number of relocations we have estimated. During the design/pre-construction phase, surveys will determine the exact placement of the ROW for individual properties and it is possible that some of the homes slated for relocation in this document *may not* need to be relocated. The maps in this document contain approximately 2-5 feet of error for line placement.

2.3.1 Northern Section

2.3.1.1 Alternative A – No Build

Existing alignment and configuration would be maintained, and no increase in traffic capacity would occur.

2.3.1.2 Alternative B – Northern Section

Symmetrical Widening: Alternative B – Northern Section includes a 120-foot wide ROW evenly distributed east and west of the current centerline of Popp's Ferry Road.

Notable Impacts: Alternative B – Northern Section will require relocations on both the east and west sides of Popp's Ferry Road. Relocations are estimated at 36 on the east and

28 on the west. This alternative would result in the elimination of all residential driveways entering directly onto Popp's Ferry Road along the Northern Section.

This alternative is not preferred due to 6 relocations south of Sunkist Country Club Road and west of Popp's Ferry Road. The preferred alternative would minimize the number of relocations.

2.3.1.3 Alternative C – Northern Section

Hold West ROW, widen to East: Alternative C – Northern Section would use the existing Popp's Ferry Road west ROW boundary and a 120-foot wide ROW resulting in an alignment located east of the current centerline of Popp's Ferry Road.

Notable Impacts: All relocations will be on the east side. Relocations are estimated at 38 on the east and 0 on the west. This alternative would result in the maintenance of all residential driveways on the west side along the Northern Section entering directly onto Popp's Ferry Road.

This alternative is not preferred due to the maintenance of all residential driveways on the west side of Popp's Ferry Road. It would not provide a controlled access corridor.

2.3.1.4 Alternative D – Northern Section

Follow Center to Ashwood, transition to East: Alternative D – Northern Section would include a 120-foot wide ROW along the centerline beginning at Riverview Drive and

extending south to approximately Popp's Ferry Road/Ashwood Place intersection. The 120-foot ROW then transitions to the east until its west ROW aligns with the existing west ROW boundary south of Sunkist Country Club Road and continuing to the causeway-bridge abutment, which is the southern terminus of the Northern Section.

Notable Impacts: Alternative D – Northern Section requires relocations on the east and west sides of Popp's Ferry Road. Relocations are estimated at 38 on the east and 22 on the west. This alternative will eliminate all residential driveways along the Northern Section entering directly onto Popp's Ferry Road thus providing a controlled access roadway. A minimum 20-foot wide buffer would exist between the remaining homes and Popp's Ferry Road south of Sunkist Country Club Road.

This alternative is <u>not</u> preferred due to the relocations south of Sabrina Drive near the bridge abutment. These relocations are avoided with the preferred alternative.

2.3.1.5 Alternative E - Northern Section (preferred)

Follow Center to Ashwood, transition East to Sabrina, transition to Center: Alternative E – Northern Section would include a 120-foot wide ROW evenly distributed east and west of the current centerline of Popp's Ferry Road until approximately Ashwood Place/Popp's Ferry Road intersection. The ROW would shift to the east until its west ROW matches the existing west ROW boundary. At approximately Sabrina Drive, the ROW would then transition back to being evenly distributed approaching the north causeway abutment (Figure 2.2).

Notable Impacts: Relocations are estimated at 36 on the east and 22 on the west. This alternative will eliminate all residential driveways along the Northern Section entering directly onto Popp's Ferry Road thus creating a controlled access roadway. This alternative would minimize impacts to residences not directly accessing Popp's Ferry Road.

This is the preferred alternative due to the creation of controlled access, preservation of two homes south of Sabrina Drive, and the avoidance of the homes west of Popp's Ferry Road south of Sunkist Country Club Road.

2.3.2 Causeway-Bridge Section

2.3.2.1 Alternative A – No Build

Alignment and configuration of the existing causeway and bridge would not be changed. Traffic capacity would not change, nor would the number drawbridge openings.

2.3.2.2 Build Alternatives Discussion for Causeway-Bridge

For each of the Build Alternatives in the Causeway-Bridge Section, a commercial property, Popp's Ferry Fish Camp will be acquired. This property is located to the south and east of the existing Popp's Ferry Bridge and includes an abandoned business and parcel with an existing building and driveway. This will be considered a "property acquisition" and not "relocation" due to it being abandoned and in disrepair.

A pedestrian and bike path is being proposed for the eastern side of the bridge. Pedestrians and bikers on the western side of Popp's Ferry Road will cross to the east side at the

Causeway Park Drive/Popp's Ferry Road and at the Bonne Terre/Popp's Ferry Road intersections for access to the bridge.

2.3.2.3 Alternative B – Causeway-Bridge

4-Lane Center Alignment, maximum 65-foot Drawbridge: Alternative B – Causeway-Bridge would include construction of a new structure that symmetrically widens the existing Popp's Ferry Bridge, accommodating 4 lanes of traffic with shoulders including a pedestrian/bike path on the west side. The causeway portion would be constructed 13 feet higher than the existing causeway height and would tie in with the Northern Section at approximately the same location where the existing tie-in occurs. The tie-in and bridge centerline would remain the same as the existing centerline. The required horizontal and vertical navigational clearances (maximum 65 ft height) would be obtained by using a bascule (drawbridge) span for the existing navigational channel, and would tie in with the Southern Section at grade at approximately the Anatole Bay Townhomes driveway, which would be rerouted.

Notable Impacts: This alternative would eliminate any potential impacts to the residential areas north and south of the bridge, but would impede vehicle traffic flow when the drawbridge is raised for ship channel navigation. Access to Anatole Bay Townhomes would be reconfigured.

This alternative is <u>not</u> preferred due to the limitations of construction. This alternative for the Popp's Ferry Causeway-Bridge would not provide any open lanes for traffic during

construction due to its central placement. Additionally, the demolition and removal of the existing structure would need to be completed prior to any new construction, thereby increasing the non-operational timeframe. Also, a "centered" bridge would impact more of the recreational area at Causeway Park.

2.3.2.4 Alternative C – Causeway-Bridge

4-Lane Highrise: Alternative C – Causeway-Bridge would include the construction of a new structure east of and parallel to the existing Popp's Ferry Causeway-Bridge and accommodating four lanes of traffic with shoulders including a pedestrian and bike path on the east side. The causeway portion would be constructed at 13 feet above existing causeway height, and would tie in with the Northern Section at approximately the same location where the existing tie-in occurs. The required horizontal and vertical navigational clearances (maximum 90 ft height) would be obtained by using a highrise fixed span for the existing navigational channel, tying in with the Southern Section between the abandoned commercial property (Popp's Ferry Fish Camp) and Bertucci Boulevard.

Notable Impacts: In order to tie the proposed structure to the Southern Section, the current driveway access for Anatole Bay Townhomes would be eliminated. Access for the townhomes would be reconfigured in the following way: Exiting Anatole Bay, a new local road would pass under the slope of the new bridge abutment, crossing to the east side of Popp's Ferry Road. Once on the east side, the road would curve to the south and connect with Bertucci Boulevard where access will be at the Old Bay (Atkinson

Road)/Popp's Ferry Road signalized intersection. Additionally, all residents north and west of this intersection would access Popp's Ferry Road at this intersection, and this would require rerouting several neighborhood roads to avoid congestion.

This alternative is not preferred due to the impact to Anatole Bay homeowners and the cost of the reconfiguration of their access driveway, as well as the impact on traffic flow within neighborhoods and access onto Popp's Ferry Road. The preferred alternative would not affect the location of the Anatole Bay access driveway or require roadway access reconfiguration.

2.3.2.5 Alternative D – Causeway-Bridge

Twin Bridges – 2 lanes each, merge into 1 bascule: Alternative D – Causeway-Bridge would include the construction of a new two-lane causeway structure parallel to and east of the existing structure including a pedestrian/bike path on the west side. The causeway height would not change. Portions of the existing causeway would remain in place, particularly north of the proposed bascule bridge. The two existing lanes would then be merged together and adjoin with the proposed bascule. The required horizontal and vertical navigational clearances (maximum 65 ft height) will be obtained by using one bascule (drawbridge) span for the existing navigational channel. The bridge would include 4 lanes of traffic with shoulders including a pedestrian/bike path on the west side. The remainder of the bridge would remain one fixed, contiguous span south of the drawbridge, tying in at or before Anatole Bay.

Notable Impacts: This alternative would eliminate any potential impacts to the residential areas north and south of the bridge, but would impede vehicle traffic flow when the drawbridge is raised for ship channel navigation. Access to Anatole Bay Townhomes would be reconfigured.

This alternative is not preferred due to the additional 4-foot ROW width required, the limitations of construction, and the long-term maintenance costs for twin bridges.

2.3.2.6 Alternative E – Causeway-Bridge (preferred)

4-Lane Eastern Alignment, 65 foot Drawbridge: Alternative E – Causeway-Bridge would include the construction of a new structure within the existing footprint and extending east of the existing Popp's Ferry Causeway-Bridge, accommodating four lanes of traffic with shoulders including a pedestrian/bike path on the east side. The causeway portion would be constructed 13 feet higher than the existing causeway height, and would tie in with the Northern Section at approximately the same location where the existing tie-in occurs. The tie-in and bridge centerline would be shifted slightly east of the existing centerline. The required horizontal and vertical navigational clearances (maximum 65 ft height) will be obtained by using a bascule (drawbridge) span for the existing navigational channel and will tie in at grade at approximately the Anatole Bay Townhomes driveway (Figure 2.2).

Notable Impacts: This alternative would minimize potential impacts to the residential areas north and south of the bridge, but would impede vehicle traffic flow when the drawbridge is raised for ship channel navigation.

This is the preferred alternative due to the slight shift of the centerline to the east, minimizing impacts to Causeway Park. Additionally, traffic flow would be maintained during construction, and the causeway would be raised for protection from errant vessels and storm surge during hurricanes. The proposed maximum 65-foot height would reduce bridge openings to approximately 2 openings per week. The tie-in occurring at Anatole Bay Townhomes would require minimal reconfiguration of their current access driveway.

2.3.3 Southern Section

2.3.3.1 Alternative A – No Build

Existing alignment and configuration would be maintained, and no increase in traffic capacity would occur.

2.3.3.2 Alternative B – Southern Section

Symmetrical Widening: Alternative B – Southern Section provides 120-foot wide ROW and alignment that is consistent with the existing centerline; therefore, widening will occur on both the east and west sides of Popp's Ferry Road.

Notable Impacts: Alternative B – Southern Section would require relocations on the west side of Popp's Ferry Road. Relocations are estimated at 0 on the east, and 16 on the west. This alternative would result in the elimination of all but 4 (southernmost) residential driveways along the Southern Section entering directly onto Popp's Ferry Road.

This alternative is not preferred due to three relocations closest to the bridge abutment and two relocations at the Martin Road/Popp's Ferry Road intersection. These homes can be avoided with the slight change in the preferred alternative ROW placement.

2.3.3.3 Alternative C – Southern Section

Hold West ROW, widen to East: Alternative C – Southern Section would use the existing Popp's Ferry Road west ROW boundary, widening eastward to a 120-foot wide ROW resulting in an alignment located east of the current centerline.

Notable Impacts: Alternative C – Southern Section would require relocations on the east side of Popp's Ferry Road. Relocations are estimated at 8 on the east and 0 on the west. This alternative would result in the maintenance of all residential driveways along the Southern Section entering directly onto Popp's Ferry Road.

This alternative is not preferred due to the maintenance of all residential driveways which would not allow for a controlled access roadway.

2.3.3.4 Alternative D – Southern Section

Hold East ROW, widen West: Alternative D – Southern Section would use the existing Popp's Ferry Road east ROW boundary, widening westward to a 120-foot ROW resulting in an alignment located west of the current centerline.

Notable Impacts: Alternative D – Southern Section would require relocation impacts on the west side of Popp's Ferry Road. Relocations are estimated at 0 on the east and 21 on the west. This alternative would result in the elimination of all residential driveways along the Southern Section entering directly onto Popp's Ferry Road thus providing for a controlled access roadway.

This is not preferred due to 10 relocations which can be avoided with the preferred alternative; 3 relocations closest to the bridge abutment, 1 at the north corner of Old Bay/Popp's Ferry Road intersection, 2 relocations at Martin Road/Popp's Ferry Road intersection, and 4 at the southernmost end of the study area.

2.3.3.5 Alternative E – Southern Section (preferred)

Follow Center to Old Bay (Atkinson), transition West: Alternative E – Southern Section would include a 120-foot wide ROW located along the current centerline of Popp's Ferry Road from the south bridge abutment to Old Bay/Atkinson Road. At Old Bay/Atkinson Road, the centerline would transition to the west and continue to Hinman Drive. At Hinman Drive, the ROW narrows to and continues along the existing ROW to the Popp's Ferry Road/Pass Road intersection (Figure 2.2).

Notable Impacts: Alternative E – Southern Section would require relocation impacts on the west side of Popp's Ferry Road. Relocations are estimated at 0 on the east and 11 on the west. This alternative would eliminate relocations on the east side. This alternative

would result in the elimination of all but four residential driveways entering directly onto Popp's Ferry Road along the Southern Section.

This is the preferred alternative due to minimizing the relocations and creating a controlled access roadway. Although four residential driveways would remain with direct access to Popp's Ferry Road, the overall safety to users of the road would be significantly improved.

2.4 Alternatives Eliminated from Further Consideration

Other alternatives were not given serious consideration because they did not widen Popp's Ferry Road to four lanes in a manner that would maximize the use of existing ROW, equally share the construction impacts between residents living on the north and south sides of Popp's Ferry Road, or allow for a more controlled access for residents living along the Popp's Ferry Road corridor within the project area.

Alternatives eliminated from further discussion include:

1) Western expansion of causeway and bridge – impacts to 4(f) recreational property and marsh/wetland habitats would be extensive.

2) Dual or "Sister" bridges with and/or without bascule – construction and maintenance cost of 2 bridges would be extensive, and the space needed for 2 bridges would encroach upon the sensitive marsh beds below.

2.5 Traffic Analysis

A traffic assessment report was performed for the Popp's Ferry Road alternatives and is included in Appendix 1. It was determined that the widening of Popp's Ferry Road to a four-lane roadway between Riverview Drive and Pass Road is needed to improve the existing roadway delays and capacity deficiencies. Current volumes are near the upper limits of capacity of a two-lane roadway. Each of the Build Alternatives provides necessary capacity and controlled access to Popp's Ferry. These improvements will significantly improve traffic operations of the corridor. Conversely, the widening of Popp's Ferry Road will increase the travel speeds and move the roadway closer to some of the existing homes, which could increase the potential for traffic accidents.

Other improvements recommended include upgrades to the signalized intersection at Sunkist Country Club Drive/Popp's Ferry Road and access road improvements at the Anatole Bay Townhomes for bridge access.

2.6 Construction Costs

Estimated construction costs for the preferred alternate are detailed in Figure 2.3. Information presented in the document, *Revised 2007 Construction Prices,* prepared by the Mississippi Department of Transportation, was used for estimating the majority of the construction costs. Other costs comparisons included similar MDOT projects adjusted for inflation. Right-of-way costs were estimated using consultations with area acquisition professionals. Table 4 provides a summary of costs for the preferred alternate.

TABLE 4:
Popps Ferry Road and Bridge EA
Preliminary Cost Estimate

Alternate: Alternate E - Preferred
Alignment Length: 2.64 Miles
Type: 4-Lane Divided Boulevard with Bascule Bridge

Bridge Length: 4,100 ft
South Section Road: 4,400 ft
North Section Road: 5,450 ft

ITEM	SUB-ITEMS	UNIT	COST	QUANTITY	TOTAL COST
ROADWAY	1.87 miles				
	Curb and Gutter	LF	$17	39,494	$671,398
	Sidewalks	SY	$35	10,969	$383,915
	Lighting	Mile	$160,000	1.87	$299,200
	Signing	Mile	$25,000	1.87	$46,750
	Landscaping	Mile	$80,000	1.87	$149,600
	Major Widening (Parallel Construction - Adding 2 Lanes):				
	Gr. and Dr.	Mile	$1,140,000	1.87	$2,131,800
	Pave	Mile	$3,220,000	1.87	$6,021,400
	10% Cost Increase for 2007 Pricing				$970,406
	15% C&E				$1,601,170
			Total Roadway Costs		$12,275,640
BRIDGE	4,100 ft Long X 81 ft Wide				
	North Approach (3,200 ft long, 81 ft wide)	SF	$65	259,200	$16,848,000
	Bascule Main Span (200 ft long, 81 ft wide)	SF	$650	16,200	$10,530,000
	South Approach (700 ft long, 81 ft wide)	SF	$65	56,700	$3,685,500
	15% C&E				$4,659,525
			Total Bridge Costs		$35,723,025
ROW	68 Relocates/167,000 SF Parcels				
	Estimated Residential Relocations	Each	$200,000	68	$13,600,000
	Estimated Parcel Acquisition	SF	$3.75	167,000	$626,250
	30% Admin				$4,267,875
			Total ROW Costs		$18,494,125
			15% Contingency		$9,973,918
			Preliminary Cost Estimate		$76,466,708

Chapter 3

AFFECTED ENVIRONMENT

This chapter describes the existing features and characteristics, as well as the socio-economic framework of the study area. This description establishes a baseline setting of the study area from which to measure the consequences and impacts from the proposed project.

3.1 Existing Study Area

The study area is located in Harrison County, Biloxi, Mississippi along Popp`s Ferry Road from Riverview Drive south to Pass Road, including the causeway and bridge spanning the Back Bay of Biloxi, for a total of approximately 2.4 miles. The general study area boundaries are shown in Figure 1.1. The eastern and western boundaries vary depending on the required ROW and future parcel acquisitions, but are within approximately 100 feet of the existing ROW.

There are 62 residential driveways and 11 non-residential driveways directly accessing Popp's Ferry Road within the study area. In the Northern Section, 52 homes exist with a direct access driveway to Popp's Ferry Road. Within the Southern Section, 10 homes exist with a direct access driveway to Popp's Ferry Road.

The existing study area is classified as a Principal Arterial with 18 current road access intersections, 4 of which are signalized. Roads intersecting Popp's Ferry Road within the study area are indicated below.

Signalized intersections on Popp's Ferry Road within the study area include:

- Old Bay/Atkinson Road Intersection
- Sunkist Country Club Boulevard Intersection
- Riverview Road Intersection
- Pass Road Intersection

Roads with residential access in the Northern Section not crossing Popp's Ferry Road are:

- North Country Club Lane
- Baytree Drive
- Ashwood Place
- Rustwood Drive
- Sabrina Drive

Non-signalized crossroads in the Southern Section intersecting Popp's Ferry Road providing residential access include:

- Carter Road
- Bonne Terre/Bertucci Boulevard

Roads within the Southern Section providing residential access but not crossing Popp's Ferry Road include:

- Ferry Road
- Popp's Ferry Fish Camp
- One access road into the Anatole Bay Townhomes
- Martin Road
- Bay Vista Drive
- Trafalgar Drive
- Hinman Drive

Properties within the Northern and Southern sections are almost exclusively residential, including single-family dwellings and apartments, with a few commercial properties interspersed. Commercial properties which exist within the Northern Section of the study

area include the Margaret S. Sherry Library, Biloxi Fire Station No. 2139, and the Little Hands Playground.

The Bridge Section of the study area includes the causeway, drawbridge, navigational channel, abutments, and the 4(f) property immediately west of the causeway and bridge, called Causeway Park. Causeway Park is a recreational and natural area of brackish water, natural and man-made marsh beds, and uplands. The marsh areas are discussed further in the Wetlands section 3.10.

In the Southern Section of the study area, several commercial properties are located directly on Popp's Ferry Road. Tri-County Eye Clinic is located at the Popp's Ferry Road/Bertucci Boulevard intersection and the New Life Christian Center Church which has direct access to Popp's Ferry Road. An abandoned restaurant is located at the foot of the Popp's Ferry Bridge south abutment and strip-mall shopping centers are located at the Pass Road/Popp's Ferry Road intersection.

3.2 Current Land Use

The study area is generally urbanized mixed-use, with single-family and multi-family homes comprising approximately 55% of the proposed project area; business and service-oriented establishments occupying approximately 15%; and the causeway/bridge portion and park area occupying approximately 30%.

Popp's Ferry Road is a north-south corridor for residents commuting to work, tourists accessing the beach, and commercial delivery of goods and services. Additionally, this

route is commonly used as an exercise path for bikers, runners, and walkers due to its straight alignment and beautiful scenery. From the park area below the causeway/bridge, fishing, boating, and nature watching are popular.

A 50-acre tract of land south of the bridge and east of Popp's Ferry Road, owned by Dr. Gregory Bertucci, is vacant, and at this time there are no plans for its development. In personal communication with Dr. Bertucci, he indicated his interest in developing this property for a retail plaza/hotel/restaurant in the future. He stated that the tract includes approximately 4-acres of delineated wetlands, 3.8 of which are mitigated. The City will not allow him to mitigate the remainder until the area is developed.

Another five-acre tract of land north of the bridge and west of Popp's Ferry Road is privately owned and plans to develop it have not been presented.

3.3 Social and Economic Characteristics

3.3.1 Demographics

The currently available 2000 Census data was used to determine the demographics associated with the study area. To investigate historic trends in the study area, both 1990 and 2000 Census data were compared.

3.3.1.1 Population

To determine population trends, population totals for the state, county, and city were reviewed. Table 5 shows the population breakdown by county for the years 1990, 2000, and 2006.

Table 5: Population Data

Population Data for 1990 – 2006					
	Population			Percent Change	
	1990	2000	2006 (est.)	1990-2000	2000-2006
Mississippi (State)	2,573,216	2,844,658	2,899,112	+10.5	+1.9
Harrison County	165,365	189,601	173,218	+14.7	-8.6
Biloxi (City)	46,319	50,644	44,342	+9.3	-12.4

Source: U.S. Census Bureau

Between 1990 and 2000, both Harrison County and Biloxi saw an increase in population. The growth rate of Harrison County was well above that of the rest of the state, while the growth rate for the city of Biloxi was only a little less than the statewide rate. By contrast, both the city and the county show a sharp decrease in population between 2000 and 2006. This reflects the effect of Hurricane Katrina on regional population. Table 6 shows a yearly breakdown of the estimated population for Harrison County from 2000 to 2007. It is clear that the population growth continued until 2005, when Hurricane Katrina caused devastation to the Mississippi Gulf Coast. The estimated population increase of nearly 3,000 (1.7%) from 2006 to 2007 shows that population recovery is under way.

Table 6: Yearly Population Estimates for Harrison County

Yearly Population Estimates for Harrison County (2000—2007)								
April 1, 2000	July 1, 2000	July 1, 2001	July 1, 2002	July 1, 2003	July 1, 2004	July 1, 2005	July 1, 2006	July 1, 2007
189,601	189,874	190,267	191,386	191,050	194,717	195,969	173,218	176,105

Source: U.S. Census Bureau

Popp's Ferry traverses three census tracts along its path. Table 7 gives the total population and population density of each census tract along the corridor. The corridor is

urban/suburban in nature. It is far more densely populated than the county and generally more densely populated than the City of Biloxi as a whole.

Table 7: Census Tract Population and Density

Census Tract, Population, and Density		
Census Tract	**Population**	**Density (Per Sq. Mi.)**
12.01	5,364	3,610
12.02	5,780	2,285
33.02	7,983	1,019
Biloxi (city)	50,644	1,332
Harrison County	189,601	326

Source: U.S. Census Bureau (2000 Census)

3.3.1.2 Age

Information about age distribution within Mississippi and the study area is shown in Table 8. Each age group is identified for the state, county, city, and each census tract. In addition, the percentage of the overall population within each age group is shown.

Table 8: Population by Age by Census Tract

Population by Age by Census Tract						
Age Range	**Census Tract**					
	12.01		**12.02**		**33.02**	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
All	5,364		5,780		7,983	
Under 5 years	494	9.21%	438	7.58%	554	6.94%
5 to 9 years	509	9.49%	439	7.60%	570	7.14%
10 to 14 years	440	8.20%	308	5.33%	544	6.81%
15 to 17 years	189	3.52%	186	3.22%	332	4.16%
18 and 19 years	138	2.57%	149	2.58%	190	2.38%
20 years	70	1.30%	89	1.54%	79	0.99%
21 years	74	1.38%	100	1.73%	92	1.15%
22 to 24 years	225	4.19%	372	6.44%	268	3.36%

25 to 29 years	433	8.07%	536	9.27%	486	6.09%
30 to 34 years	469	8.74%	444	7.68%	560	7.01%
35 to 39 years	485	9.04%	447	7.73%	690	8.64%
40 to 44 years	321	5.98%	408	7.06%	669	8.38%
45 to 49 years	268	5.00%	381	6.59%	602	7.54%
50 to 54 years	217	4.05%	319	5.52%	517	6.48%
55 to 59 years	135	2.52%	244	4.22%	450	5.64%
60 and 61 years	65	1.21%	98	1.70%	163	2.04%
62 to 64 years	87	1.62%	126	2.18%	268	3.36%
65 and 66 years	81	1.51%	71	1.23%	167	2.09%
67 to 69 years	137	2.55%	125	2.16%	219	2.74%
70 to 74 years	162	3.02%	210	3.63%	242	3.03%
75 to 79 years	143	2.67%	168	2.91%	172	2.15%
80 to 84 years	110	2.05%	77	1.33%	100	1.25%
85 years and over	112	2.09%	45	0.78%	49	0.61%

Source: U.S. Census Bureau

Table 9: Population by Age

Population by Age						
	Biloxi		Harrison County		Mississippi	
	Number	Percent	Number	Percent	Number	Percent
All	50,644		189,601		2,844,658	
Under 5 years	3721	7.35%	13,556	7.15%	204,364	7.18%
5 to 9 years	3634	7.18%	13,956	7.36%	216,920	7.63%
10 to 14 years	3078	6.08%	13,589	7.17%	218,742	7.69%
15 to 17 years	1841	3.64%	8,287	4.37%	135,161	4.75%
18 and 19 years	2449	4.84%	6,541	3.45%	98,027	3.45%
20 years	1087	2.15%	3,147	1.66%	47,999	1.69%
21 years	1033	2.04%	2,922	1.54%	44,153	1.55%
22 to 24 years	2659	5.25%	8,433	4.45%	120,795	4.25%
25 to 29 years	3939	7.78%	13,697	7.22%	192,526	6.77%
30 to 34 years	3706	7.32%	13,701	7.23%	189,272	6.65%
35 to 39 years	4115	8.13%	15,526	8.19%	212,309	7.46%
40 to 44 years	3580	7.07%	14,958	7.89%	213,063	7.49%

45 to 49 years	3189	6.30%	12,923	6.82%	192,111	6.75%
50 to 54 years	2633	5.20%	11,253	5.94%	169,870	5.97%
55 to 59 years	2044	4.04%	8,609	4.54%	132,202	4.65%
60 and 61 years	747	1.48%	3,106	1.64%	47,422	1.67%
62 to 64 years	1114	2.20%	4,395	2.32%	66,199	2.33%
65 and 66 years	739	1.46%	2,732	1.44%	40,209	1.41%
67 to 69 years	1096	2.16%	3,925	2.07%	57,970	2.04%
70 to 74 years	1555	3.07%	5,578	2.94%	87,531	3.08%
75 to 79 years	1303	2.57%	4,399	2.32%	68,558	2.41%
80 to 84 years	773	1.53%	2,505	1.32%	46,364	1.63%
85 years and over	609	1.20%	1,863	0.98%	42,891	1.51%

Source: U.S. Census Bureau

There does not appear to be a notable difference in the percentage of persons under the age of 18 or of those over the age of 65 between the study corridor, city, county, and state.

3.3.1.3 Race

Minority population trends for Mississippi and the study area are shown in Table 10 for the years 1990 and 2000. The minority percentage for the corridor is less than that for both the county and the state. The minority percentage is highest in the south part of the corridor. Nearly one-third of the population in one of the census tracts is non-white or multi-racial.

Table 10: Minority Population

Minority Population: 1990—2000							
Region	**Total Population**		**Minority Population**		**Percent Minority**		**Percent Change**
	1990	**2000**	**1990**	**2000**	**1990**	**2000**	
Mississippi	2,573,216	2,844,658	939,755	1,078,538	36.5%	37.9%	1.4%
Harrison Co.	165,365	189,601	37,735	50,909	22.8%	26.9%	4.0%

Biloxi	46,319	50,644	11,772	14,467	25.4%	28.6%	3.2%
Tract 12.01		5,364		1,268		23.6%	
Tract 12.02		5,780		1,779		30.8%	
Tract 33.02		7,983		1,353		16.9%	
Corridor		19,127		4,400		23.0%	

3.3.2 Economics

The percent of population below the poverty level, median household income, and per capita income data were obtained for Mississippi, Harrison County, the City of Biloxi, and the 2000 census tracts. Table 11 provides information related to Mississippi and the study area.

Table 11: Poverty Data

Poverty Data for Study Area		
Area	**Percent of Population Below Poverty Level**	
	1989	**1999**
Mississippi	25.2%	19.9%
Harrison Co.	19.0%	14.6%
Biloxi	21.4%	14.6%
Tract 12.01		6.9%
Tract 12.02		23.2%
Tract 33.02		8.8%
Corridor		12.6%

The poverty rate for the corridor is reasonably close to the rates for the county and the city and significantly less than of the state. Generally, the poverty rate is higher in the south part of the corridor, particularly in Census Tract 12.02. A downward trend in poverty is evident at the state, county, and city levels.

The median household income for Mississippi in 1999 was $31,330. The median household incomes for the city, county, and corridor are all above the statewide level. The lowest income level among the three census tracts in the corridor was $35,197, nearly $4,000 above the statewide level. Census Tract 33.02, north of the Back Bay, had a median household income of nearly $48,000. All three census tracts have a larger median household income than the city, and only one has a median household income less than that for the county (by about $400).

3.4 Cultural Features and Community Facilities

Community facilities located along the project corridor include a church, library, fire station, and park (Fig. 3.1).

3.4.1 Church

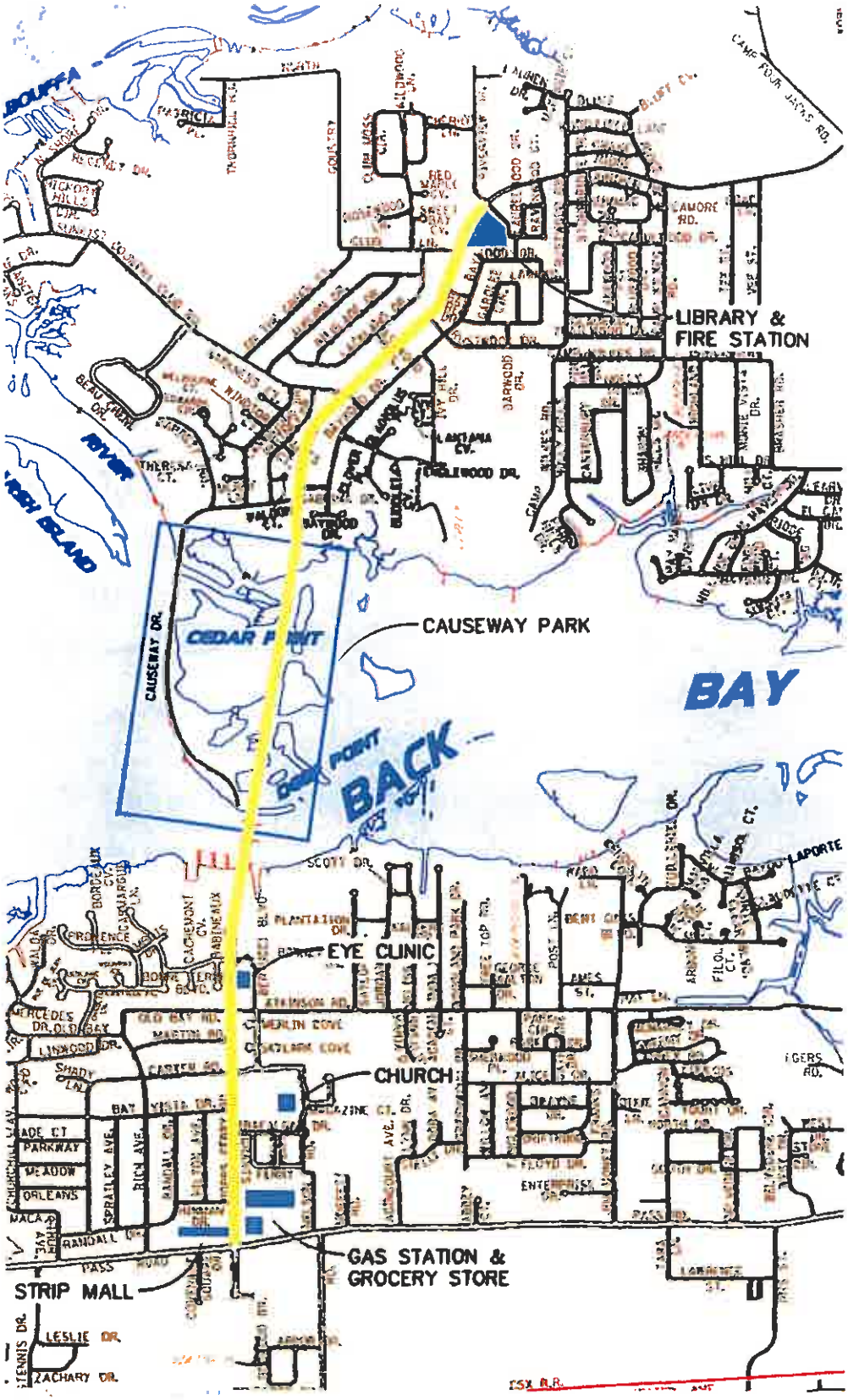
The New Life Family Church is a congregation of approximately 250 members and serves the surrounding community. It is located on the west side of Popp's Ferry Road, approximately 0.5 miles north of Pass Road. Currently, its campus consists of a sanctuary building and parking lot.

3.4.2 Library

The Margaret S. Sherry Memorial Library (Margaret Sherry Library) is a public library within the Harrison County Library System located in the southeastern quadrant of the Riverview Drive/Popp's Ferry Road intersection.

Figure 3.1

COMMUNITY FACILITIES LOCATION MAP



POPPS FERRY ROAD AND BRIDGE ENVIRONMENTAL ASSESSMENT

Community Facilities Locations

BASE MAP CREATED BY NEEL-SCHAFFER, INC.

BROWN & MITCHELL, INC.
Consulting Engineers
796 Vieux Marche, 2nd Floor Biloxi, MS 39530
Ph (228) 436-7612 Fax 436-7678 Web: brownandmitchell.com

OCTOBER 2008

3.4.3 Emergency Medical Services

A Gulfport Fire Department fire station adjoins the Margaret Sherry Library which is at the north terminus of the study area. Rescue vehicles access Popp's Ferry Road via the signalized intersection at Riverview Drive.

3.4.4 Parks and Recreation

Causeway Park, the area beneath and on either side of the Popp's Ferry Bridge and causeway is a natural marsh and vegetated park. This property is leased from the Secretary of State by the City of Biloxi for recreation, fishing, and nature viewing. The park consists of 2 boat ramps, a 12 car parking area, 1 boardwalk, street lighting, and a paved road. The facilities are maintained and controlled by the City.

3.5 Transportation and Utilities

3.5.1 Pedestrian and Bicycle Facilities

Pedestrian sidewalks are present along Popp's Ferry Road within the study area and are maintained by the City. A designated pedestrian walkway is located within the study area along the causeway and bridge. No bicycle lanes are present within the study area.

3.5.2 Utilities

Utilities along Popp's Ferry Road include sewer collection mains, water distribution mains, storm drainage facilities, telephone and power. Sewer collection mains range in size from 6 – 8-inch diameter and are generally located under the existing roadway. Water distribution mains range in size from 4 – 12-inch diameter and are located east and west of Popp's Ferry Road. Storm drainage facilities, including pipes and collection boxes, are located adjacent to the street, with main lines running parallel and smaller

collection lines installed perpendicular to Popp's Ferry Road. Telephone and power lines are located on the east and west sides of Popp's Ferry Road. South of the Popp's Ferry Bridge, these lines are located on above ground transmission poles. North of the Popp's Ferry Bridge, these lines are underground. Water and sewer services to the bridge tender house are attached to the bridge from the south.

3.6 Air Quality

Per Environmental Protection Agency (EPA) standards, the state of Mississippi is within acceptable levels of air quality and relatively free of air pollution. The City and the preparers have agreed that an air quality assessment is not required for this project.

3.7 Noise

Noise level measurements were collected from selected locations using a Casella sound level meter, model number CEL-490.C1. The meter was field calibrated before and after each use with a Casella CEL-284/2 field calibration unit. Existing and predicted noise levels were determined using the Federal Highway Traffic Noise Model (TNM) version 2.5. Three hundred ninety-nine (399) possible noise receptors were identified and analysed within the project corridor (Appendix 2).

The FHWA and the USDOT have developed noise abatement criteria for each land use category. These criteria provide a basis for the quantification of noise impacts and a tool to evaluate noise abatement alternatives. A description of the various types of land use categories and the noise abatement criteria are found in Table 12.

Table 12: Noise Abatement Criteria (NAC)

Hourly A-Weighted Sound Level in Decibels (dBA)			
Activity Category	$L_{eq}(h)$	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	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	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, auditoriums.

3.8 Geologic Resources

3.8.1 Soils

The area surrounding the study area, including each alternative, was studied to determine the types of existing soils. Based on information obtained from the United States Department of Agriculture (USDA) Natural Resource Conservation Service, seven types of soil associations, or series, were determined to be present within the study area These soil series are defined as a group of named taxonomic soil units found occurring together sharing similar space and resources over a general region or area. The soils within a series generally vary with depth, texture, color, slope, density, drainage potential, and other characteristics. Table 13 is a brief description of each soil series, the approximate percentage of that soil located within the study area, and whether it is a soil typically

found in wetland areas. Appendix 3 contains a soil map and complete description of each soil series (USDA website, 2004).

Table 13: Soil series found in Popp's Ferry Road and Bridge Study Area

Name of soil	Approx. Acres in study area	Approx. % of study area	Description	Considered a wetland soil?
Eustis Series	78.7	25.9	Deep, somewhat excessively drained soil.	No
Lakeland Series	1.8	0.6	Very deep, excessively drained, rapid to very rapidly permeable soil.	No
Plummer Series	37.6	12.4	Very deep, poorly or very poorly drained	Yes
Latonia Series	29.0	9.6	Deep, well drained, moderately rapidly permeable soils	No
Harleston Series	8.8	2.9	Deep, moderately well drained, moderately permeable soils.	No
Handsboro Series	35.3	11.6	Deep, very poorly drained, moderately permeable soils.	Yes
Poarch Series	2.4	0.8	Deep, well and moderately well drained, moderately permeable soils.	No
Eustis and Poarch soils	24.4	8.0	See description for each in this table.	No

5.9 Water Resources

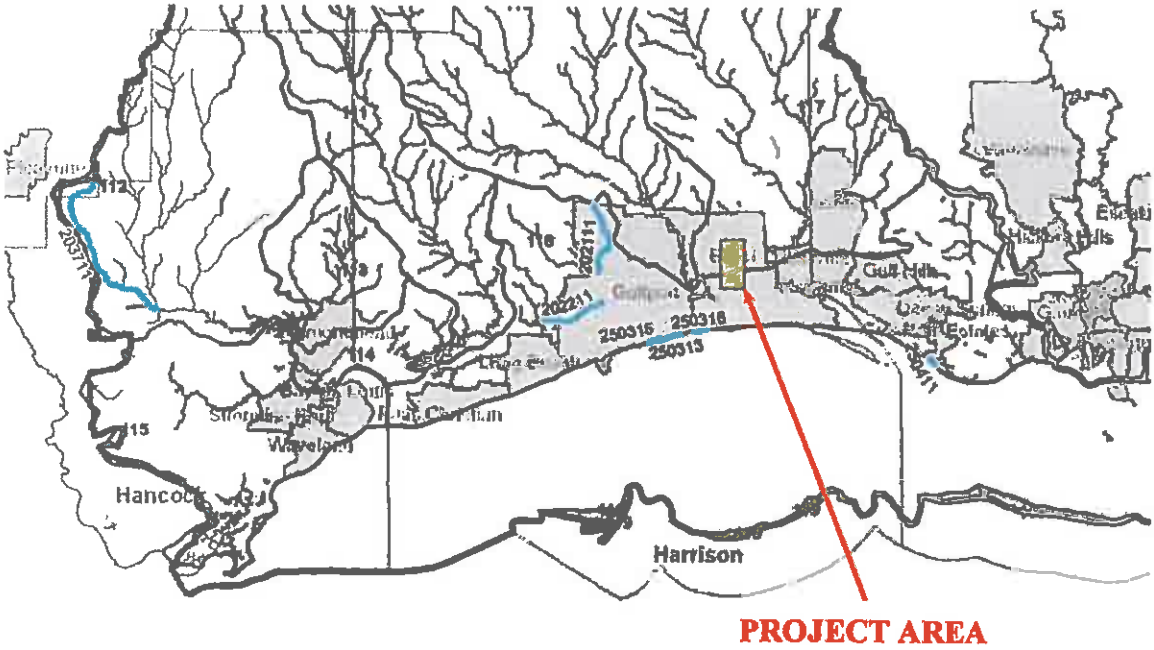
3.9.1 Surface Water

The study area is located within the Mississippi Coastal Watershed. The EPA defines a watershed as the area that drains to a common waterway, such as a stream, lake, estuary, wetland, aquifer, or even the ocean. No 303d Streams (impared waters) are located within the project area (see Figure 3.2).

Figure 3.2

303d STREAMS MAP

303d Streams Map
Coastal Mississippi
Map dated 2010



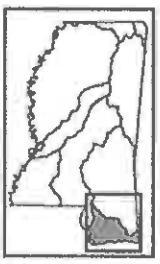
Monitored Waters
Coastal Streams Basin

This map produced by the Department of Environmental Quality (MDEQ), Office of Pollution Control, Surface Water Division, Standards Modeling & TMDLs Branch on February 15, 2010.

All map data is from the Mississippi Automated Resource Information System (MARIS), the United States Geological Survey (USGS), and MDEQ.

Projection: Mississippi Transverse Mercator

The Mississippi Department of Environmental Quality makes no warranties, expressed or implied, as to the accuracy, completeness, currentness, reliability, or suitability for any particular purpose of the data contained on this map.



Mississippi Basins

0 5 10

Legen

Monitored Waterbod

Monitored Stream

Perennial Stream

Waterbody

The study area's south terminus is approximately 2 miles north of the Mississippi Sound. This close proximity and the consistency of the topography yields a body of water which intersects with the Back Bay of Biloxi, a landlocked, mile-wide westward continuation of Biloxi Bay, paralleling the coast for about 10 miles. The Back Bay is 6-20 feet deep, with a navigable channel dredged and maintained for commercial barges and personal watercraft. These waters and the marsh habitats within them are leased by the Secretary of State to the City. Separating the Back Bay of Biloxi from the Mississippi Sound is a peninsula approximately 2-miles wide occupied on the eastern end by the City.

3.9.2 Ground Water

Ground water is found under the earth's surface and is a supplier of water to wetlands, streams, springs, and larger bodies of water. Mississippi's main source of fresh water is groundwater. Water supply for thermo-power, irrigation, industrial, and commercial use is from groundwater.

The aquifer system which supplies coastal Mississippi is from the west to the Rio Grand Basin of Texas, east to the western side of the Florida Panhandle, and north where it merges with the Mississippi River Valley Alluvial Aquifer, and south to the Gulf of Mexico to the edge of the continental shelf.

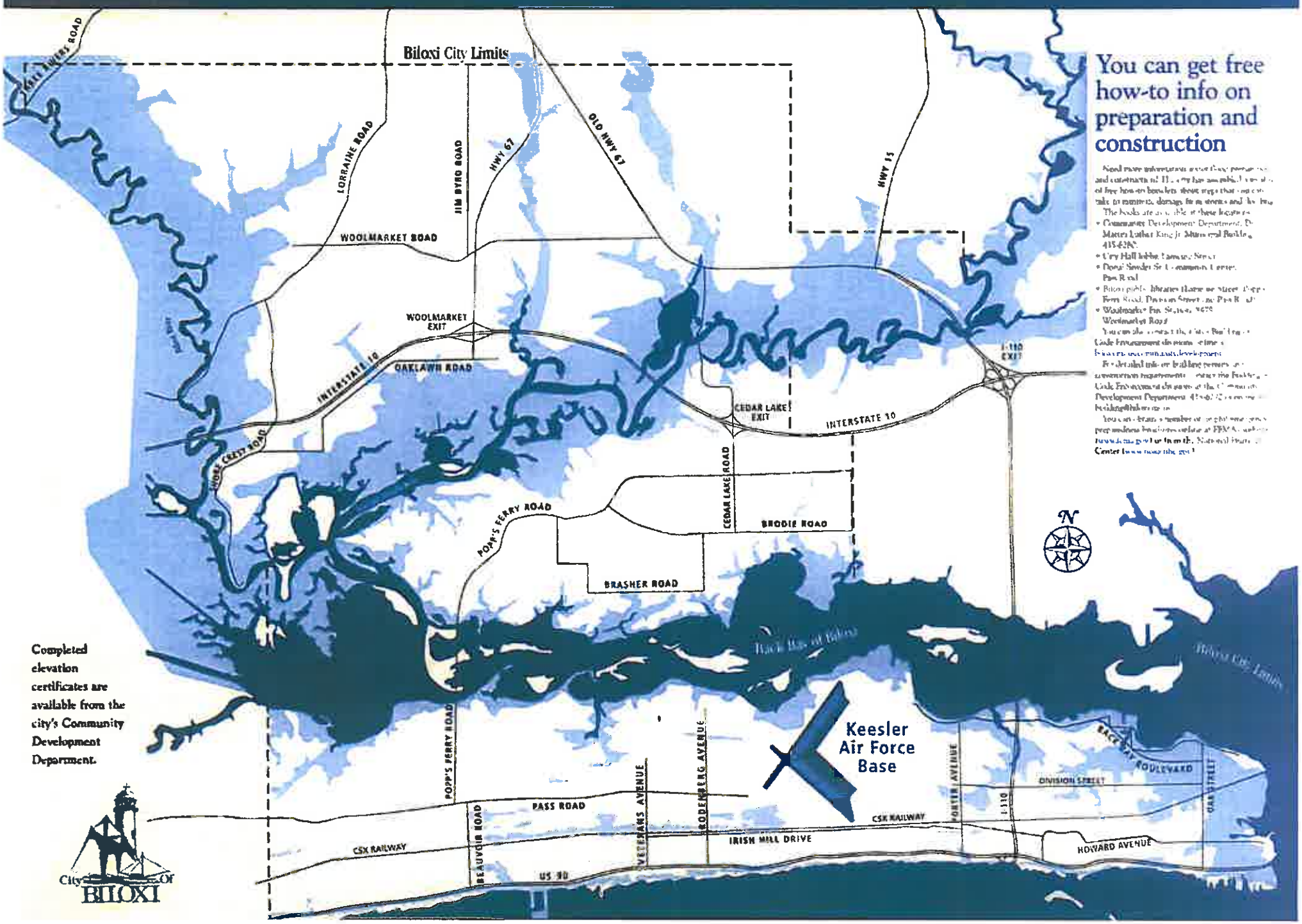
3.10 Floodplains

The Federal Emergency Management Agency (FEMA) has defined floodplains in Executive Order 11988 as "lowlands, relatively flat areas adjoining inland and coastal waters, including flood prone areas of offshore islands, including at a minimum, those

Figure 3.3

100-YEAR FLOODPLAIN MAP

City of Biloxi 100-Year Floodplain



You can get free how-to info on preparation and construction

Need more information [illegible] and construction? [illegible] has assembled [illegible] of free how-to booklets about steps that can [illegible] take to minimize damage from storms and [illegible]

The books are available at these locations:

- Community Development Department, [illegible] Martin Luther King Jr. Municipal Building, 415-6280.
- City Hall lobby, Lamoine Street
- Donal Snyder Sr. Community Center, Pass Road
- Biloxi public libraries (Lamoine Street, Popp's Ferry Road, Division Street and Pass Road)
- Woolmarket Fire Station, 9679 Woolmarket Road

You can also contact the City's Building [illegible] Code Enforcement divisions online at [illegible]

For detailed info on building permits and construction requirements, contact the Building [illegible] Code Enforcement divisions at the Community Development Department, 415-6270 [illegible]

You can obtain a number of [illegible] preparedness brochures online at FEMA [illegible] www.fema.gov [illegible] National [illegible] Center [illegible]

Completed elevation certificates are available from the city's Community Development Department.

City of BILOXI

Figure 3.4

MARSH AREAS and DREDGE PLAN

BIG LAKE

BILOXI RIVER

NORTH

N.T.S.

POPPS FERRY CAUSEWAY PARK

NM

NM

PRIVATE LANDS

EXISTING CAUSEWAY

34'

CM

CM

CM

NM

CM

CM

DREDGED WORK CANAL

EXISTING DREDGE DEPOSITS TO BE REMOVED

BACK BAY OF BILOXI

LEGEND

NM NATURAL MARSH

CM CREATED TIDAL MARSH

ABOVE MEAN LOW WATER

POSSIBLE DREDGE DEPOSIT SITES

POSSIBLE REMOVAL OF UPLAND AREA

POPPS FERRY BRIDGE
FIGURE 3.4

BMI 03-2756 6/14/2010

BROWN & MITCHELL, INC.
Consulting Engineers

The continued health and benefit of the man-made marsh in this area allows one to assume that placing dredge material excavated for this project along the perimeters of these beds will increase marsh acreage and growth.

In the Northern Section, a wetland finger exists in close proximity (i.e., approx. 40 feet) to the roadway near the bridge abutment, yet outside the study boundary. This area of wetlands was delineated to avoid any potential disturbance. An aerial photograph and overlay, and photographs of this area are found in Appendix 4.

3.14 Vegetation and Wildlife

The location of the proposed project area is within the lower three counties of Mississippi known as Coastal Mississippi. Generally, it is an area with large species diversity, meaning that many species of animals and plants are found within a given area.

3.14.1 Vegetative Communities

Historically, species composition of the land areas included a natural landscape consisting of oak, pine, beech, and other hardwoods as well as upland, floodplain, and wetland species. This habitat changed with development to an urban-residential landscape to vegetative species such as ornamental azaleas, palms, and pears. Remnants of the pre-development landscape can be detected in only a small area of privately owned land near the proposed project area, north and west of the causeway-bridge. Table 14 lists a sample of vegetative species occurring along the proposed project area.

Table 14: Representative Sample of Vegetation found in Study Area

Common Name	Scientific Name
Privet	*Ligustrum spp.*
Swamp Dock	*Rumex verticillatus*
Goldenrod	*Solidago spp.*
UPLANDS	
Vitis – grape	*Vitis vinifera*
Sawpalmetto	*Serenoa repens*
Yaupon holly	*Ilex vomitoria*
Sweet-bay magnolia	*Magnolia virginiana*
Honeysuckle	*Lonicera spp.*
DRAINS	
Lizards Tail	*Saururus cernuus*
Poison Ivy	*Toxicodendron radicans*
Ferns	*Various spp.*
Organic material (means no LA Quillwort)	*Various spp.*
Elm	*Ulmus spp.*
Brackenfern	*Pteridium*
Trumpet Creeper	*Campsis radicans*

Additionally, the area under the causeway/bridge portion affected during and following construction includes 2 bodies of water, Cedar Point and Deep Point located in the Back Bay of Biloxi. These areas are influenced regularly by tidal flow and contain emergent wetlands. A list of prevalent wetland and non-wetland plant species found adjacent to the causeway/bridge is found in Table 15.

Table 15: Prevalent Plant Species found near or within the Causeway-Bridge Section

Common Name	Scientific Name
Smooth cordgrass	*Spartina alterniflora*
Salt meadow cordgrass	*Spartina patens*
Cogon grass (invasive)	*Imperata cylindrical*

Privet	*Ligustrum spp.*
Yaupon Holly	*Ilex vomitoria*
Common spikerush or spikesedge	*Eleocharis palustris*
Leafy Three-square	*Scirpus robustus*
Sawgrass	*Caladium jamaicense*
Black needlerush	*Juncus roemerianus*

3.14.2 Wildlife

The wildlife within the study area ranges from species typically found in an urban/residential setting to those found in a natural marsh/aquatic habitat.

Nearly two-thirds of the project area is urban/residential, with fragmented or isolated habitat-types supporting few species. Species commonly found in this area include: Northern Mockingbird (*Mimus polyglottos*), Northern Cardinal (*Cardinalis cardinalis*), Blue Jay (*Cyanocitta cristata*), and the like; rodents, raccoons, opossum, squirrels; and turtles.

Almost one-third of the study area is a marsh and aquatic habitat. The marsh habitat is known for its use as a nursery for many species of fish and crustaceans. It is an ecologically important area supporting a diverse group of species, providing food, shelter, and water. Species found in this area include: Gull (*Larus spp.)*, seasonal migratory birds, osprey (*Pandion haliaetus*) and other raptors, rails (family *Rallidae*), herons, egrets, terns, woodpecker, red-wing blackbird; fiddler crabs, blue crabs, shrimp, fish; turtles, alligators, frogs, snakes; rodents, raccoons, nutria, coyote, and feral cats.

3.14.3 Threatened and Endangered Species

...g to the list as of January 31, 2008, the State of Mississippi currently has 38 ... and 4 plant species named on the Threatened and Endangered Species (T&E) list ... ted by the USFWS (Appendix 6). Sections 7 & 9 of the Endangered Species Act ... 1973 (as amended) lawfully requires that activity which is likely to affect a ... protected species be reviewed by the U.S. Fish and Wildlife Service. Their ... of "May Affect, but Not Likely to Adversely Affect" was received in June, ... pendix 6).

...y, a Solicitation of Views (SOV) was sent to various other agencies for comments ... protected species. The SOV and list of agencies is found in Appendix 7. After ... of the proposed project, all informed agencies submitted letters supporting ... ation of the project (Appendix 7). Mississippi Museum of Natural Science listed ... of concern regarding possible occurrence within the study area. They are as ...

1) Alabama Red-Bellied Turtle (*Pseudemys alabamensis)*: do not use fill-material during construction to avoid disturbance of its habitat. Currently, the Alabama Red-Bellied Turtle is not found within the study area.

2) Gulf Sturgeon (*Acipenser oxyrinchus desotoi*): this is a possible transient species in which the use of explosives for bridge destruction may disrupt its path. The recommendation is to use explosives only during seasons when these species are not likely to occur in the area.

3) Manatee (*Trichechus manatus*): same recommendation as for the Gulf Sturgeon.

...tical habitat is defined by the USFWS as an area "on which are found those physical ... biological features essential to the conservation of the species and which may require

special management considerations or protection." Critical habitat has not been identified within the study area.

Observation of T&E species found within the study area will be reported to the appropriate agency at the first sight and identification of the species. No further disturbance of the area where the species is found will occur until the proper authorities provide approval for the project's continuation.

3.14.4 Essential Fish Habitat (EFH)

EFH occurs in the project area, specifically under the Causeway-Bridge Section. It is influenced regularly by tidal flow, and is primarily a salt/brackish-marsh and shallow water habitat, beneficial as a nursery for many aquatic species.

The Office of Habitat Conservation/Habitat Protection Division defines Essential Fish Habitat as habitat that "can consist of both the water column and the underlying surface (e.g. seafloor) of a particular area. Areas designated as EFH contain habitat essential to the long-term survival and health of our nation's fisheries. Certain properties of the water column such as temperature, nutrients, or salinity are essential to various species. Some species may require certain bottom types such as sandy or rocky bottoms, vegetation such as seagrasses or kelp, or structurally complex coral or oyster reefs. EFH includes those habitats that support the different life stages of each managed species. A single species may use many different habitats throughout its life to support breeding, spawning, nursery, feeding, and protection functions. EFH encompasses those habitats necessary to ensure healthy fisheries now and in the future."

Additionally, "Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq). For the purpose of interpreting the definition of essential fish habitat: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and spawning, breeding, feeding, or growth to maturity covers a species' full life cycle (EFH Interim Final Rule, 62 FR 66531)." Protection and management of this area during construction are discussed in Chapter 4.

3.15 Cultural Resources

A complete investigation of the Cultural Resources within the project area was executed and submitted to MDOT and the Department of Archives and History. The report and findings are located in Appendix 8. No responses were received by the American Indians regarding this project, and therefore it is assumed that there are no objections. There are two previously recorded archaeological site locations within the proposed project area. The first site, 22-HR-691, was destroyed by apartment complex development, and the other, 22-HR-520/551, was reduced to a shoreline expression as a combined result of the construction of the causeway bridge and shoreline erosion. McGahey noted the destruction of this resource in 1992. The MDAH concurs with these findings and requests that these areas be marked as a "no-work" area. They also

requested that an archaeologist be present to monitor construction activities which may affect this area (see App. 7, MDAH letter dated 2-24-2010).

No additional archaeological sites were recorded as a consequence of this assessment, and no standing structures that meet Register criteria were located. National Register properties in Harrison County are well away from the proposed project area and will not be adversely impacted as a result of project construction. As a result, the author recommends that the proposed project for the road improvement and bridge addition proceed accordingly.

3.16 Hazardous Materials

3.16.1 Federal and State Regulatory Agency Review

Information regarding a Hazardous Materials review was obtained by Environmental Data Resources (EDR). Pertinent information is summarized in Appendix 9. No hazardous material sites are located within the right-of-way proposed for construction. Generally, the data summarized is for sites located within a one-fourth of a mile radius of the project area footprint. Additionally, field reviews were done to corroborate the findings in the EDR report and locate any potential contaminated sites not previously documented. A complete EDR report is on file at Brown and Mitchell, Biloxi office.

Chapter 4

ENVIRONMENTAL CONSEQUENCES

The alternatives for this proposed project are all within the same corridor, therefore, the environmental impacts will be similar for most categories. Each category will address the impacts for the No Build scenario followed by the Build Alternatives scenario. Please note that Alternative E-Preferred was developed after the brochure in Appendix 13 was printed.

4.1 Relocations

No Build Alternative

The No Build Alternative would result in no relocations within the study area.

Build Alternatives

The number of relocations (see Table 16) will have significant impact on the residential population and character of the current Popp's Ferry Road. Per the preferred alternative, most of the homes which now front Popp's Ferry Road will be removed, and only four of the existing homes or driveways will access Popp's Ferry Road directly. Homes that will remain have driveways that do not access Popp's Ferry Road directly (Figure 2.2). Access from these homes will be via existing local roads.

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Table 16: Summary of Anticipated Relocations by Alternative

Alternative	Brief Description	Residences affected	Mobile Homes	Businesses	Other
A	No Build for each section	0	0	0	0
B Northern Section	Symmetrical widening	36 east 28 west	0	0	0
C Northern Section	Hold west ROW Widen east	38 east 0 west	0	0	0
D Northern Section	Follow center to Ashwood, transition east	38 east 22 west	0	0	0
E Northern Section	Center, then east, then center **(preferred)**	36 east 22 west	0	0	0
B Bridge	65 ft, 4-lane Bascule	0	0	0	0
C Bridge	90 ft. Bridge Highrise	0	0	0	0
D Bridge	65 ft. Twin Bridge	0	0	0	0
E Bridge	65 ft., 4-lane Bascule **(preferred)**	0	0	0	0
B Southern Section	Symmetrical widening	0 east 16 west	0	0	0
C Southern Section	Hold west ROW, widen east	8 east 0 west	0	0	0
D Southern Section	Hold east ROW, widen west	0 east 22 west	0	0	0
E Southern Section	Center to Old Bay, trans. west **(preferred)**	0 east 11 west	0	0	0

4.2 Visual Impacts

No Build Alternative

Visual impacts can be defined as change to the visual landscape. The No Build Alternative would result in no impact to the visual landscape within the study area.

Build Alternatives

Visual impacts can be categorized as minimal, moderate or high. Minimal impact generally occurs when existing transportation facilities are already part of the view shed, the view has few or no visually sensitive resources and the proposed project would introduce few, if any, noticeable changes to the view shed. Moderate visual impact occurs when changes to the existing view shed would be noticeable, but not substantial and/or there are visually sensitive resources that would undergo a noticeable change of view. High visual impact occurs when substantial changes are made to the existing view shed that would result in a greatly changed view and/or there are visually sensitive resources that would undergo a substantial change in view.

This project is improving an existing transportation facility that is already part of a view shed that consists of modern residential and commercial development. None of the alternatives pass through any area of outstanding visual character, whether natural or man-made. Most visual impacts to the roadway would be minimal.

Additionally, the relocation of residents along Popp's Ferry Road would provide adequate ROW to allow landscaping buffers on the east and west sides.

control plan will be formulated for the road sections, which will incorporate agement practices. To minimize impacts to vegetation and wildlife, the tion limits will be staked and enforced. A variety of controls are effective in ing erosion and siltation during construction and in removing pollutants from . Controls effective during construction may include phased clearing and silt screens, staked straw wattles, shell and gravel filters, and temporary ation basins.

uction activities would result in temporary noise and vibration impacts due to heavy construction equipment. Mitigation of construction noise and vibration complished through development of a construction noise control plan. This would include measures such as limiting certain construction activities or equipment ng the evenings, weekends, or holidays; locating storage and staging areas away ise-sensitive sites; and shielding stationary equipment.

in solid waste generation would result from removal of structures and materials nnot be relocated or re-used. Burning and burying of any waste material will not wed. Any hazardous materials encountered during construction would be removed posed of in accordance with state and federal regulations. Disposal of excess would be the responsibility of the contractor who would be contractually ired to handle and dispose of the material in accordance with MDOT standard ifications. Recycling, re-using, or donating for beneficial use will be strongly raged.

All phases of construction operations would temporarily contribute to air pollution. Airborne particulates would increase slightly in the corridor as dust from construction collects in the air surrounding the project. The construction equipment would also produce a slight increase in exhaust emissions. The emission of air pollutants would be reduced by the use of properly maintained equipment and the use of tarps and covers on trucks transporting construction materials and waste products.

Construction of any of the Build Alternatives would result in the relocation of utilities. Details regarding utility relocation would be developed before construction. Appropriate officials and organizations would be contacted and efforts coordinated to minimize damage or disruption of existing service. The public would be notified of the timing and duration of expected outages.

In addition to known utilities, other subsurface obstructions or conditions may exist that are not known at this time. During construction, if previously unknown archaeological sites are discovered, MDAH will be contacted immediately so they may offer comments under 36 CFR 800.13. An archaeologist will be scheduled by the contractor to monitor activities. The portion of the remaining midden beneath the Poppenops Ferry Bridge as well as the site 22Hr520/551 outside our study boundaries will be set aside as a no-work area during bridge construction.

Unknown hazardous materials sites may also be encountered. Construction would cease immediately until hazards and safety considerations could be determined.

4.4.2 Causeway/Bridge Section

4.4.2.1 Avoidance and Minimization of Impacts

Construction of the causeway and bridge will be planned and designed with specific detail to avoid or minimize impacts to the ecosystem along the project area. Marsh areas have been delineated and will be placed on plans. Impacts to marsh areas and water bottoms will be minimized by an "end-to-end" and/or a "top-down" strategy (working from the bridge surface when possible and barges, not from the water bottom for removal and construction), use of barges for equipment and working surface, careful removal of concrete, approval of blasting schedule (if blasting is employed, see Section 4.4.2.3 Demolition Approach), and timing of construction activities.

The use of barges was employed during the repair of Popp's Ferry Causeway after Hurricane Katrina and will also be used for this project. The dredge depth for effective barge use for repairs was approximately –5.0 MLW.

Field inspection in April, 2010 verified that the existing depth of the work canals remains at approximately –2.0 MLW. Minor re-dredging in this existing work canal on the east side of the bridge may be necessary, and will be to a depth of –5.0 MLW. The maximum amount estimated to be dredged is 15,600 cubic yards of material.

As mitigation for the disturbance from possible minor re-dredging, all usable dredge material will be placed specifically to add girth/base to the existing natural and man-made marsh habitats. As cranes excavate dredge material, it will be immediately placed along the outer edges of a marsh bed, avoiding crushing live plant material, in order to extend the base of the marsh bed suitable for future plant growth (Fig. 3.4). This "one-touch" strategy will minimize the unnecessary damage and transportation of the dredge material, as the excavating equipment can remove and place the material with one effort (dig it out, rotate the crane arm to the designated area, and release the material.) If any dredge material is unusable for this mitigation, it will be loaded onto a barge or truck and disposed of properly by the contractor. Recycling, re-using or donating for beneficial use will be strongly encouraged.

Avoidance techniques for species in the bridge project area will include timing of construction activities to avoid migration and seasonal occurrence of species through the area, cessation of work if species of concern (Red-Bellied Turtles, Gulf Sturgeon, Manatee) are detected, and scatter charges (warning blasts) to disperse species in the area before blasting occurs (Appendix 20).

4.4.2.2 Causeway/Bridge Construction Phases

Stage I: Build Eastern Lanes – Move Traffic to New Lanes: Barges will be brought in on the eastern side of the existing bridge and all work equipment will be kept on and run from the barge deck. Crews will build the deck for the 2 eastern-most lanes while the existing bridge remains open for traffic. Once the 2 eastern lanes are complete (with

no bike path barrier or operator's house installed at this stage), they will be opened for 2-way traffic and all existing bridge lanes will be closed. All traffic will be routed to the new lanes.

Stage II: Tear Out Old Bridge: "end-to-end" and/or "top-down": After traffic is routed to the 2 new lanes (one northbound, one southbound), demolition of the entire bridge and causeway will begin. Removal of concrete will be completed with cranes, either mounted on barges, or on the deck of the existing bridge. No concrete rubble will be dropped into the water. Rubble will be loaded onto a barge or into trucks and disposed of properly. If rubble is used for beneficial use by MDMR, a separate contract for placement will be executed between the contractor and MDMR. The bascule piers will be blasted only if needed, and removed to 2 feet below the mud line. Proper disposal will be the responsibility of the contractor. Recycling, re-using, or donating for beneficial use will be strongly encouraged.

Stage III: Build Western Lanes – Open All Lanes: As demolition of the existing bridge is complete, construction of the new western 2 lanes and median will begin. The western side of the causeway and bridge will be built in the same footprint as the existing causeway and bridge, (i.e., the new western edge-of-slab will be in the same alignment as the existing western edge-of-slab.) As before, all work for this portion will be done from barge decks or the bridge deck. After completion, all lanes of travel (2 northbound, 2 southbound) will be opened. Bike path barriers and operator's house will be installed during this stage.

4.4.2.3 Causeway/Bridge Demolition Approach

A combination of a "Top-Down" and "End-to-End" approach will be employed during demolition, design and construction. Demolition of the existing bridge will be done in a piece-by-piece manner, loaded onto a barge or truck, and removed. Due to the close proximity of the new bascule piers to the old, precision blasting may be necessary due to their massive size. The piers will be removed to approximately 2 ft. below the mud line. All debris from blasting will be removed. Blasting will be limited to the bascule piers, and done only if needed. This approach will ensure that impacts to the water bottom, water quality, vegetation, and marsh areas will be minimized.

Concrete rip-rap debris from the demolition of the existing bridge will be removed immediately by cranes, trucks, and/or barges. Placement and operation of demolition and hauling equipment will be limited to roadway or dry ground, or will remain in the existing dredge-areas east of the bridge. Rip-rap disposal will be the responsibility of the contractor. Any removal of debris and dredge material will be contracted and handled according to regulations stated in the permits for such activities. Recycling, reusing, and donating for beneficial use will be strongly encouraged.

During the course of construction, safety of construction workers and the public is of utmost importance. Safety precautions will be implemented in accordance with Occupational Safety and Health Administration requirements and will include fencing and other barriers to separate pedestrians and vehicles from the construction site.

4.5 Noise Study

No Build Alternative

The results of this study indicate that of 22 noise receptors are predicted to approach NAC levels and 2 receptors will exceed NAC levels should the No Build Alternative be selected.

Build Alternatives

Twenty (20) receptors are predicted to approach and 1 receptor is predicted to meet or exceed the NAC levels if any of the Build Alternatives are selected.

Although noise walls and berms are typically the method used for traffic noise abatement, several issues preclude that use of such structures. Specifically, the number of streets that intersect Popp's Ferry Road would render the noise barriers ineffective, especially near the south terminus of the project, along Pass Road, where noise levels are the highest. Another consideration is the excessive costs associated with the construction of sound barriers make this option unfeasible. A list of possible noise abatement measures is discussed in the complete noise investigation report found Appendix 2.

4.6 Social and Economic Impacts

No Build Alternative

The No Build Alternative would result in no impact to socioeconomic resources within the project area.

Build Alternatives

The proposed roadway is not expected to increase burdens on local social resources. No adverse changes to local employment rates, poverty levels, or local incomes would occur

as a result of the new roadway. Therefore, no adverse impacts are expected with implementation of Build Alternatives.

The labor for the construction of the proposed roadway would be provided by local and/or regional contractors, resulting in short-term, insignificant increases in the population of the project area. Materials and other project expenditures would predominantly be obtained through merchants in the local community giving a temporary direct economic benefit. In addition, there is the possibility of long-term economic benefit as the improved traffic flow would make land along the proposed roadway more desirable for commercial and/or industrial development. As a result, beneficial impacts to local employment rates and local incomes could occur, and through development, additional tax bases could be added to the area with implementation of Build Alternatives.

4.7 Protection of Children from Health and Safety Risks

E.O. 13045 "Protection of Children from Environmental Health Risks" dated April 21, 1997 requires federal agencies to identify and address the potential to generate disproportionately high environmental health and safety risks to children. This E.O. was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults.

No Build Alternative

The No Build Alternative would have no effect, either beneficial or adverse, upon the health and safety of children in the project area.

Build Alternatives

No effect to the health and safety of children would be expected from implementation of any alternatives. MDOT takes precautions for the safety of children by a number of means, including, but not limited to, the use of fencing, barriers, warning signs, and limitations on access to certain areas. Access to the project areas would be restricted during construction.

4.8 Environmental Justice Issues

On February 11, 1994, President Clinton issued E.O. 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations". The E.O. is designed to focus the attention of federal agencies on the human health and environmental conditions in minority communities and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse impacts of proposed actions on these communities and to identify alternatives that might mitigate these impacts. It also directs agencies to ensure that representatives of an affected community have every opportunity to provide input regarding the effects of the proposed project.

Minority populations, as identified in E.O. 12898, include American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Poverty

status, used in this EA to define low-income status, is reported as the number of persons with income below the poverty level.

No Build Alternative

The No Build Alternative would have no effect, either beneficial or adverse, upon environmental justice issues in the project area.

Build Alternatives

Families and business owners that would be relocated are not minorities, and the alternatives do not traverse any predominantly minority neighborhoods. No adverse impacts to minority or low-income populations are anticipated as a result of constructing any alternative. Since there would be no adverse impacts to minority or low-income populations, all alternatives are in compliance with E.O. 12898.

4.9 Considerations Relating to Pedestrians and Bicyclists

No Build Alternative

In accordance with 23 USC 109(n), MDOT gives full consideration to bicycle facilities by providing reasonable alternatives to the bicycling public in the development of transportation projects. If the No Build Alternative is selected, no changes will occur to benefit or impair the pedestrian and bicycle use within the study area.

Build Alternatives

Use of the study area will change slightly as improvements are completed. There will be bicycle lanes and sidewalks along the entire project area. Additional foot and bicycle traffic during construction near the Causeway Park will likely increase its use. The park will remain open and accessible throughout construction.

With the increase in speed limit along the proposed project corridor, traffic patterns may change slightly within school zones and other community facilities. However, we do not anticipate the entrances and exits to these facilities to be altered. Safety lights and street markings will be placed and used according to proper safety regulations.

4.10 Permitting

No Build Alternative

There will be no permits required if the No Build Alternative is selected.

Build Alternatives

Bridge demolition and construction will require both State and Federal Water Quality Permits for the bridge crossing and wetland impacts. A Joint Application, to be submitted to MDMR after receiving the FONSI, will begin this process. The bridge crossing will require a U.S. Coast Guard Bridge Permit for construction over a navigable waterway. Section 404 permits from the Corps of Engineers, National Pollution Discharge Elimination System (NPDES) permits and Mississippi State Water Quality Permits will also be needed.

Roadway improvements to the Northern and Southern sections will require a Large Construction Notice of Intent (LCNOI) permit from MDEQ.

4.11 Wetland Impacts

No Build Alternative

There would be no impact to the water body or to the wildlife if the No Build Alternative were selected.

Build Alternatives

The delineated wetlands in the project area are located near and under the causeway portion of the project. These wetlands are emergent vegetative species, mostly comprised of *Juncus romerianus* and *Spartina patens* marsh beds (see Fig. 3.4). Marsh habitats will be specifically protected from equipment, barges, etc., and contractors will be instructed to avoid any damage, intrusion, or disturbance of these areas.

No submerged vegetation was noted or expected in the areas to be impacted by construction.

4.11.1 Shading Effect

The potentially detrimental effects to the emergent vegetation due to shading from a wider bridge will be offset by the height of the new bridge and causeway as illustrated in Figure 4.1. The new bridge will be at least 13 ft. higher (at lowest chord) and have a steeper incline to the drawbridge than the existing height.

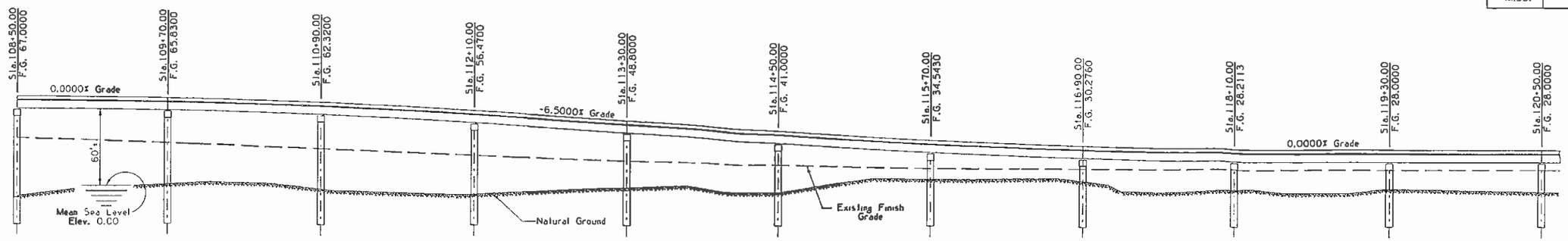
Shading effect was approximated by a Height/Width ratio. The existing causeway (lowest chord) is 12 ft. high, and 34 feet wide, yielding a .35 h/w ratio. The proposed causeway will be 28 ft. high and 80 ft. wide, also yielding a .35 h/w ratio. Thus, there will be no difference in the shading effect after the bridge is completed.

Figure 4.1

CONCEPTUAL DRAWING:
Comparison between Old and New Bridge/Causeway Height

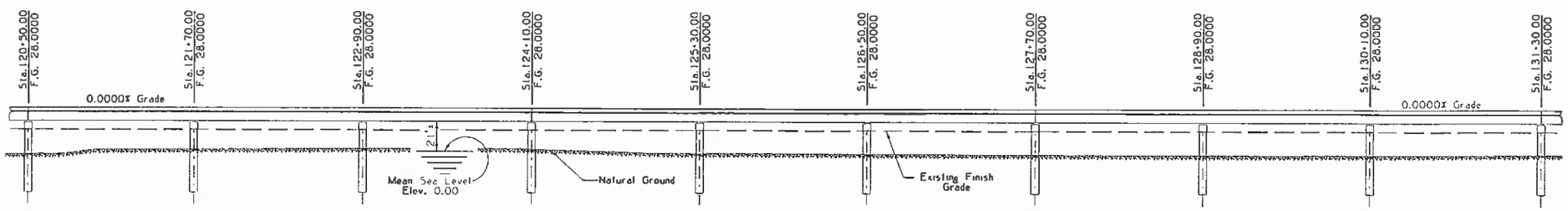
UPPER RIGHT CORNER OF HP488CA PAPER PLOT

STATE	PROJECT NO.
MISS.	.



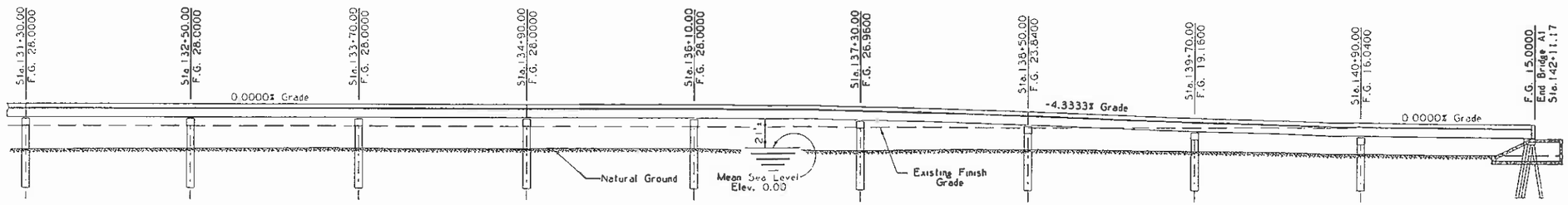
PART ELEVATION AND PROFILE AT ℄ OF CAUSEWAY

Scale: 1" = 40'



PART ELEVATION AND PROFILE AT ℄ OF CAUSEWAY

Scale: 1" = 40'



PART ELEVATION AND PROFILE AT ℄ OF CAUSEWAY

Scale: 1" = 40'

FIGURE 4.1

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

POPP'S FERRY ROAD ACROSS BACK BAY OF BILOXI

CAUSEWAY CONCEPTUAL

PROJECT

HARRISON COUNTY

WORKING NUMBER

SHEET NUMBER

REVISIONS BY

DATE

Pickering

DESIGNED RCF DETAILED WBS TRACED CADD

CHECKED ISSUED DATE

LOWER LEFT CORNER OF HP488CA PAPER PLOT

Additionally, most of the marsh areas affected by shading are not located under the lowest portion of the causeway/bridge, but under the incline. The slope of the new incline will be steeper than the existing incline and will impact the marshes beneficially as length of sunlight exposure to the marshes will increase in proportion to the incline. With these estimations, detrimental impacts to the marsh beds are expected to be minimal (Figure 4.1).

4.12 Water Body Modification and Wildlife Impacts

No Build Alternative

There would be no impact to the water body or to the wildlife if the No Build Alternative is selected.

Build Alternatives

There would be no modifications to the existing navigational ship channel, Big Bay Lake, or Back Bay, for any of the bridge alternatives.

The upland vegetated area under and to the east of the northern incline of the drawbridge (the upland area closest to the bascule) may need to be removed during construction for a work canal. Removal of this low-quality, upland area has been discussed with and verbally approved by Mark Thompson, NMFS (Appendix 24). If needed, approximately 1 acre of this site will be removed and the dredge material used to add girth to existing marsh beds or properly disposed of during the construction of the new bridge (Fig 3.4)

The completed bridge is expected to only minimally impact the public access areas under the bridge, the man-made and naturally occurring marsh areas, and Causeway Park (Appendix 10). Terrestrial wildlife inhabitants and birds should not be affected long-term, as the requirements for survival (i.e., shelter, food and water supply) will not be significantly altered (Appendix 6).

Construction impacts are expected to produce a "no net loss" of habitat due to mitigation efforts throughout the project area. Effects to wildlife are expected to be minimal, temporary, and displace species only during the months of construction and reestablishment of habitat.

4.13 Floodplain Impacts

No Build Alternative

No impacts to the floodplain are expected if the No Build Alternative is selected.

Build Alternatives

In accordance with Executive Order 11988 "Flood Plain Management," FEMA floodplain maps were examined to determine the project's potential impact or encroachment on designated 100-year floodplains. The floodplain associated with the Back Bay of Biloxi is included within each alternative alignment (Figure 3.3). During design, the improvements would be planned to minimize floodplain impacts as required by the Federal Highway Administration procedures in 23 CFR 650A. The floodplain crossing(s) would be designed to meet the following criteria:

- There is no potential for interruption or termination of the transportation facility that is needed for emergency vehicles or provides the communities' only evacuation route due to the construction of the project.
- The water crossing will convey floodwaters so there will be no increase in flooding due to the encroachment in the floodplain.
- The Build Alternatives will have no substantial impacts on the natural and beneficial floodplain values.

The impacts on the natural and beneficial floodplain values within each alternative would be loss of wildlife habitat and loss of vegetation. Impacts would be temporary, short-term, and minimal losses due to re-establishment capabilities of the species located in the area. Any influence on the flood level resulting from these possible encroachments would be determined during the survey and preliminary design phase of the project.

4.14 Coastal Zone

No Build Alternative

Coastal Zone requirements and permits would not be necessary if the No Build Alternative is selected.

Build Alternatives

The project area is in the Coastal Zone limits of Mississippi. The MDMR is the point of contact in Mississippi for wetland permits in the Mississippi Coastal Zone, which includes the counties of Hancock, Harrison and Jackson. Under a Memorandum of Agreement with the Mobile and Vicksburg districts of the U.S. Army Corps of Engineers (USACE), applications for wetland activities in the Mississippi Coastal Zone are to be submitted to the MDMR on the Joint Application and Notification form. This EA approval and FONSI will be included as a requirement of the application.

4.15 Threatened or Endangered Species

No Build Alternative

If the No Build Alternative is selected, nothing will change, and there will be no impact to any potential Threatened or Endangered (T&E) species.

Build Alternatives

The waters or beach areas are not identified as critical habitat for any of the T&E species, and infrequent, if any, occurrences of these species are expected. The effects the proposed project will have on the T&E species occurring in this vicinity are assumed to be minimal, if any. The construction of the proposed bridge will be done by bringing in all equipment and supplies by barge, and working from the barge rather than filling in the area and working from the ground, thus disturbing the least amount of habitat possible.

As recommended by the Department of Wildlife, Fisheries, and Parks, (Appendix 7) the timing of construction will be scheduled to avoid the time of year in which manatee may be in the area. Additionally, the Alabama Red-Bellied Turtle, currently not found in the project area, would not be attracted to this area during construction due to the barge (no-fill) construction strategy.

4.15.1 Essential Fish Habitat Impacts

The EFH in the study area will be minimally impacted during construction. Barges will be used as the construction platform for holding and transporting equipment to minimize disturbance and/or damage to the water column or water bottom. Water quality will be affected temporarily as dredging occurs in the existing canals along the east side of the

bridge. Dredging in the existing canals will be to the previous depth (appx. 8 ft.) of the canals dug for Katrina repairs in 2005. The canals will not cross or impede the sand beach area which borders the navigable waterway.

4.16 Land Use

No Build Alternative

Land Use would not change if the No Build Alternative is selected.

Build Alternatives

The proposed improvements would not significantly change the general land use of this portion of Popp's Ferry Road. The 2.4 mile project area has been "built-out" and established for many years and is not anticipated to evolve due to the proposed improvements. Visual changes and safety improvement would be among the most notable changes, as greenspace would be created along the Northern and Southern sections.

4.17 Historic and Archaeological Preservation/4(f) Lands

No Build Alternative

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 USC Section 303) requires that when federal funds are used on a project, the agency must consider the affect on Section 4(f) resources. Section 4(f) resources include publicly owned land of a public park, recreation area, wildlife and waterfowl refuges, or land of a historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, recreation area, refuge, or site). The No

Build Alternative would result in no impact to historic and archaeological preservation/4(f) lands.

Build Alternatives

The 4(f) land located within and surrounding the study area is leased to the City of Biloxi by the Secretary of State. Upon their review of the proposed project, it was determined that little, if any impact will be made on the 4(f) property at Causeway Park. The Secretary of State approved the preliminary bridge placement and is supportive of this project. The letter submitted with this decision is found in Appendix 10.

Any potential impacts to the marsh beds and 4(f) property will be carefully monitored and minimized.

We anticipate a *de Minimis* finding from FHWA, as the construction activities will only temporarily, and minimally affect the activities, features, and attributes of this resource. Should any unforeseen disturbance of marsh occur, mitigation for that impact will be arranged.

4.18 Hazardous Waste Sites

No Build Alternative

The No Build Alternative would yield no impact to hazardous waste sites within the study area.

Build Alternatives

None of the sites determined to be within one-fourth mile radius of the project area are located within the footprint of the project (Appendix 9). Therefore, no impacts or disturbance of hazardous materials sites are anticipated.

4.19 Energy Impacts

No Build Alternative

There would be no change in the energy use of the study area should the No Build Alternative is selected.

Build Alternatives

Selection of any of the Build Alternatives would involve the commitment of energy resources both during the short-term construction period and throughout the long-term use of the roadway. The energy requirements of the alternatives are basically similar and are greater than the energy requirements of the No Build Alternative.

The energy used by the preferred alternative can be characterized as follows:

- Construction: Energy would be used for the manufacturing and transport of the construction components and by the heavy equipment utilized for roadway improvements and bridge construction.
- Maintenance: The preferred alternative would require routine maintenance on equipment and could result in energy use for those maintenance activities. Potential traffic delays could result from maintenance activities and could consequently increase energy use temporarily during those times.
- Motor Vehicle Use: Upon completion of the project, traffic flow should increase, thereby reducing travel time which, in turn, decreases energy use.

In summary, the amount of energy required to perform these improvements may be substantial, but temporary. Once the project is complete, a reduction in operating costs

and energy use should ensue due to controlled access, increased traffic flow, reduced travel time, and increased safety.

4.20 Secondary and Cumulative Impacts

No Build Alternative

No changes in the study area would occur if the No Build Alternative is chosen, therefore, no secondary or cumulative impacts would result.

Build Alternatives

Secondary and cumulative impacts are a potential concern in any transportation improvement project. Secondary, or indirect impacts, are "caused by the action and occur later in time or farther removed in distance" as opposed to direct impacts. These effects are often less predictable than direct project effects but are still "reasonably foreseeable" (40 CFR 1508.8). Cumulative impacts encompass all impacts related to a project, both direct and indirect, as well as effects of any other actions that may impact the environment in the area under study. The cumulative impact of a project is defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions," (40 CFR 1508.7). Actions to be considered in a cumulative impacts assessment include not only previous or future actions of MDOT, but actions of other government agencies, private citizens, corporations, and other entities which may be either related or unrelated to the project team. This addresses the potential secondary and cumulative impacts associated with the implementation of the alternatives outlined in Chapter 2 and other projects/programs that are planned for the region.

Secondary, or indirect impacts, would be the result of induced development encouraged by construction of all Build Alternatives. Induced development includes development that would not take place if not for the proposed action, or development that would take place at a different location, a later time or on a smaller scale.

4.21 Wild and Scenic Rivers

There are no rivers in the study area that are listed in the National Park Service's Nationwide Rivers Inventory as a Wild and Scenic Riverway. Therefore, the coordination requirements for the Wild and Scenic Rivers Act do not apply to this project.

4.22 Air Quality

Per EPA standards, the state of Mississippi is within acceptable levels of air quality and relatively free of air pollution. The City and the preparers have agreed that an air quality assessment is not required for this project.

4.23 Farmland

No farmlands are found in the project area.

4.24 Joint Development

This project is not part of a larger initiative and should be considered on its own merits.

4.25 Coastal Barriers

The proposed project area is not located within a Coastal Barrier.

Chapter 5

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Chapter 6

DISTRIBUTION

The following is a list of agencies and individuals who will receive a copy of this EA for their records and public information.

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Chapter 7

AGENCY COORDINATION AND PUBLIC INVOLVEMENT

Coordination among three engineering firms, local government officials, and oversight agencies began immediately after MDOT approval to perform an Environmental Assessment. Scoping meetings, frequent communication and status reports within the 3 firms ("team"), and public informational meetings were tools used for ease of communication.

7.1 Agency Coordination

7.1.1 Kickoff Meeting and Team/City of Biloxi Scoping Meeting

The kickoff meeting was held on November 28, 2007, in Hattiesburg, MS. Key members of the project team, as well as other representatives of each firm were in attendance. The primary goal of this meeting was to get acquainted, and become familiar with the scope of work. The agenda is in Appendix 11.

The scoping meeting was held on December 20, 2008, at City Hall in Biloxi, MS. Attendees were given a summary of the project and an introduction of the proposal. A total of 16 people attended this meeting, including the Mayor and other City of Biloxi officials, MDOT, FHWA, and representatives from the 3 project teams. The agenda, list of attendees, and the minutes can be found in Appendix 12.

On March 21 & 22, 2010, another Scoping Meeting was called, to include all resource agencies in a roundtable discussion. The list of attendees, agenda, and minutes are

presented in Appendix 23. Several important comments were discussed at the meeting, and addressed after the meeting. A follow-up email with these changes (edits were highlighted in Chapters 3 & 4) was sent to all resource agencies on April 27 (cover letter in Appendix 21). No comments were received, and edits are now incorporated in the EA.

7.1.2 Coordination with FWHA and MDOT

During all phases of this study, FHWA and MDOT have been involved. As mentioned in previous sections, representatives from each agency attended meetings and provided consultation. Communication by phone and email was employed on an occasional basis.

7.1.3 Solicitation of Views sent to Resource Agencies

A letter was sent on Jan. 3, 2008, requesting written participation from outside agencies regarding their concern or comment about the road/bridge project. These agencies participate in this project based on their jurisdiction and oversight of a certain element that could potentially be affected during or after construction. A copy of the letter and the agencies' response is found in Appendix 7.

It should be noted that National Marine Fisheries was inadvertently overlooked for this first mailout. Upon discovering this mistake, members of the team met with Mark Thompson personally, on-site, and explained the project. The specifics of this meeting and resulting emails are detailed in Appendix 22.

7.2 Joint Application for Debris Removal & Dredging

The Department of Marine Resources will require a Joint Application for the removal of debris resulting from the demolition of the existing bridge, and for dredging activities. A

copy of the Application is being submitted to MDMR. The approval of this permit is contingent upon comments and receipt of the FONSI for this EA. Modifications can be made if necessary.

Rubble and dredge spoils will be the property and responsibility of the contractor. Should the contractor elect to donate it to MDMR for beneficial use, a separate contract between the contractor and MDMR will be executed regarding the hauling and placement of the material. MDMR has agreed to accept the rubble and spoils for beneficial use if the contractor so chooses (Appendix 5).

7.3 Coordination with the City of Biloxi and Residents

Portions of Popp's Ferry Road have undergone improvements several times in the last 10 years. As a result, residents and elected officials are keenly interested in any potential project along this corridor. Hence, open communication with the City and the residents was well received. Throughout the EA process, contact information for the design teams was readily available, and communication with the design teams was encouraged.

7.3.1 Presentation to Biloxi City Council

On February 12, 2008, the project team presented the project to the Biloxi City Council. Kreg Overstreet from Brown and Mitchell, Inc. (BMI) made the presentation. Each member of the council, the Mayor, and the media was given a packet of information describing the need, project limits, and strategy for this EA and potential project. No potential alignments were presented at this time. It was noted that anyone interested in the preliminary thoughts on the potential alignments could contact BMI's Biloxi office

for further information. It was stressed to the council that we intended to use the comments from our first Public Meeting in March 2008 to help us refine our initial ideas on alignments and to select the most viable options for further study.

After the presentation to the council, each council member, the Mayor of Biloxi, and all other interested parties were provided with a summary of this presentation, including comments received from the council.

A copy of the packet presented to the council, and the summary of the presentation are found in Appendix 13.

7.4 Public Involvement

A copy of all exhibits mentioned in this section can be found in Appendix 14.

7.4.1 Public Meeting #1

Public meetings such as this one are not required by regulatory agencies, but are recommended. Likewise, a detailed list of invitees, addresses, and notification of receipt are not required as they are in the Public Hearing portion of the EA.

A public meeting was held on Thursday, March 6, 2008, at the Donal M. Snyder Sr. Community Center in Biloxi, MS. This location is within a mile of the project area and was suggested by members of the Biloxi City Council in order to accommodate the expected response.

7.4.1.1 Invitations

At the request of Councilmen Mike Fitzpatrick (Ward 4), Tom Wall (Ward 5), and Ed Gemmill (Ward 6), approximately 11,700 invitations were mailed to constituents, City of Biloxi officials, and interested parties approximately two weeks before the meeting. The mailing list was composed from a computerized "saturation mail" strategy in which the mailperson delivers a postcard to each mail receptacle on their route. No names were gathered or addressed specifically, unless requested. Additional invitations were made available at local community centers, libraries, and City Hall.

Approximately two hundred (200) people attended the public meeting. A copy of the sign-in sheet is on file with BMI.

7.4.1.2 Brochure

Attendees were given an information brochure with a brief description of the project. This included maps and narrative of the project area, possible alignments and consequences, and an explanation and timeframe estimate for the entire project.

7.4.1.3 Comment Card

The meeting included a comment card for attendees to fill out, asking about their preferences regarding the type of roadway and bridge structure. These were either collected at the door, or taken home, filled out, and mailed to BMI.

A total of 66 cards were returned with comments. The results and comments are summarized in Appendix 14. The original comments are on file with BMI.

7.4.1.4 Exhibits and Discussion

The format of this meeting was "come and go" and informal, meaning there was no formal presentation before an audience. Residents were able to view the exhibits and discuss their questions individually with the leaders and team members.

Three exhibit stations were displayed and manned by a member of the design team. Each station had two identical 24"x 36" aerial photographs with three potential alignments denoted. The brochure mentioned above contained the same photographs as the exhibits. The exhibit stations were: 1) Southern Section 2) Bridge-Causeway Section, and 3) Northern Section. Exhibits were large enough that each home was visibly identifiable on the map and property owners could easily see how their property would likely be affected by each of the proposed alignments.

7.4.2 Anatole Bay Homeowners Association Meeting

Anatole Bay is a 60 unit townhome/condo complex approximately 50 yards south of the south abutment of the causeway-bridge and west of Popp's Ferry Road. It was determined after-the-fact that most residents either did not receive notice of the Public Meeting, unknowingly threw it away, or could not attend the meeting. This group of residents will be impacted regardless of the alignment that is chosen due to the location of their only entrance into the complex. The design team offered to meet with their homeowners' association to answer any questions.

Kreg Overstreet and Jill High attended a regular meeting of the homeowners' association. Maps, brochures, and contact information identical to those presented at the initial Public Meeting were provided and left on site for anyone interested. Residents were concerned about several issues including the entrance to the Anatole Bay development, noise due to traffic, and residents' view of the Back Bay. These issues were addressed in as much detail as possible, with the information we had at that time. Residents at the meeting professed a preference for a fixed-span bridge in order to lessen the traffic noise created by the current bascule bridge.

June 2, 2008: Mr. Ed Gemmill requested an update to be included in a "Capital Projects Update" mailout to his constituents of Ward 6. A copy of the update is also found in Appendix 14.

7.4.3 Public Meeting #2

Councilmen Fitzpatrick and Gemmill called a Ward Meeting on November 25, 2008 to discuss the Popp's Ferry Road and Bridge alternatives, prior to the City Council vote of concurrence for the preferred alternative. Approximately 5,500 postcard announcements were mailed, and approximately 100 people attended. The invitation and minutes are found in Appendix 14.

December 2, 2008: Biloxi City Council voted to accept and concur with the findings in the Draft Environmental Assessment and approved its submittal to MDOT and FHWA. A copy of the Resolution is found in Appendix 14.

7.4.3.1 Summary of Public Hearing and Citizen Comments

An open forum, public hearing, as recommended by MDOT was conducted on September 23, 2009 from 4pm-7pm (see Appendix 15 for proof of public announcements). A sign-in sheet was available and attendees were encouraged to sign in. A copy of the sign-in list can be found in Appendix 16. Comment cards were readily available for each attendee to fill out and leave with us, or to take home and mail in. A copy of each comment card turned in can be found in Appendix 17.

A certified court reporter was also available throughout the hearing to take verbal comments. Her typewritten copy of the verbal comments received can be found in Appendix 18.

Two identical stations were provided for public viewing in the gym of the Donal Snyder Community Center. Each station presented an aerial map of our preferred alternative for the entire length of the project corridor as well as renderings of the isometric typical section views of the roadway and bridge concepts. Information on the maps included Right-of-Way lines and roadway alignment, maximum number of potential relocations, and bridge footprint (see Figs. 2.1-2.2).

The following information summarizes the public interest. Nearly all written comments have been addressed previously in the Draft EA, and the reference is noted in italics after the comment. Comments with no reference in the Draft EA are addressed individually after the comment.

- 299 citizens signed in at the meeting not including media and engineers
- 10-day comment period ended Saturday October 3, 2009
- 29 people made at least 1 verbal comment recorded by the court reporter.
  - ✓ Approximately 14 comments are assumed to be in support of the project
  - ✓ Approximately 12 comments are assumed to be opposed to the project
  - ✓ Approximately 4 comments are assumed to be neutral

- 25 comment cards were turned in at the Public Hearing. One was mailed in.
  - ✓ 16 appear to be in support
  - ✓ 5 appear to be against
  - ✓ 1 question was asked regarding the project
  - ✓ 2 questions were asked which were not related to this project
  - ✓ 2 comments were made which were not related to this project

WRITTEN COMMENTS:

Of those in support of the project:

- ✓ 1 liked the roadway design with NO elevated roadway
- ✓ 3 think this project is needed now
- ✓ 2 like the Controlled Access with lights at intersections and turning bays
- ✓ 1 liked the bike path
- ✓ 8 were generally in support of the project (nothing specific)

Of those against the project:

- 4 were against the proposed route (preferred another route location).

Response: Choosing another route location would not satisfy the Project Purpose and Need (Section 1.3), and would hinder the goals of this project (see Table 2).

- 1 was concerned with the expense of purchasing homes and right-of-way.

Response: The City has not secured all of the funding for this project, and the Acquisition, Design and Construction Phases will not begin until funding is obtained.

Concerns that were mentioned on the comment cards:

- 2 suggested to maintain the light at Sunkist Country Club Road.

Response: No signalized intersections are slated for removal within this project area. However, improvements or upgrades to existing signalized and/or unsignalized intersections may occur.

- 2 would prefer to remove ALL homes on the East & West sides of Popps Ferry.

Response: Removing all homes on both sides of Popps Ferry Road would be cost prohibitive and unnecessary. Not all homes on Popps Ferry Road have driveways entering directly onto Popps Ferry Road. Our goal is to reduce the number of conflict points along the corridor, not to remove each home along the corridor.

- 1 recommends considering a channel route change under the bridge.

Response: Changing the existing channel route is not mandatory to satisfy the goals of this project. The cost of a channel route change would be prohibitive to this project.

- 1 was concerned that property values along the corridor might decrease b/c of the widening.

Response: There is no indication that the widening of this road will decrease surrounding property values. Property values increase or decrease for a variety of reasons, not simply for nearby roadway improvements. Safety, aesthetics, and efficiency resulting from these improvements are expected to affect the area positively.

Question asked:

- How will homeowners be reimbursed? Is FMV the same as appraisal value?

Response: They will be made whole in three different ways:

1. They will receive the Appraised Value of their home; ex. $ 165,000.00
2. If a comparable house cannot be found for $165,000.00, but a comparable house costs $185,000.00, the owner is eligible for Relocation Benefits. calculated as the difference between Appraised Value and the house's purchase price of $185,000.00. Therefore, a relocation payment would be granted for $20,000.00.
3. Moving expenses will be paid by either "actual" or" lump sum" cost. Owner gets to choose. If someone has a significant amount to move, "actual" will be most beneficial. "Lump Sum" is figured on the number of rooms according to a HUD schedule.

VERBAL COMMENTS:

All verbal/transcribed comments are included in Appendix 18. One citizen called in a verbal comment after the public hearing. Verbal comments were not as straightforward as the written comments. Citizens seemed to be "thinking out loud" without focusing on one specific idea, thereby seeming to be undecided regarding their support of the project. Several citizens made multiple comments on various subjects. This summary will attempt to highlight specific comments gleaned from the transcription, without assigning a "for" or "against" decision. No response was given to these comments as most of them are opinions.

- ✓ 2 would prefer a different bridge design
- ✓ 1 not in support of roadway design
- ✓ 4 concerned with property values
- ✓ 1 concerned with living in the shadow of an underpass
- ✓ 2 like the controlled access concept
- ✓ 4 want smaller footprint and do not want Limited Access
- ✓ 3 think this project is not needed
- ✓ 1 thinks it will deter from the aesthetics of the area
- ✓ 1 says the project is too close to her house

- ✓ 1 concerned with safety and speed. Prefers a 2 lane road.
- ✓ 3 claim the City is being secretive in their planning process
- ✓ 1 wants to know the timeframe for beginning
- ✓ 2 would like to have information more readily available
- ✓ 1 concerned that the City will be buying too many houses
- ✓ 1 wants to close Sabrina Drive to protect her property value
- ✓ 1 wants to have a south-bound turn from Sabrina onto Popps Ferry Road
- ✓ 1 in support of bridge concept and design but not in support of roadway design
- ✓ 1 wants to see roadwork completed before bridge work
- ✓ 1 wants a common fence along the corridor separating private properties from PF to maintain the aesthetic nature of the project
- ✓ 1 wants safety barriers
- ✓ 1 wants to suggest places for intersections, turn lanes, and bike paths
- ✓ 1 wants to see more controlled access at LaBonne Terre
- ✓ 1 wants another route to be selected
- ✓ 1 wants this project to be a voting referendum
- ✓ 1 wants to model the bridge after the newly opened, fixed-span bridge in Orange Beach, AL
- ✓ 6 neutral comments/ not related to this project

7.4.4 Coordination with American Indian Tribes and Cultural Resources Report

The Cultural Resources Report (Appendix 8) was submitted to MDAH and the six (6) federally recognized American Indian Tribes on August 6, 2008. MDAH requested additional information, and a resulting Addendum and concurrence letter is found in Appendix 8. Also, a letter of invitation to participate in the environmental review process (Appendix 8) was extended to the Indian tribes, and no responses were received as of December 3, 2009. It is therefore assumed that the tribes have no objection to moving forward with the preferred alternative.

Chapter 8

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Appendix 1

ALTERNATIVES TRAFFIC ASSESSMENT

ALTERNATIVES TRAFFIC ASSESSMENT

for

Popp's Ferry Bridge - Environmental Assessment

Biloxi, MS

October 2008

Prepared for

City of Biloxi

140 Lameuse Street

Biloxi, MS 39533

Prepared by:

NEEL-SCHAFFER

Contents

1.0 Introduction and Summary 1
2.0 Existing Conditions 2
2.1 Study Area 2
2.2 Land Use 2
2.3 Roadways and Intersections 4
2.4 Marine Traffic Volumes 11
2.5 Automobile Traffic Volumes 12
2.6 Capacity and Level-of-Service 12
3.0 Projected Traffic 15
3.1 GRPC Model 15
3.2 Bridge Volume Comparison 19
3.3 Intersection Traffic Analysis 20
3.4 Operational Deficiencies 23
3.5 Typical Section 24
4.0 Proposed Roadway Improvement Alternates 27
4.1 Alternate A – No-Build 27
4.2 Alternate B – Widening to the West 27
4.3 Alternate C – Widening to the East 28
4.4 Alternate D – Symmetrical Widening 29
4.5 Alternate E – Widening Shifting East and West 29
4.6 Other Roadway Improvements 30
4.7 Level-of-Service Analysis 34
4.8 Signal Warrants 36
5.0 Recommendations and Conclusions 38
Appendix 40

- Turning Movement Counts
- FDOT Quality/LOS Handbook, Table 4-1
- Traffic Signal Warrants
- Level of Service Summary Sheets

LIST OF TABLES

No.	Title	Page
1	Vessel Log Summary from 1/4/07 to 7/13/07	11
2	Year 2008 Existing Traffic Level-of-Service	12
3	Historical Daily Traffic Volumes	14
4	Daily Volume Connecting I-10 with Peninsula	19
5	Year 2018 (Existing Geometrics) Traffic Level-of-Service	20
6	Year 2030 (Existing Geometrics) Traffic Level-of-Service	20
7	Year 2018 (Improved Geometrics) Traffic Level-of-Service	34
8	Year 2030 (Improved Geometrics) Traffic Level-of-Service	34
9	Traffic Signal Warrant Analysis	37

LIST OF FIGURES

No.	Title	Page
1	Study Corridor	3
2-1	Existing Conditions-Aerial of Southern Corridor	8
2-2	Existing Conditions- Aerial of Back Bay Bridge	9
2-3	Existing Conditions- Aerial of Northern Corridor	10
3	2008 Existing Traffic Volumes	13
4	Transportation Model – Year 2030 Daily Traffic (2-lane bridge)	16
5	Transportation Model – Year 2030 Daily Traffic (4-lane bridge)	17
6	Transportation Model – Year 2030 Daily Traffic (4-lane bridge & Popp's Ext to 90)	18
7	Year 2018 Traffic Volumes	21
8	Year 2030 Traffic Volumes	22
9	Popp's Ferry Road – Typical Section	25
10	Popp's Ferry Road – Bridge Section	26
11-1	Preliminary Alignment (Southern Corridor)	31
11-2	Preliminary Alignment (Back Bay Bridge)	32
11-3	Preliminary Alignment (Northern Corridor)	33

1.0 Introduction and Summary

This report summarizes the findings of a traffic assessment performed by Neel-Schaffer, Inc. as requested by the City of Biloxi for the proposed Popp's Ferry Bridge Environmental Assessment for widening the existing bridge over Biloxi's Back Bay in west Biloxi, Mississippi. The project extends from Riverview Drive south to Pass Road through primarily residential areas. The proposed alignments for the roadway and bridge widening were reviewed for impacts to traffic and access.

The Popp's Ferry Road corridor is vital to the transportation network supporting the City of Biloxi. The portion of Biloxi south of the Back Bay is a peninsula with limited access. Regionally, the only roadways connecting the I-10 corridor with property south of the Back Bay include: 1) Lorraine Road (Hwy 605) – 4 lane divided roadway, 2) Popp's Ferry Road via Cedar Lake Road – 5-lane, 3-lane and 2-lane, and 3) Interstate 110 – 4 lane divided. As a result of these limited connections to the peninsula, capacity of these connecting roadways is of critical importance to support the major employers in Biloxi including casinos and Keesler Air Force Base. Another important factor relating to the capacity of these connecting regional roadways is that they serve as the primary Hurricane evacuation routes. Each of these three facilities has a draw-bridge, that must accommodate the evacuation of marine vessels at the same time that automobiles are evacuating. Each of the these three connecting routes is operating near capacity during peak hours, thus necessitating the need for additional capacity to support existing and future businesses and to provide for safe and timely hurricane evacuation routes.

2.0 Existing Conditions

2.1 Study Area

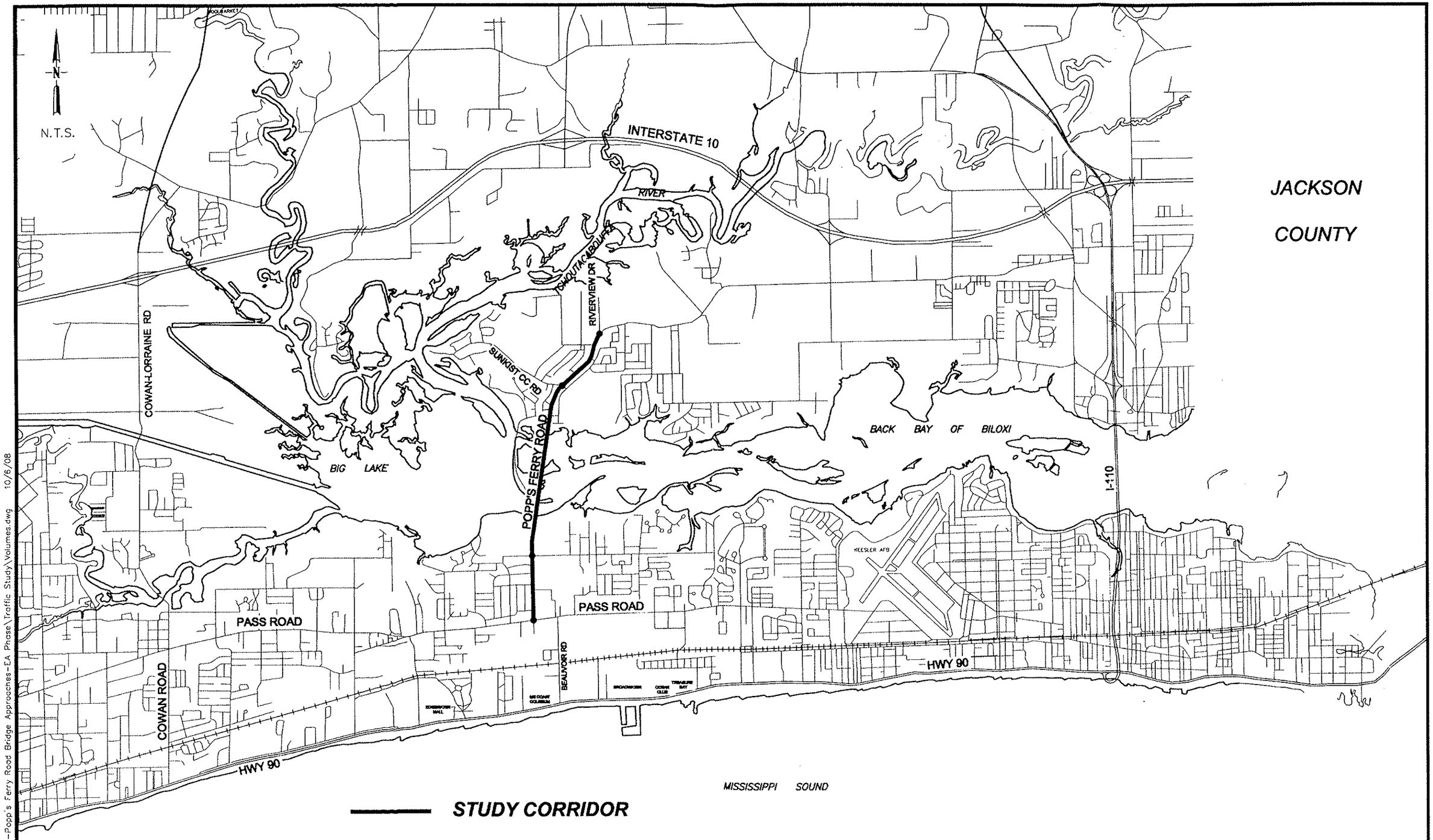
The study area was identified based on the project limits, to include the area adjacent to the existing Popp's Ferry Road between Riverview Drive and Pass Road. The study corridor includes the area within 100 ft of either side of Popp's Ferry Road, for consideration of widening to the east, west or symmetrically along the existing alignment for each of the alignments considered. The study area is shown in Figure 1.

2.2 Land Use

The study corridor is primarily developed residential land. North of the Back Bay, Popp's Ferry Road extends north/south between residential single family lots with The Oaks Subdivision east of Popp's Ferry Road, and Sunkist Manor and Greenleaf Subdivision west of Popp's Ferry Road. A municipal complex including the Margaret Sherry Library, fire station and water tower exist on the east side at Riverview Drive, and municipal soccer fields on the west side at Riverview Drive.

The area around the Biloxi Back Bay is accessed via Causeway Drive, providing access to fishing, a boat ramp, and a pier and park that were heavily damaged by Hurricane Katrina in 2005 and again by Hurricane Gustav in 2008.

South of the Back Bay, Popp's Ferry Road has a diverse set of land uses, including multi-family units, single family, medical office, religious, restaurant and retail/commercial. Subdivisions include La Bonne Terre, Bay Vista, and Popp's Ferry Place.



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NEEL-SCHAFFER Solutions you can build upon	POPP'S FERRY ROAD ENVIRONMENTAL ASSESSMENT BILOXI, MISSISSIPPI	STUDY CORRIDOR	FIGURE 1

2.3 Roadways and Intersections

The primary roadways serving the study corridor include: Popp's Ferry Road, Riverview Drive, Sunkist Country Club Road, Atkinson Road/Old Bay Road, and Pass Road. These intersections with Popp's Ferry Road are each signal controlled intersections with auxiliary turn lanes and protected left turn movements.

Popp's Ferry Road

Popp's Ferry Road is classified as a Principal Arterial roadway on the Gulf Regional Planning Commission (GRPC) map designating Federal Aid routes. Popp's Ferry Road transitions in width throughout the corridor from north to south. The northern portion of the corridor is 60 ft wide with curb, gutter, sidewalks and 5 travel lanes and a posted speed limit of 35 mph. The travel lanes consist of two thru lanes in each direction and a center two-way, left-turn lane. The roadway then transitions from 5 lanes at Riverview Drive, to a 3-lane roadway at N. Country Club Lane south to the Back Bay bridge. The three lane section includes 36 ft of width, with curb, gutter and sidewalks. The roadway includes a single travel lane in each direction with a center two-way, left-turn lane. At the bridge over the Back Bay, the section narrows to a two-lane bridge across the Back Bay and the speed limit increases to 40 mph across the bridge. The cross section of the bridge is approximately 40.5 ft, which includes a 1'8" concrete barrier on the west side, two 12 ft lanes, 4 ft shoulders, a 1'6" concrete barrier, a 4'6" pedestrian walking area on the east side, and a 1' rail. The bridge also has a draw-bridge near the south landing with a bridge tender, and gates that control access when the draw is open for vessels. A curfew is in place limiting the opening of the draw to off-peak times. Regular coal deliveries to the power plan necessitate the regular opening of the draw to accommodate these coal barges, in addition to general marine traffic.

South of the Back Bay bridge, the Popp's Ferry Road widens from a two-lane bridge to 48 ft in width south to Hinman Avenue with a posted speed limit of 30 mph. This widened section includes one thru lane in each direction, a center two-way, left-turn lane, a northbound right turn lane, curb, gutter and an attached sidewalk on the west side of the road, and no curb or gutter on the east side. A detached, meandering sidewalk exists on the east side of Popp's Ferry Road

between Hinman Avenue and Atkinson Road. A school zone exists south of Atkinson Road, reducing the posted speed limit to 15 mph during school hours.

Popp's Ferry Road widens to 60 ft in width with a 5 lane section between Hinman Avenue and Pass Road. This section includes two northbound lanes, two southbound lanes, a center left turn lane, curb and gutter, and an attached sidewalk on the west side of the road. The eastern northbound lane ends at the driveway for the Winn Dixie plaza as a dedicated right turn lane. The western southbound lane ends at Pass Road as an exclusive right turn lane.

South of Pass Road, Popp's Ferry Road has a 48 ft wide section with curb and gutter, some segments of center raised median, and a sidewalk along the west side to the Walgreens driveway and along the east side to the Burger King driveway. This widened section extends south to the south Wal-mart driveway, then narrows to enter the Gulf Coast Coliseum and Convention Center (Coliseum) property as a two-lane paved roadway without curb, gutter or sidewalks. Popp's Ferry Road terminates at the coliseum property north of the CSX railroad tracks, accessing the new coliseum buildings that are currently occupied by MEMA and FEMA for disaster relief coordination efforts.

Due to the fact that Popp's Ferry Road terminates south of Pass Road at the coliseum property north of the CSX railroad, the majority of regional traffic on Popp's Ferry Road utilizes Pass Road and Beauvoir Road to access Highway 90 and the main coliseum campus. This is the reason that Popp's Ferry Road operates with split (north/south) signal phasing at Pass Road. Current plans by the City and Coliseum include extending Popp's Ferry Road south to Highway 90 with a new at-grade railroad crossing of the CSX tracks. The City also has design completed on intersection improvements to the Pass Road/Popp's Ferry Road intersection, to provide dual eastbound left turn lanes from Pass Road to Popp's Ferry Road.

Intersecting Roadways

River View Drive is a north/south roadway that serves as a local collector/residential street extending north of the signalized intersection of Riverview Drive/Popp's Ferry Road with 24 ft of asphalt, with a single travel lane in each direction without curb, gutter or sidewalks. The traffic signal has mast-arm mounted signal heads with protected/permitted left turn movements for Popp's Ferry Road, Man/Hand pedestrian crossing signal displays on each approach, and sidewalk ramps. Riverview Drive provides access into the single family residential areas to the north in the Riverview Development Subdivision and Wildwood Trace subdivision and terminates south of the Tchoutacabouffa River. Adjacent to Popp's Ferry Road, Riverview Drive provides access to the municipal property that has soccer fields and picnic areas on both the east and west sides of Riverview Drive.

South of Popp's Ferry Road, Riverview Drive serves the Margaret Sherry Library and municipal complex, and provides access into the Sunkist Manor Subdivision with a two lane, 22 ft wide roadway without curb, gutter or sidewalks.

Sunkist Country Club Road is a local collector/residential street that intersects Popp's Ferry Road at approximately a 50 degree angle on the west approach, and has a channelized right turn lane for the eastbound movement. Sunkist Country Club Road extends west into the Greenleaf Subdivision, Beau Chene Subdivision, Sunkist Manor Subdivision, Ancient Oaks Subdivision and is the primary access to the Sunkist Country Club. The area to the west is a peninsula area that is surrounded by Big Lake and the Tchoutacabouffa River. The intersection of Popp's Ferry Road/Sunkist Country Club Road is signal controlled, with mast arm mounted signal heads and protected/permitted left turns for the northbound movement only. Man/Hand pedestrian crossing signal displays and sidewalk ramps exist on the north, east and west approaches. The east approach of the intersection of Sunkist Country Club Road is 24 ft in width, with curb and gutter and no sidewalks. This east approach provides access into the Oaks Subdivision and Sunkist Manor Subdivision.

Atkinson Road is classified by GRPC as a Collector roadway on the Federal Aid system. Atkinson Road intersects Popp's Ferry Road south of the Back Bay, with a traffic signal

controlling the intersection. Atkinson Road extends east of Popp's Ferry Road and Old Bay Road extends west of Popp's Ferry Road. The signalized intersection has mast arm mounted signal heads with protected/permitted left turns for southbound traffic only. The east, west and south approaches have Man/Hand pedestrian signal displays and sidewalk ramps. Westbound Atkinson Road traffic has a channelized right turn lane at Popp's Ferry Road. Although sidewalk, curb and gutter are present at the intersection with Popp's Ferry Road, Atkinson Road is primarily 23 ft in width, without curb, gutter or sidewalks and has a 25 mph posted speed limit. Atkinson Road extends east to Jim Money Road and into Hiller Park, where it terminates as a gated entrance/exit into the Veterans Administration (VA) property. Atkinson Road provides access into the Tanglewood Subdivision, Saylor Estates Subdivision, Magnolia Bay Subdivision, Bent Oaks and Bluff Oaks Subdivision.

Old Bay Road is also classified by GRPC as a Collector roadway on the Federal Aid system. Old Bay Road extends west of Popp's Ferry Road as a circuitous east/west roadway that terminates at Big Lake Road to the west. Many direct driveway and brick mailboxes line the street. The roadway is approximately 22 ft in width, with sidewalk on the north side of the road in the vicinity of Popp's Ferry Road. Old Bay Road provides access into the Bay Vista Subdivision, La Bonne Terre Subdivision, and Lake Villa Subdivision. The posted speed limit is 25 mph on Old Bay Road.

Pass Road is classified by GRPC as a Principal Arterial roadway on the Federal Aid system. Pass Road extends west of Keesler Air Force Base with a 5 lane typical section that is approximately 55 ft wide, with 5-11 ft lanes. The intersection of Pass Road with Popp's Ferry Road is signal controlled with span-wire mounted signal heads. These heads were heavily damaged during Hurricane Katrina from high winds. The signal phasing includes east/west protected/permitted left turn phasing, and north/south split phasing. Pass Road has curb, gutter and sidewalks on both sides, with sidewalk ramps at the intersection with Popp's Ferry Road. No pedestrian signal displays exist at the signalized intersection. The posted speed limit on Pass Road is 35 mph.

The existing corridor is shown on aerial photography in Figures 2-1, 2-2 and 2-3.

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QA/QC:	DATE: .....

Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

NEEL-SCHAFFER
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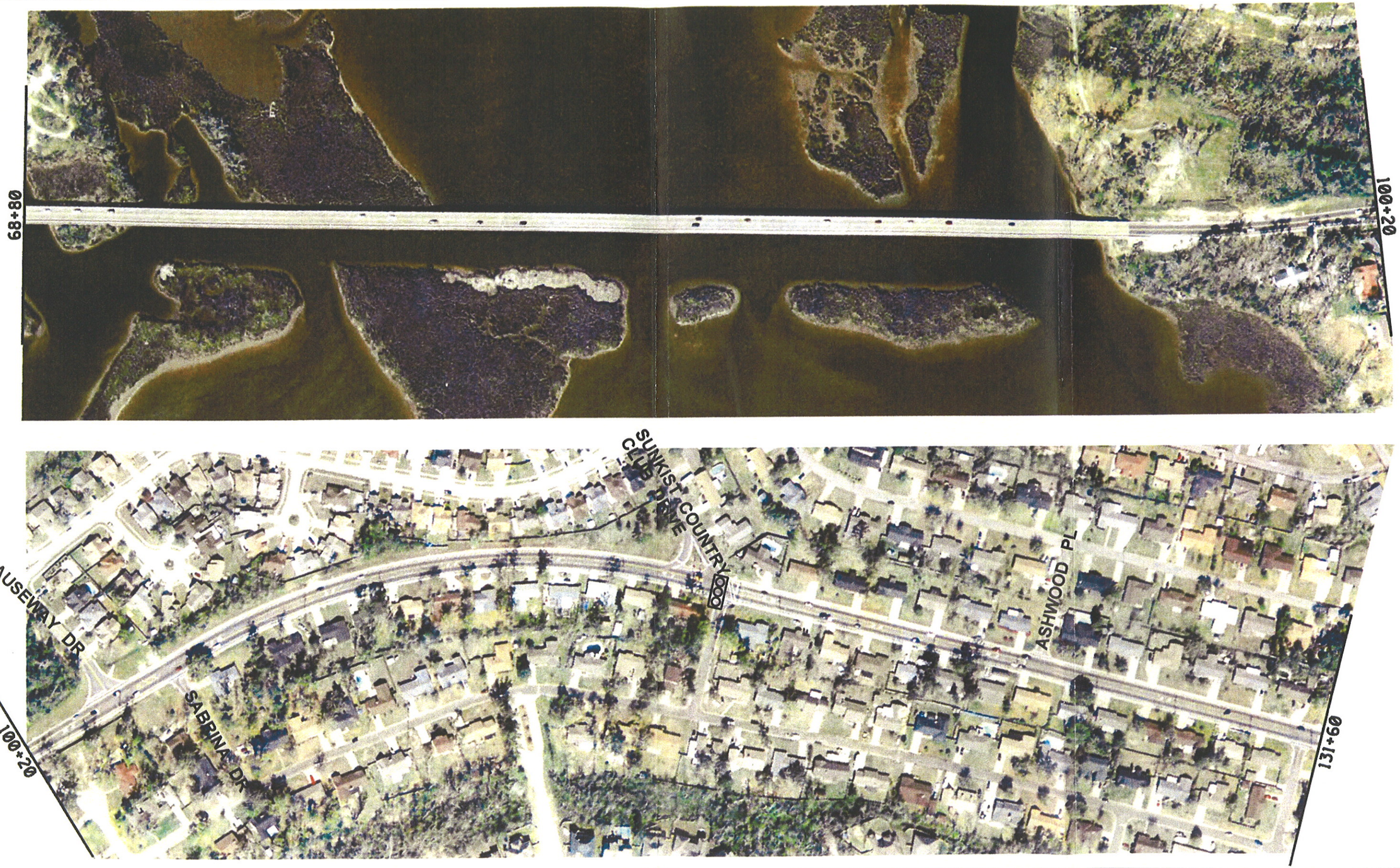
Existing Conditions

Aerial of Southern Corridor

Figure 2-1



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CHKD:	DATE:
QA/QC:	DATE:

Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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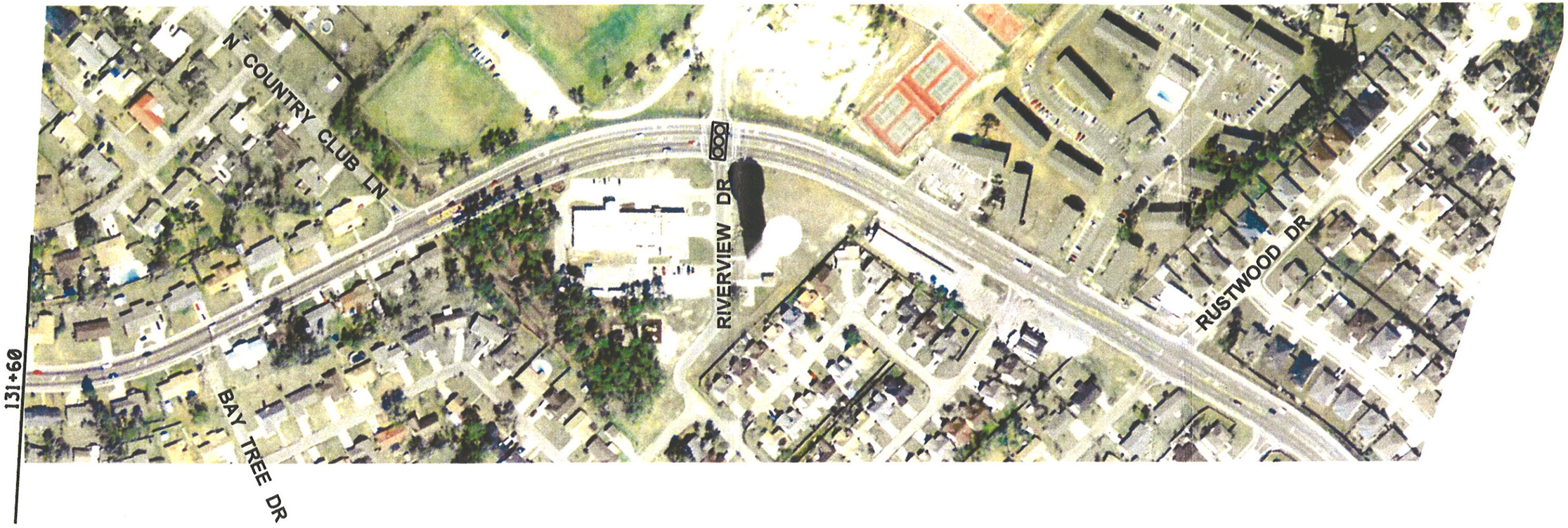
Existing Conditions

Aerial of Back Bay Bridge

Figure 2-2



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Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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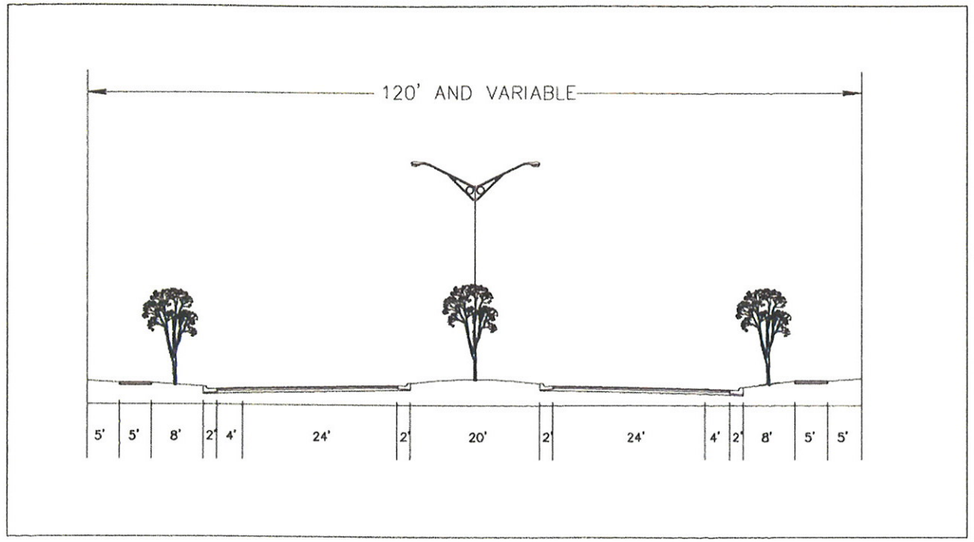
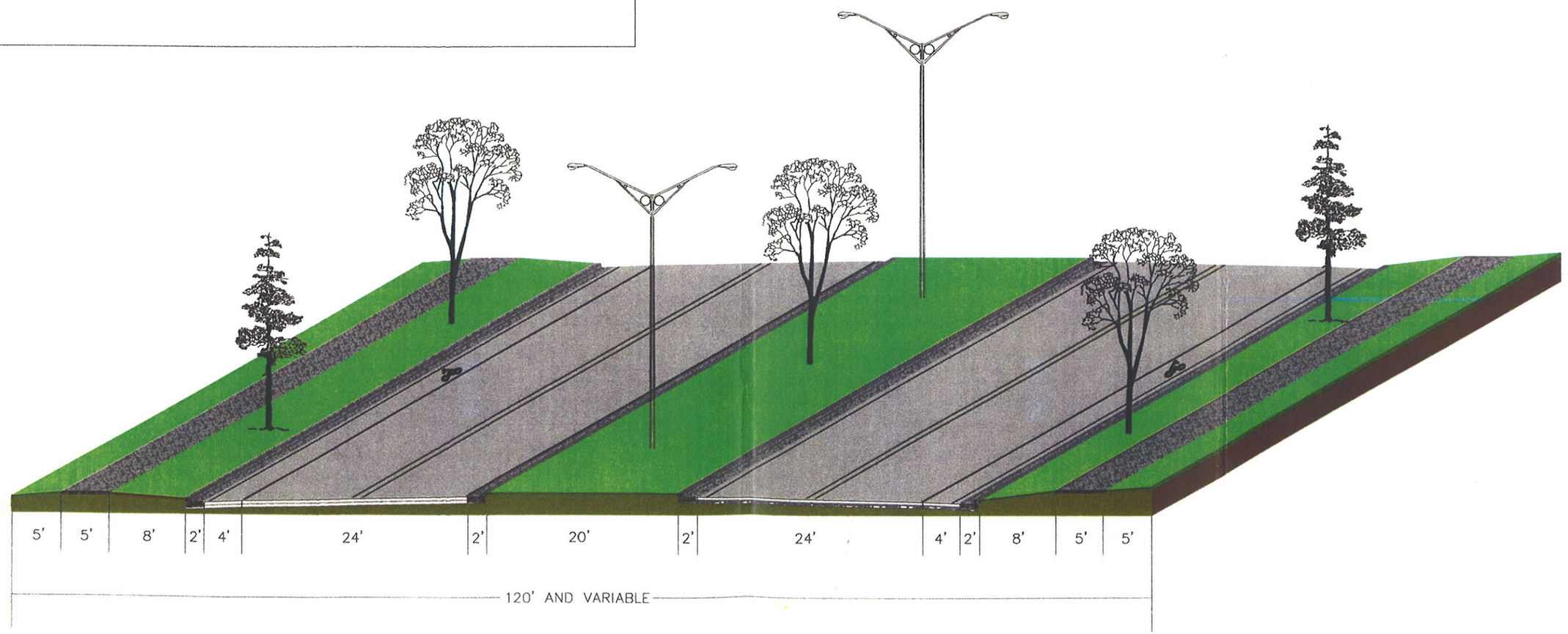
Existing Conditions
Aerial of Northern Corridor

Figure 2-3 | Page 10





NEEL-SCHAFFER Solutions you can build upon	POPP'S FERRY ROAD ENVIRONMENTAL ASSESSMENT BILOXI, MISSISSIPPI	POPP'S FERRY ROAD – TYPICAL SECTION	FIGURE 9

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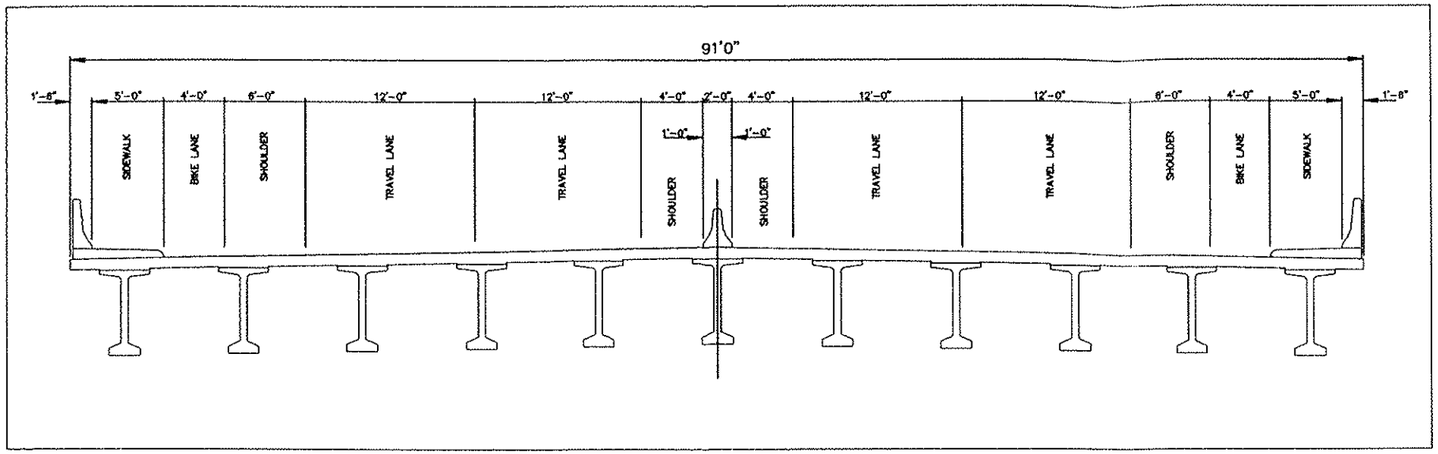

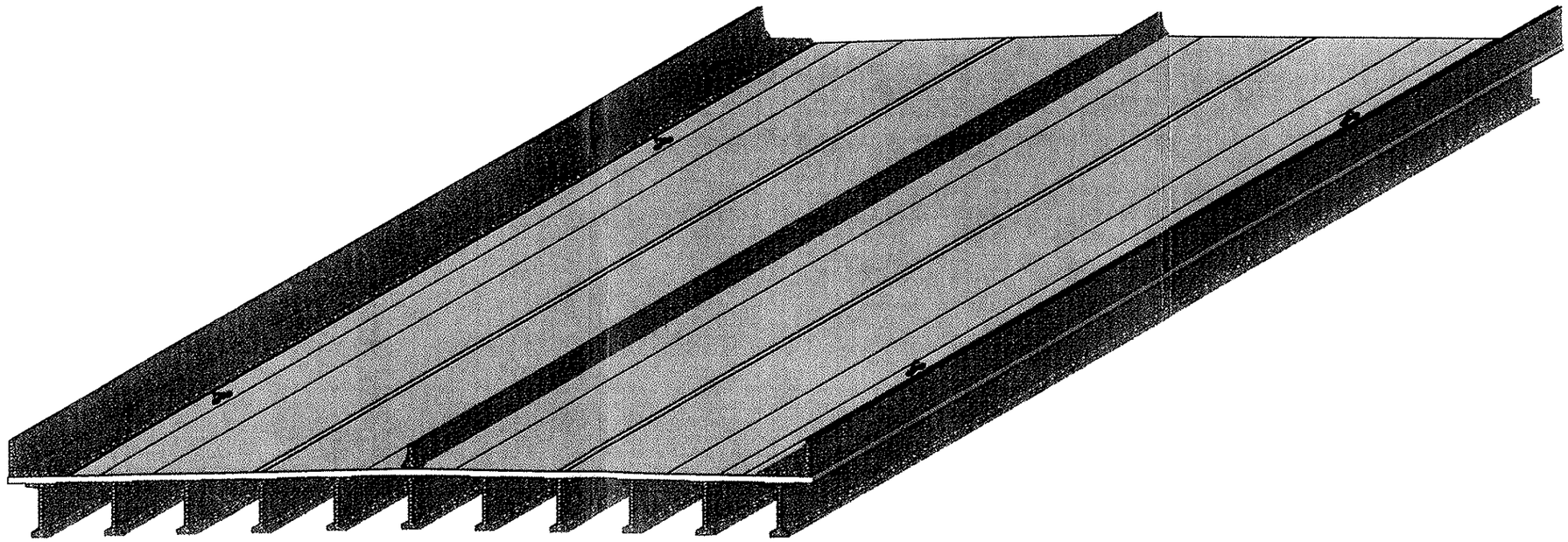

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2.4 Marine Traffic Volumes

Historical marine traffic volumes were researched through the bridge tender logs kept by the City of Biloxi. The City provided copies of the log from January 4, 2007 to July 13, 2007, for evaluation. The log summary revealed that the primary movements of marine traffic requiring the opening of the drawbridge were generated by the Derrell McKinney tugboat, delivering coal to the Power Plant on Lorraine Road. The Derrell McKinney is 42 ft in height, and over the 190 days evaluated, accounted for 298 of the draw openings, or 58.55% of the total openings in approximately 6 months. The bridge tender stated that the Derrell McKinney has been replaced by the Beverly H, which is also 42 ft in height. A summary of the bridge vessel traffic by vessel is provided in Table 1.

Table 1

Vessel Log Summary from 1/4/07 to 7/13/07

Vessel Name	Height (ft)	# of Draw Openings	Percent Openings	Vessel Name	Height (ft)	# of Draw Openings	Percent Openings
Derrell McKinney	42	298	58.55%	JoAnne Stegbauer	38	5	0.98%
Man Man	25	28	5.50%	Larry Barks	36.5	5	0.98%
Howard Evans	42	15	2.95%	Blanche Marie	44	4	0.79%
Skirt Chaser	37	15	2.95%	Bobby Joe James	42	4	0.79%
As Is, Where Is	37	11	2.16%	Bobby Jones		4	0.79%
Kay Minor	40	8	1.57%	Caddo		4	0.79%
AA McKinney		7	1.38%	Chloe Lee		4	0.79%
Anthony Taylor	37	6	1.18%	Fish Bone		4	0.79%
C McVea Jr.	40	6	1.18%	Margaret	40	4	0.79%
Captain Bill	45	5	0.98%	Tuscaloosa		4	0.79%
Ethel Anne		5	0.98%	Tuskegee		4	0.79%
					Sub	**450**	**88.41%**

Note: 5 vessels had 3 draw openings each, 14 vessels had 2 draw openings each, and 16 vessels had 1 draw opening.
Source: City of Biloxi, 2008

Based on the 6 month period and notations regarding height of vessels, over 80% of the vessels that require opening of the draw are less than 46 ft in height.

2.5 Automobile Traffic Volumes

Existing traffic volumes were documented through traffic counts at the study intersections on Popp's Ferry Road at Riverview Drive, Sunkist Country Club Road (2007), Atkinson Road/Old Bay Road (2008), and Pass Road (2008). Peak hour turning movement counts were collected from historical counts provided to the City.

The traffic counts revealed that within the project area the AM Peak hour is approximately from 7:30-8:30 AM and the PM Peak hour from 5:00-6:00 PM. The peak hour periods were used in this analysis to determine capacity and level-of-service at study intersections. The existing peak hour volumes are shown in Figure 3. The traffic count reports are contained in the report Appendix.

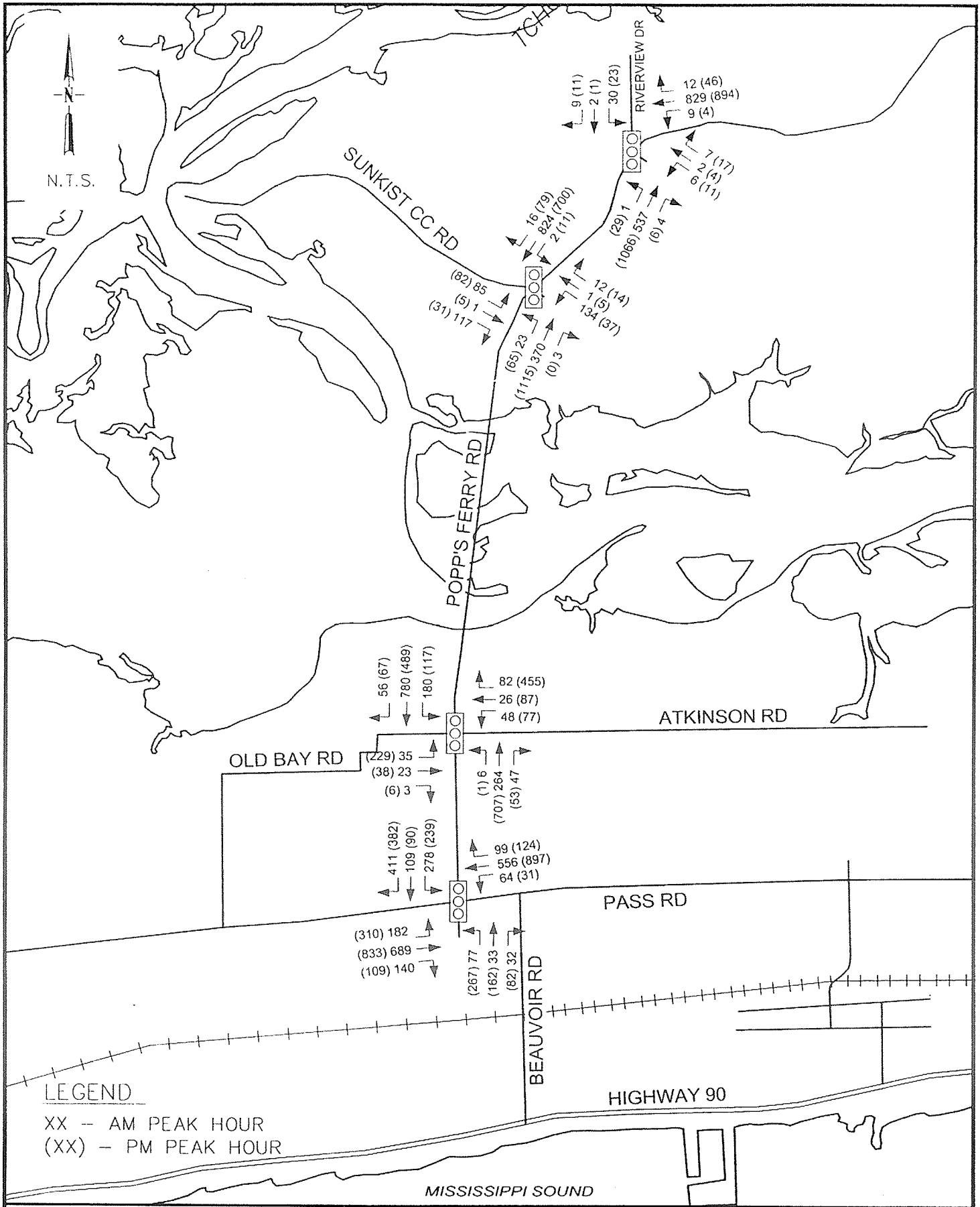
2.6 Capacity and Level-of-Service

The capacity and level-of-service (LOS) of an intersection is evaluated based on the average vehicular delay during the peak hour periods. The vehicular delays are directly related to the turning movement volumes, traffic composition and roadway geometrics at the intersection. The methodology utilized in this analysis is based on the *Highway Capacity Manual*, 2000 Edition (HCM 2000). The level-of-service, as outlined in the HCM, is reported as a letter designation of LOS A through LOS F (A is least delay and F is most delay). The traffic volumes recorded at the study intersections during the AM and PM peak hours were analyzed using the information provided in the HCM. The results of this analysis are shown in Table 2. The analysis reports are contained in the report Appendix.

Table 2
Year 2008 Existing Traffic Level-of-Service

Signalized Intersection	Time Period	Intersection Level of Service					
		NB	SB	EB	WB	Intersection	v/c
Riverview Dr/	AM Peak	A	C	B	B	**C**	0.63
Popp's Ferry Rd	PM Peak	B	D	B	B	**C**	0.72
Sunkist CC Rd/	AM Peak	A	B	C	D	**B**	0.80
Popp's Ferry Rd	PM Peak	B	A	D	D	**B**	0.79
Atkinson-Old Bay/	AM Peak	A	A	C	C	**A**	0.67
Popp's Ferry Rd	PM Peak	B	A	F	C	**D**	0.90
Pass Rd/	AM Peak	C	C	C	C	**C**	0.58
Popp's Ferry Rd	PM Peak	E	D	C	D	**D**	0.90

Source: Neel-Schaffer, 2008



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2008 EXISTING TRAFFIC VOLUMES

POPP'S FERRY BRIDGE EA – BILOXI, MS

FIGURE 3

The level-of-service analysis shows that the study intersections are currently operating with the heaviest delays during the PM peak hours. Turning volumes on Pass Road and on Old Bay Road are experiencing significant delays. A review of 24 hour daily traffic volumes from MDOT/GRPC traffic counts is provided in Table 3.

Table 3
Historical Daily Traffic Volumes

Location	Count Year					Annual Change*
	2003	2004	2005	2006	2007	
Popp's Ferry Rd – S of Atkinson Rd.	16,000	16,000	16,000	21,000	19,000	4.39%
Popp's Ferry Rd – On Back Bay Bridge	17,000	17,000	17,000	23,000	22,000	6.66%
Popp's Ferry Rd – N of Riverview Dr.	14,000	14,000	19,000	24,000	24,000	14.42%

*Annual Change calculated from 2003 to 2007 count volumes. Source: MDOT

A review of the daily traffic volumes reveals that the existing traffic in excess of 20,000 vehicles per day (vpd) exceeds the threshold volumes of operation of two lane roadways. Typically, as volumes on two-lane roadways exceeds 15,000 vpd, planning for widening takes place. Based on the FDOT Quality/LOS tables, a threshold volume of 15,600 for LOS E is listed. Traffic volumes on Popp's Ferry Road are further impacted due to the existing draw bridge and school zone with reduced speed limit, that further reduce the capacity of the roadway.

The high demand for automobile access to the peninsula area of Biloxi is shown by the heavy traffic volumes crossing the Back Bay on the Popp's Ferry Road bridge. The two primary loading points for Popp's Ferry Road south of the bridge are located at Old Bay Road/Atkinson Road and at Pass Road. These cross streets are shown to operating near capacity, with a large volume of traffic apparently avoiding the Pass Road intersection by utilizing the connecting routes to the east of Jim Money Road and Atkinson Road and Hiller Park for the VA traffic, and from the west via Big Lake Road and Old Bay Road. These routes allow people to bypass the Pass Road/Popp's Ferry Road intersection which operates with the heaviest PM Peak hour delays.

3.0 Projected Traffic

3.1 GRPC Model

Base Model

The Gulf Regional Planning Commission (GRPC) transportation model includes daily traffic volume forecasts on major roadway links, based on committed and planned growth. The transportation model is forecast to year 2030 to help plan for future growth. The base Transportation Plan model forecast for traffic on Popp's Ferry Road (without widening the bridge over the Back Bay from two to four lanes) forecasts the traffic volume in year 2030 to be approximately 23,500 vpd. With 2007 traffic volumes at 22,000 vpd, this future year volume is merely showing that there is almost no available capacity on the bridge for future growth.

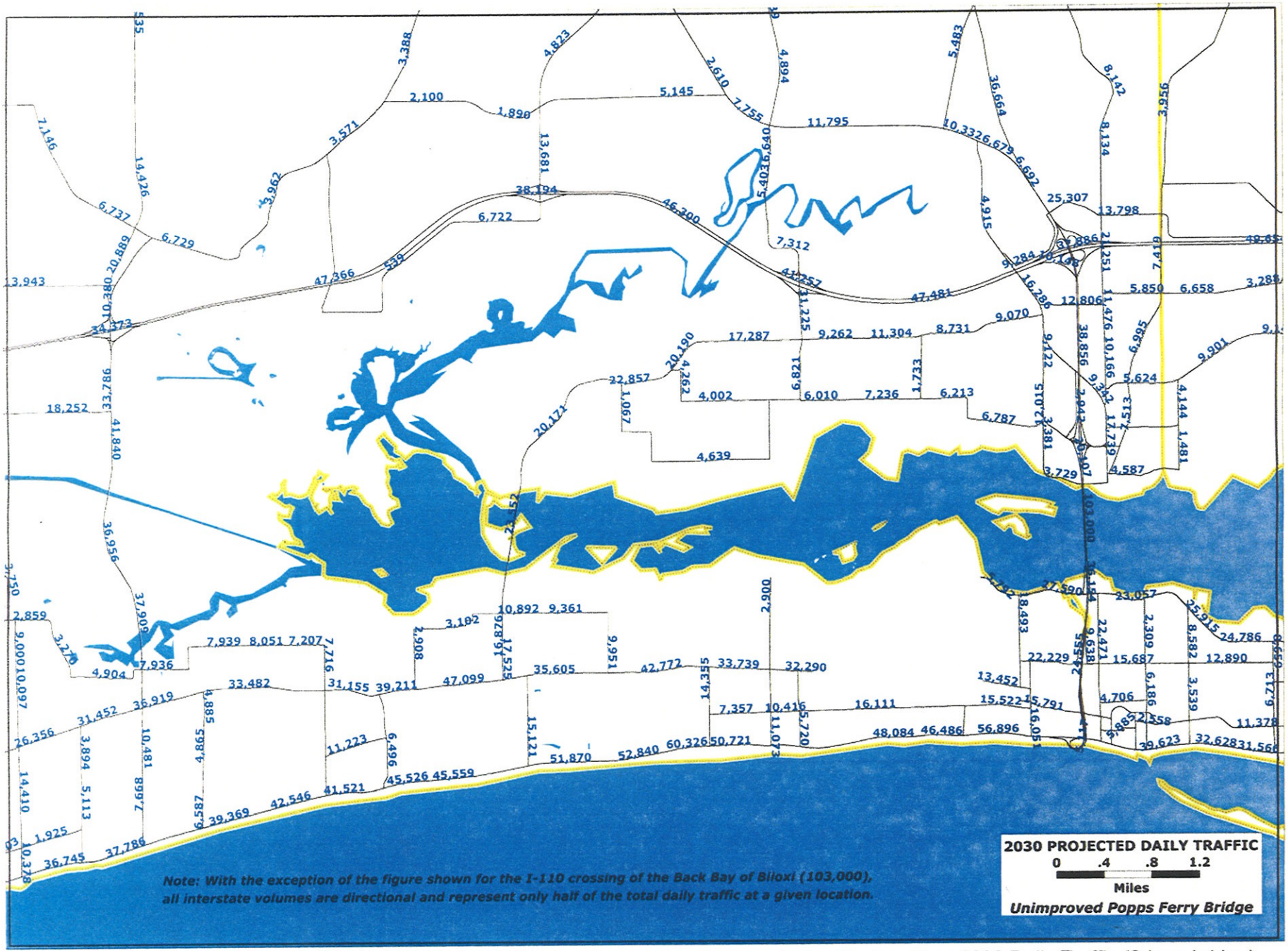
Widened Bridge & Roadway

The modification to the model to include a widened Popp's Ferry Road bridge and a continuous four lane connection between Pass Road and Cedar Lake Road was conducted. This improved network with the same socio-economic data revealed an increase in traffic on the bridge to 33,500 vpd. This would result in an increase of traffic of 42%, or equates to a compound annual growth of 1.6% annually.

Extension to Highway 90

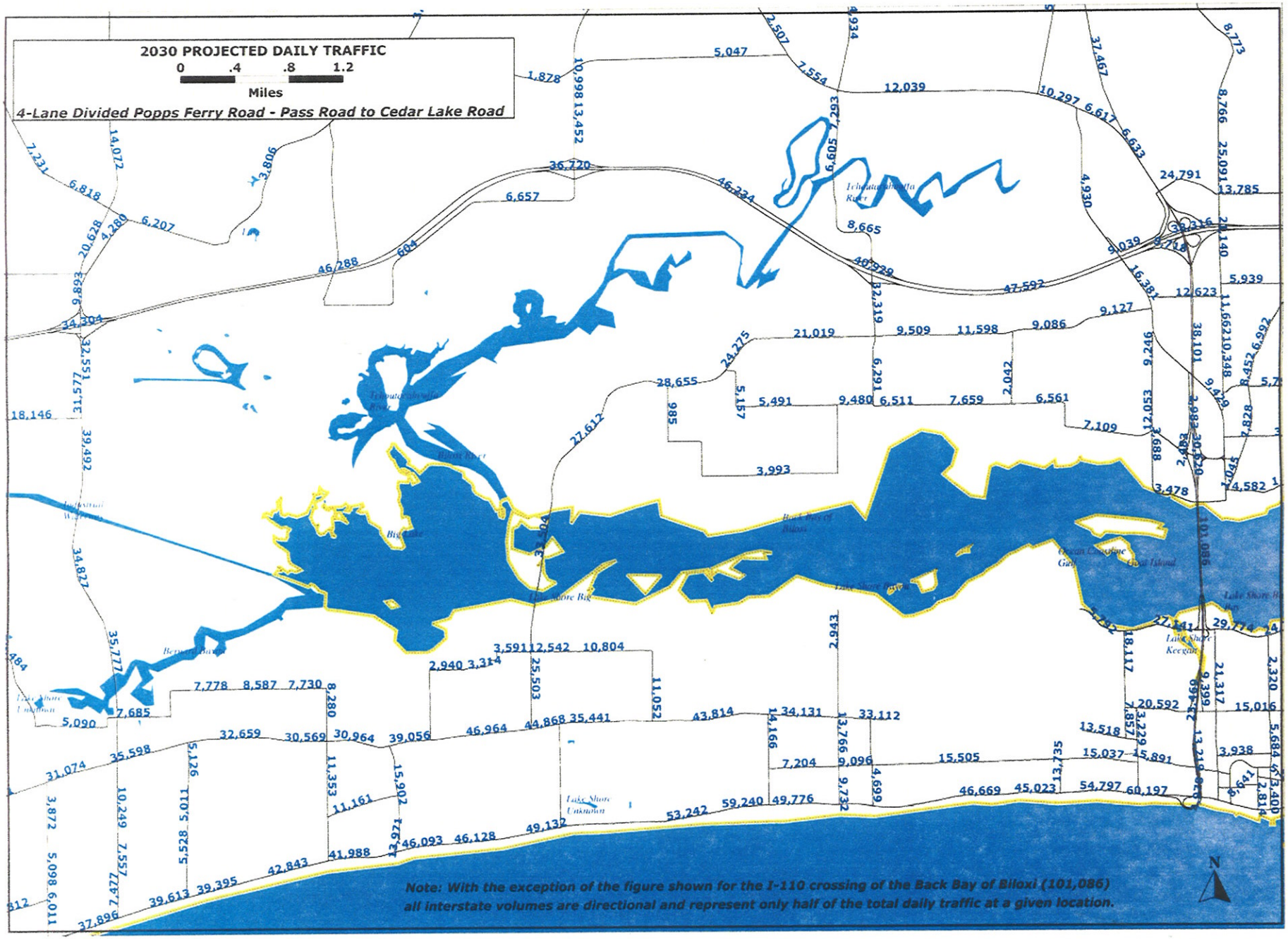
Additionally, the extension of Popp's Ferry Road south of Pass Road to Highway 90, as a direct connection is planned by the City and supported by the Coliseum to enhance access to the area. The Transportation Model was modified to reflect this direct connection, concurrent with the widened bridge and providing a continuous 4 lane section between Highway 90 and Cedar Lake Road. The traffic volume forecast shows an increase in traffic to 21,000 vpd on the proposed connecting segment of Popp's Ferry Road south of Pass Road.

The traffic model forecasts are shown in Figures 4-6.

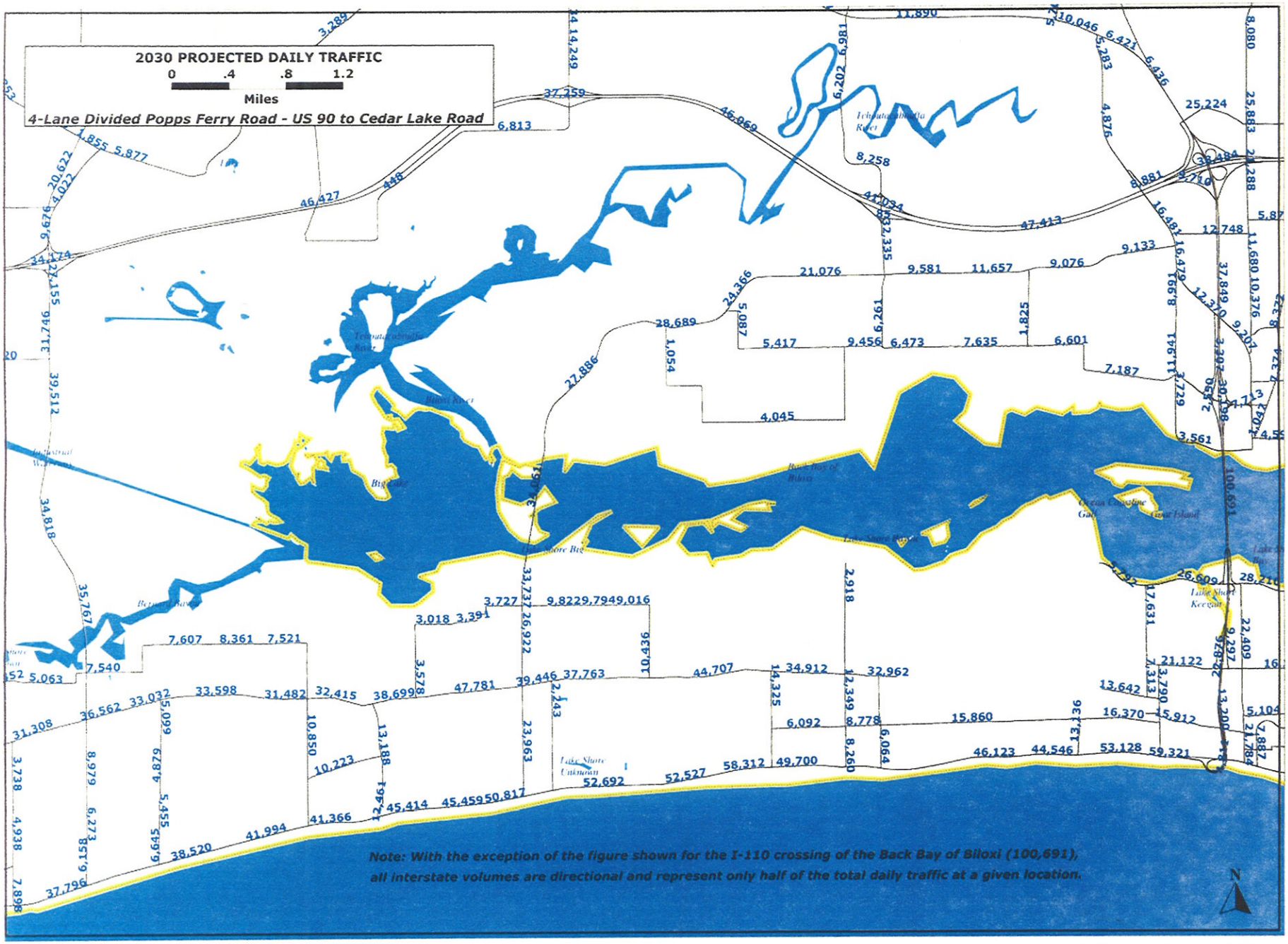


Transportation Model - Year 2030 Daily Traffic (2-lane bridge)

Figure 4 - Pag 16



Transportation Model - Year 2030 Daily Traffic (4-lane bridge)



Transportation Model - Year 2030 Daily Traffic (4-lane bridge & Popp's Ext. to 90)

3.2 Bridge Volume Comparison

The existing year and horizon year traffic volumes crossing the Back Bay of Biloxi and the Industrial Seaway in Gulfport were compared based on the GRPC 2030 Model forecast. The three roadways connecting I-10 with the Biloxi/ Gulfport include Cowan-Lorraine Road, Popp's Ferry Road and Interstate 110. Each of these roadways has a drawbridge to serve marine traffic. The most recent daily traffic volumes (2007) were compared to horizon year 2030 volumes with the existing conditions, a widened Popp's Ferry Road bridge, and a widened Popp's Ferry Road bridge with the extension of Popp's Ferry Road to Highway 90. The cumulative volumes of these three roadways and corresponding LOS based on daily traffic, are shown in Table 4.

Table 4
Daily Volume Connecting I-10 with Peninsula

Description	Cowan-Lorrain Daily Vol/LOS	Popp's Ferry Rd Daily Vol/LOS	Interstate 110 Daily Vol/LOS	Cumulative Daily Vol
2007 Existing	27,000/ LOS B	22,000/ LOS F	67,000/ LOS E	116,000 vpd
2030 No Improvements	41,840/LOS E	23,552/ LOS F	103,000/ LOS F	168,392 vpd
2030 – 4 Lane Popp's Ferry Bridge	39,492/ LOS E	33,504/ LOS C	101,086/ LOS F	174,082 vpd
2030 – 4-Lane PF + PF Extension to Hwy 90	39,512/ LOS E	34,061/ LOS C	100,691/ LOS F	174,264 vpd

Note: PF-Popp's Ferry. Volumes are at existing locations of draw bridge on each roadway.
LOS based on FDOT Quality/LOS Handbook, Table 4-1.
Source: Neel-Schaffer, 2008, MDOT, 2008.

The daily traffic volume forecast shows the traffic volumes travelling across the three draw bridges are forecast to increase from 116,000 vpd currently, to 174,000 by Year 2030. Popp's Ferry Road is currently at LOS F, from a planning volume analysis, and widening would improve the LOS to C in 2030. Interstate 110 is currently at the threshold of capacity (LOS E), and is in need of improvement to sustain future growth, as well. Cowan-Lorraine Road is shown to be operating at acceptable capacity levels at the Industrial Seaway crossing. However, future volumes shown that this roadway may be at capacity by 2030.

3.3 Intersection Traffic Analysis

The existing year traffic volumes were forecast to Year 2018 and Year 2030 using the 1.6% compound annual growth on Popp's Ferry Road to determine the future year turning movements. The traffic volumes were then evaluated using the existing lane geometrics, and then with improved geometrics, based on widening to a four-lane divided roadway. The Year 2018 and 2030 traffic volumes are shown graphically in Figures 7 and 8, respectively.

Table 5
Year 2018 (Existing Geometrics) Traffic Level-of-Service

Signalized Intersection	Time Period	Intersection Level of Service					
		NB	SB	EB	WB	Intersection	v/c
Riverview Dr/	AM Peak	A	F	B	B	**D**	0.74
Popp's Ferry Rd	PM Peak	C	F	B	B	**E**	0.86
Sunkist CC Rd/	AM Peak	A	D	C	**E**	**C**	0.95
Popp's Ferry Rd	PM Peak	C	B	D	C	**C**	0.94
Atkinson-Old Bay/	AM Peak	A	B	C	C	**B**	0.79
Popp's Ferry Rd	PM Peak	C	B	**F**	**E**	**E**	**1.11**
Pass Rd/	AM Peak	D	D	C	D	**D**	0.68
Popp's Ferry Rd	PM Peak	**F**	**E**	**E**	**F**	**E**	**1.10**

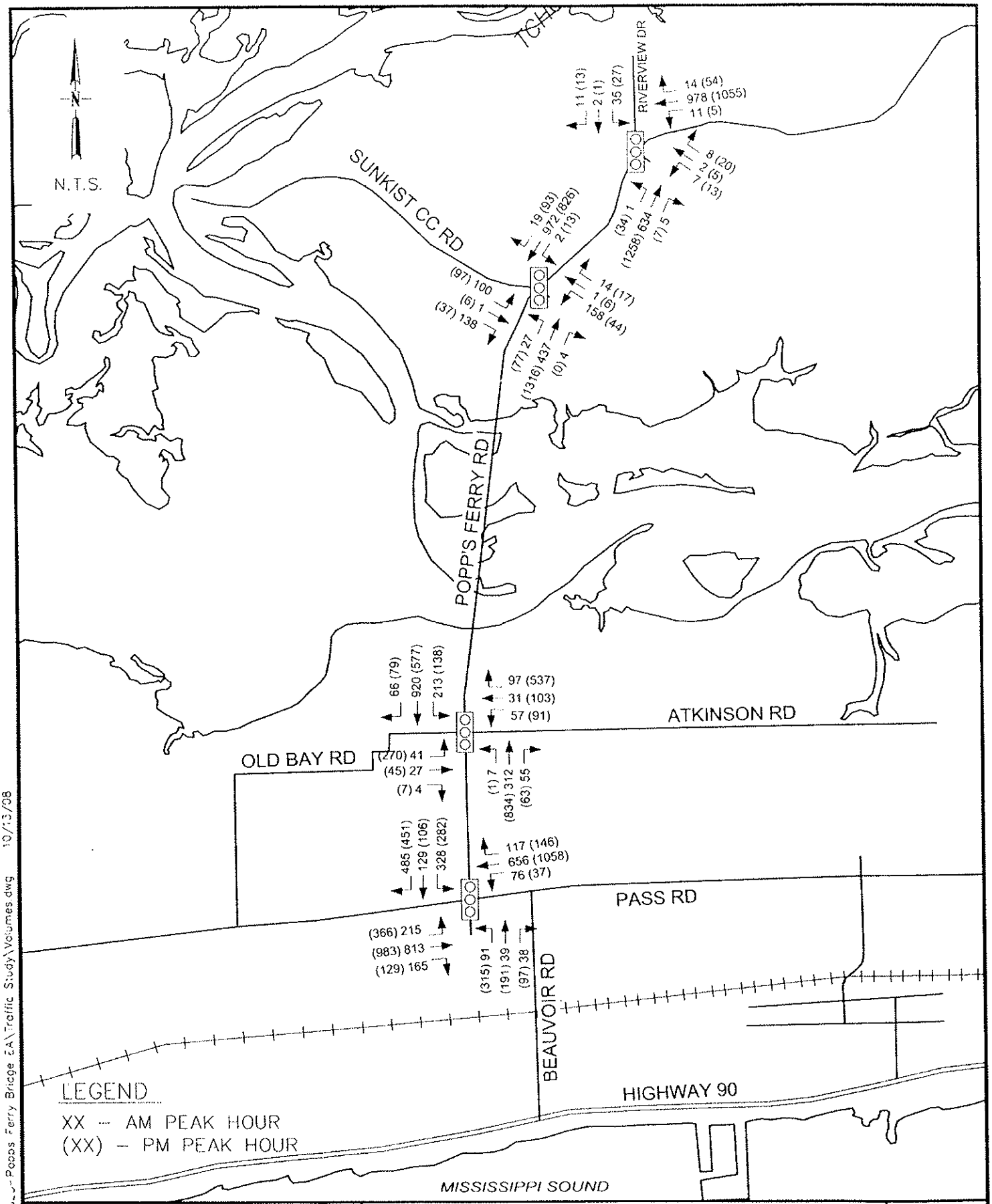
Source: Neel-Schaffer, 2008

Table 6
Year 2030 (Existing Geometrics) Traffic Level-of-Service

Signalized Intersection	Time Period	Intersection Level of Service					
		NB	SB	EB	WB	Intersection	v/c
Riverview Dr/	AM Peak	B	**F**	B	B	**F**	0.90
Popp's Ferry Rd	PM Peak	E	**F**	B	B	**F**	1.12
Sunkist CC Rd/	AM Peak	A	**F**	C	**F**	**F**	1.19
Popp's Ferry Rd	PM Peak	**F**	D	D	C	**F**	1.14
Atkinson-Old Bay/	AM Peak	A	C	C	C	**C**	0.96
Popp's Ferry Rd	PM Peak	**F**	B	**F**	**F**	**F**	1.48
Pass Rd/	AM Peak	D	**F**	D	D	**E**	0.88
Popp's Ferry Rd	PM Peak	**F**	**E**	**F**	**F**	**F**	1.37

Source: Neel-Schaffer, 2008

The intersection LOS analysis shows a significant denigration of the operating conditions by 2018 with an 18% growth in traffic from a 1.6% compound annual growth rate over 10 years. However, the existing traffic volumes queue from Old Bay Road/Atkinson Road south to Pass Road during the PM Peak hours routinely. The intersections are currently operating closer to capacity than indicated by the analysis software, whether it is the result of increased headways, or decreased traveling speeds. By the time the growth is expanded out to year 2030 without improvements to the existing infrastructure, the intersections are shown to operate over capacity during the peak hours.



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YEAR 2018 TRAFFIC VOLUMES
POPP'S FERRY BRIDGE EA – BILOXI, MS

FIGURE 7

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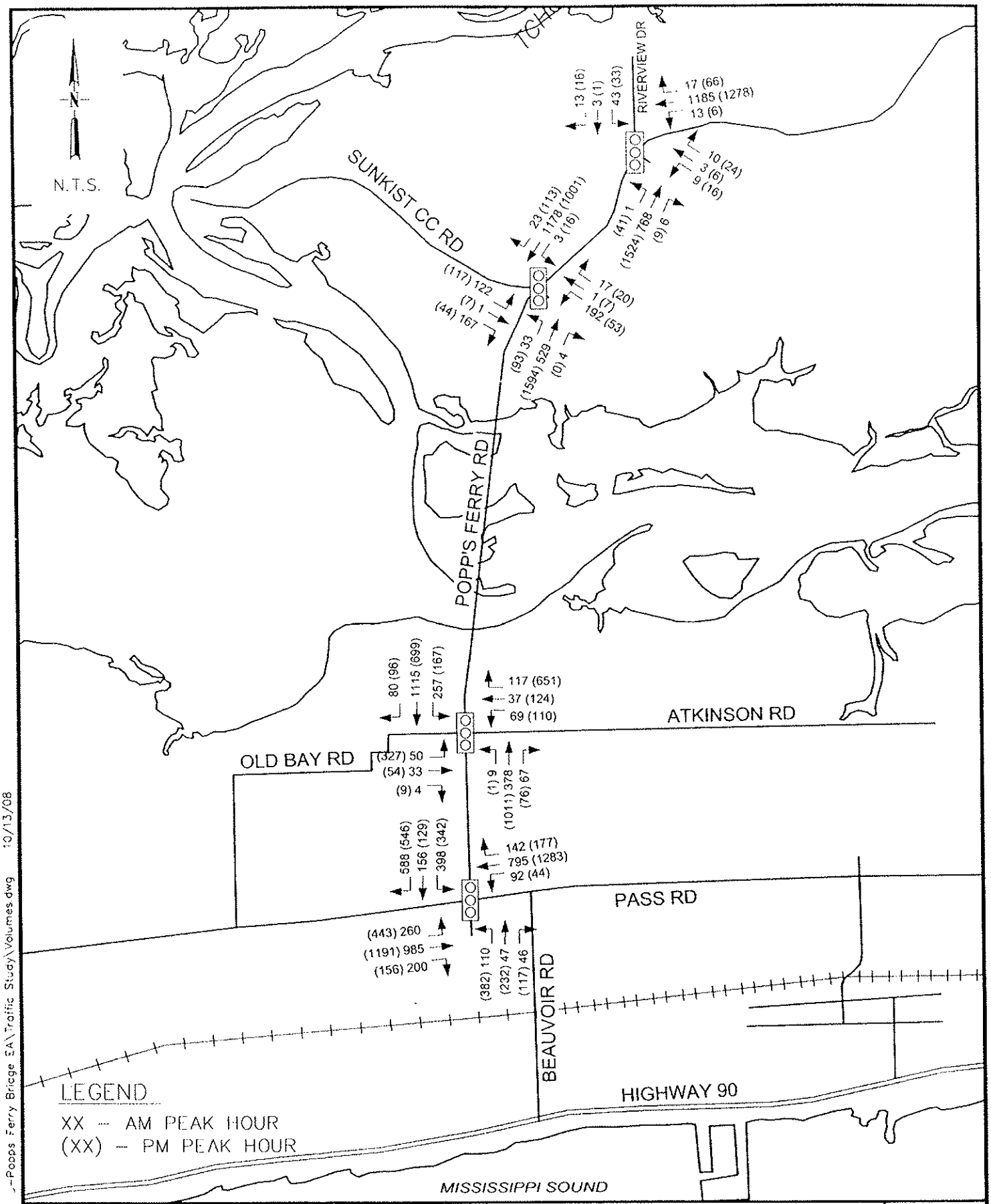

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YEAR 2030 TRAFFIC VOLUMES
POPP'S FERRY BRIDGE EA – BILOXI, MS

FIGURE 8

3.4 Operational Deficiencies

The operational characteristics of Popp's Ferry Road between Riverview Drive and Pass Road have had numerous conditions affect the operation and performance of the roadway. The roadway was widened from a 2 lane road to a 5 lane roadway north of North Country Club Lane. South of North Country Club Lane, Popp's Ferry Road was widened from a two lane roadway to a three-lane roadway. The southbound lanes drop the western lane at North Country Club Lane, as an exclusive right turn lane. The completed widening project has had people disregard the southbound lane drop and drive across the lawn of the residence at 2168 Popp's Ferry Road, located in the southwest corner of the Popp's Ferry Road/North Country Club Lane intersection. The owner routinely complained about people crossing his front yard and running over his mailbox. Guardrail is in place to prevent southbound vehicles from striking his house. The City has taken additional measures, through restricting through traffic to a single southbound through lane at Riverview Drive, to the north, thus requiring that through traffic merge into the east lane, prior to arriving at North Country Club Lane.

Two separate crash reports noted that a residence at 2185 Popp's Ferry Road had northbound automobiles leave the roadway and strike (or nearly strike) the brick residence located within a horizontal curve. Guardrail has been placed behind the sidewalk, to protect the residence from vehicles mounting the curb and entering the yard.

The numerous driveways (57) along this 3 lane route create many conflict points for traffic on this Principal Arterial Roadway. Additionally, the presence of a bridge over the Back Bay at a height that requires frequent opening of the draw, impacts the movement of traffic along this route, as well as emergency service response times. During Hurricane Katrina, the low profile of the bridge caused errant ships to collect against the side and damage the decking, requiring closure of the bridge for over 90 days until sections of the deck could be replaced.

Improvements to the corridor include evaluating the residential driveways for acquisition of the structures to allow for improved horizontal control, reduced conflict points, and raising the profile of the bridge to limit the impacts of flooding and surge and reduce the impacts to capacity from marine traffic.

3.5 Typical Section

The existing traffic volumes exceed the planning level thresholds for a two-lane roadway. The limited connections to the Biloxi peninsula, concurrent with the existing and future traffic volumes (Year 2030) demonstrate an increase in traffic on Popp's Ferry Road from 22,000 vpd in 2007 to 33,500 vpd in 2030 illustrate the immediate need for capacity improvements on Popp's Ferry Road between Pass Road and Riverview Drive.

The roadway is recommended to be constructed to current standards to include two travel lanes in each direction, paved shoulders, a raised center median, curb and gutter, detached sidewalks, street lighting, mast arm mounted traffic signals, and an elevated bridge to minimize the impact that marine traffic has on the vehicular access crossing the Back Bay.

The recommended typical section for Popp's Ferry Road is shown graphically in Figure 9. The proposed typical section for the new bridge is shown in Figure 10.

4.0 Proposed Roadway Improvement Alternates

4.1 Alternate A- No-Build

Alternate A, the No Build Alternate, would include maintaining the street and bridge in their existing condition. There would be no increase in traffic capacity, and the existing lane and bridge configuration would be maintained. Although it is necessary to include this alternate for consideration, the alternate does not address the need to add lanes for increased traffic capacity and the need to improve emergency service response times and hurricane evacuation. While a curfew exists on opening the bridge during peak hours on weekdays, typically, a barge is passing through the draw immediately before, or immediately after the peak hour, when vehicular traffic is heavy.

4.2 Alternate B – Widening to the West

The southern portion of Alternate B (south of the Back Bay) would include a 120 foot wide right-of way located more west of the present day centerline of Popp's Ferry Road. This alternate would result in the elimination of all residential driveways along the southern portion of the corridor entering directly onto Popp's Ferry Road through acquisition of potentially 19 residences, thus providing for fewer conflict points and more controlled access to Popp's Ferry Road.

A new 4-lane elevated drawbridge would be erected with a vertical clearance of approximately 65 ft at the navigational channel. The new bridge structure would be constructed on an alignment parallel to the existing Popp's Ferry Road bridge accommodating 4 lanes of traffic with shoulders. The height of the new bridge would be at an elevation that would accommodate the majority of the marine traffic without requiring opening the draw for barges that routinely serve the adjacent coal powered power plant. The required horizontal and vertical navigational clearances (Maximum 65 ft height) will be obtained by using a bascule (drawbridge) span for the existing navigational channel. This alternate would impede vehicle traffic flow when the drawbridge is raised for ship channel navigation, however, the height will be set to minimize the draw opening by raising the bridge above its current height.

The northern portion of Alternate B (north of the Back Bay) would include a 120 foot wide right-of way located east and west of the present day centerline of Popp's Ferry Road. This alternate alignment equally distributes the parcel acquisition and relocation impacts on the east and west

sides of Popp's Ferry Road. This alternate would result in the elimination of all residential driveways through the acquisition of approximately 27 residences along the west side of Popp's Ferry Road and potentially 36 residences along the east side of Popp's Ferry Road. The acquisition of the (approximate) 63 structures on this north section would eliminate the conflict points created by these existing residential driveways.

4.3 Alternate C – Widening to the East

The southern portion of Alternate C (south of the Back Bay) would use the existing Popp's Ferry Road west right-of-way boundary and a 120 foot wide right-of way resulting in an alignment located more east of the present day centerline of Popp's Ferry Road. This alternate would result in the maintenance of all residential driveways along the southern portion of the corridor entering directly onto Popp's Ferry Road. This widening to the east would result in the acquisition of approximately 9 residences and a medical office building.

A 4-lane elevated bridge structure would be erected parallel to the existing Popp's Ferry Road bridge, accommodating 4 lanes of traffic with shoulders. The required horizontal and vertical navigational clearances (Maximum 90 ft height) will be obtained by using a high-rise fixed span bridge over the existing navigational channel. This alternate would impact residences on the south side of the bridge because of the horizontal distance required to transition the bridge from 100 ft of elevation back down to natural grade. However, this option would not impede vehicle traffic flow at any time due to the elimination of the drawbridge resulting from a high-rise bridge construction, thus allowing continuous ship channel navigation concurrent with continuous vehicle access.

The northern portion of Alternate C (north of the Back Bay) would use the existing Popp's Ferry Road west right-of-way boundary and a 120 foot wide right-of way resulting in an alignment located more east of the present day centerline of Popp's Ferry Road. This alternate would result in the maintenance of all residential driveways on the west side of Popp's Ferry Road north of the Back Bay, but would include potential acquisition of the 38 residences along the east side of Popp's Ferry Road.

4.4 Alternate D – Symmetrical Widening

The southern portion of Alternate D (south of the Back Bay) would use a 120 foot wide right-of way symmetrical to the present day centerline of Popp's Ferry Road. This alternate would result in the maintenance of all residential driveways along the southern portion of the corridor entering directly onto Popp's Ferry Road, and would include acquisition of approximately 9 residences on the east side and potentially 3 or more residences on the west side of Popp's Ferry Road.

The Back Bay bridge construction is proposed to include the construction of a new high-rise fixed span structure parallel to the existing Popp's Ferry Road bridge, accommodating 4 lanes of traffic with shoulders. The required horizontal and vertical navigational clearances (Maximum 90 ft height) will be obtained by using a high-rise fixed span for the existing navigational channel. This alternate would impact residences on the south side of the bridge through the transition from a grade of 90 ft above the water elevation back to natural grade. The elevated bridge would allow continuous navigational marine traffic concurrent with continuous vehicular automobile traffic.

The northern portion of Alternate D (north of the Back Bay) would include a 120 foot wide right-of-way along the centerline beginning at Riverview Drive and extending south to the intersection of Popp's Ferry Road and Ashwood Place. The 120 foot right-of-way would then transition to the east until its west right-of-way aligns with the existing west right-of-way. This alternate alignment equally distributes the parcel acquisition and relocation impacts on the east and west sides of Popp's Ferry Road. This alternate would result in the elimination of all residential driveways along the northern portion of Alternate D entering directly onto Popp's Ferry Road thus providing for fewer conflict points and more controlled access to Popp's Ferry Road.

4.5 Alternate E – Widening Shifting East and West

The southern portion of Alternate E (south of the Back Bay) would include a 120 foot wide right-of way located more west of the present day centerline of Popp's Ferry Road from Hinman Drive to Old Bay Road and then transitioning to the east at Old Bay Road and continuing to the south bridge abutment. This alternate would result in the elimination of all residential driveways along the southern portion of the corridor entering directly onto Popp's Ferry Road thus eliminating

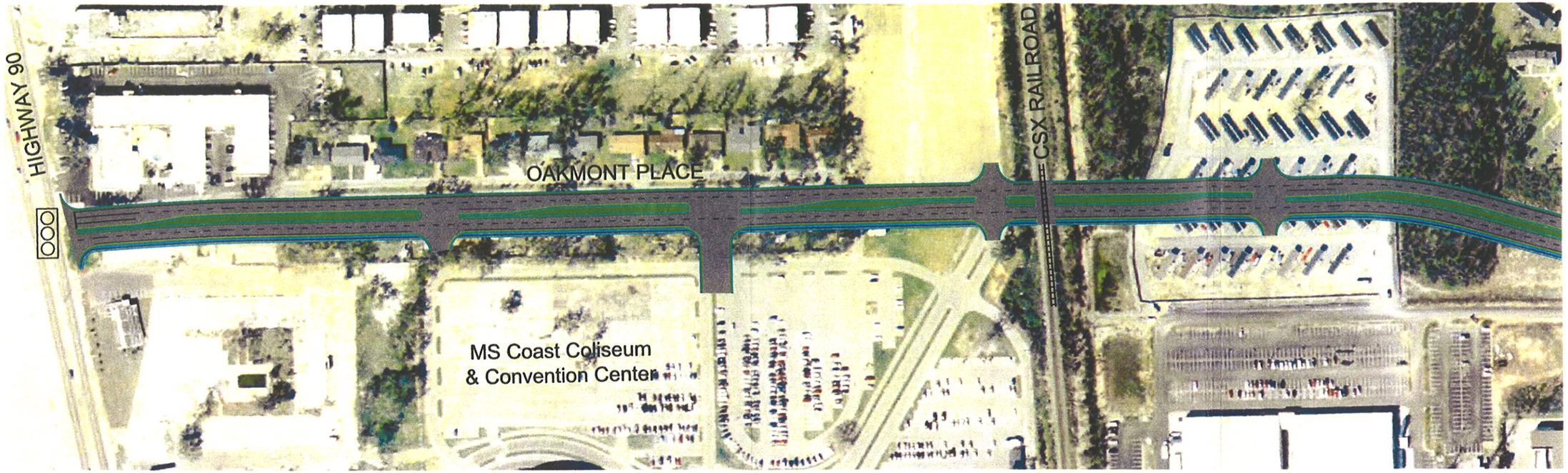
many of the conflict points. The transition from west to east would minimize the impacts to the residential areas between Old Bay Road and the existing Back Bay bridge.

The northern portion of Alternate E (north of the Back Bay) would include a 120 foot wide right-of way along the centerline beginning at Riverview Drive and extending south to the intersection of Popp's Ferry Road and Ashwood Place. The 120 foot right-of-way would then transition to the east until its west right-of-way aligns with the existing west right-of-way. This alternate's alignment equally distributes the parcel acquisition and relocation impacts on the east and west sides of Popp's Ferry Road. This alternate would result in the elimination of all residential driveways along the northern portion of the corridor.

4.6 Other Roadway Improvements

The City of Biloxi has two planned roadway projects in different stages that affect the southern terminus of the Popp's Ferry Road corridor. The City has design plans for widening the Popp's Ferry Road/Pass Road intersection, to accommodate dual eastbound left turn lanes. Additionally, the City has commissioned a study to extend Popp's Ferry Road south of Pass Road as a direct connection to Highway 90. The connection to Highway 90 would eliminate the circuitous connection that currently utilizes Beauvoir Road to access Highway 90 and the Mississippi Coast Coliseum and Convention Center (Coliseum). The Coliseum is currently expanding their facilities, and will benefit from improved direct access to Popp's Ferry Road. The extension of Popp's Ferry Road south of Pass Road will include an at-grade rail crossing, connecting the Coliseum property that is bisected by the railroad.

The conceptual widening of Popp's Ferry Road between Riverview Drive and Pass Road is shown in Figure 11-1, 11-2 and 11-3. The exhibit includes the graphic illustration of the extension of Popp's Ferry Road south to Highway 90, planned by the City as a separate project.



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Popp's Ferry Road
Environmental Assessment

City of Biloxi
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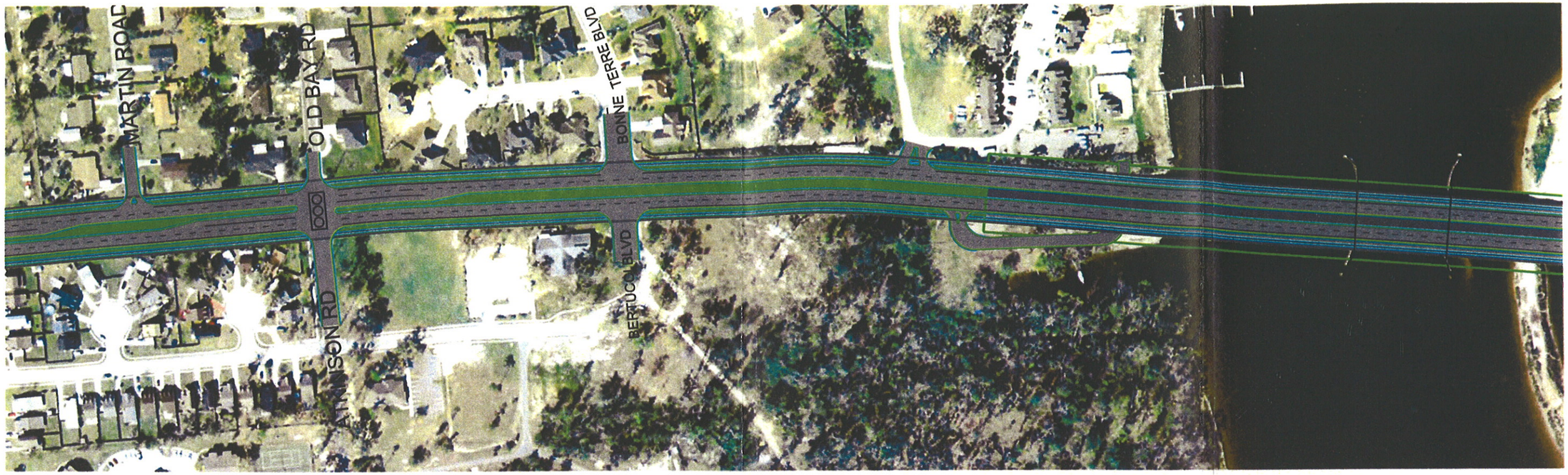
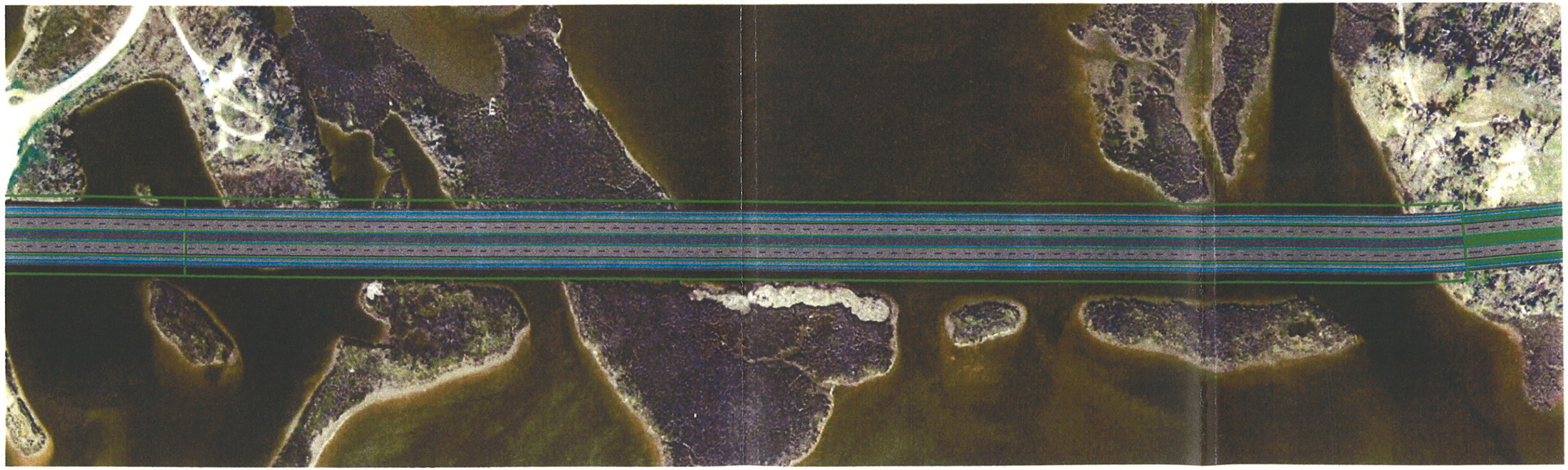
Preliminary Alignment

Southern Corridor

Figure 11-1





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Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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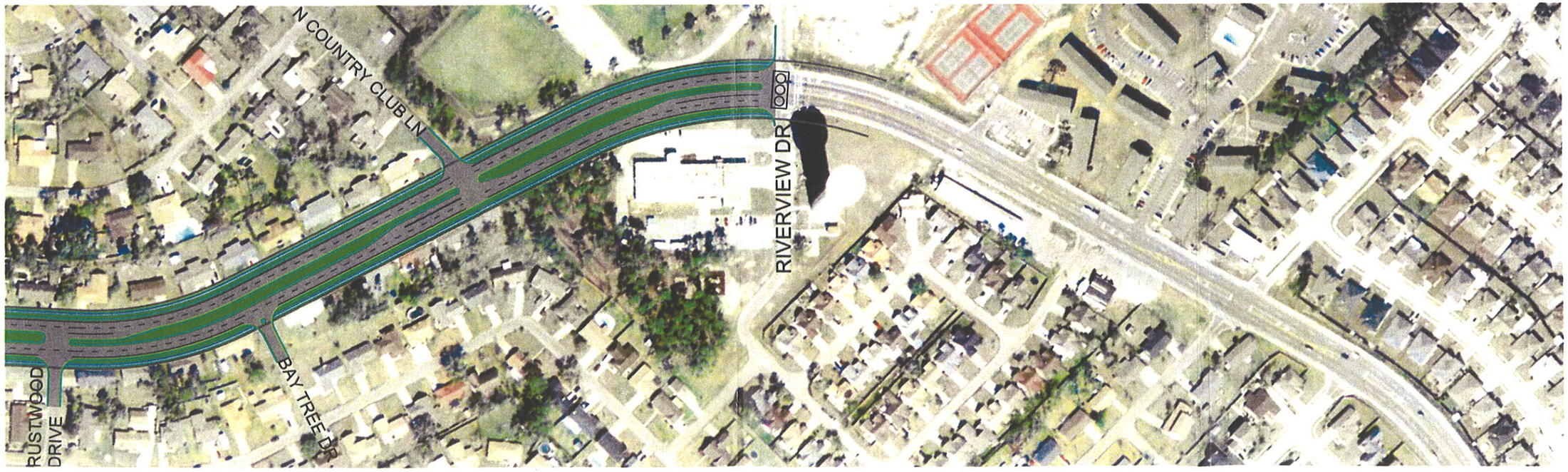
Preliminary Alignment

Back Bay Bridge

Figure 11-2



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Popp's Ferry Road
Environmental Assessment

City of Biloxi
Harrison County Mississippi

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Preliminary Alignment

Northern Corridor

Figure 11-3

4.7 Level-of-Service Analysis

An analysis of the Year 2018 and 2030 traffic volumes was conducted using the information provided in the *Highway Capacity Manual, 2000 Edition.* The lane geometry and stop control for the total traffic analysis includes the existing traffic control and improved geometry at study intersections, taking into account a four-lane Popp's Ferry Road. The results of the analysis are shown in Table 7 for 2018 Traffic and Table 8 for 2030 Traffic. The analysis reports are contained in the report Appendix.

Table 7
Year 2018 (Improved Geometrics) Traffic Level-of-Service

Signalized Intersection	Time Period	Intersection Level of Service					
		NB	SB	EB	WB	Intersection	v/c
Riverview Dr/	AM Peak	A	A	B	B	**A**	0.39
Popp's Ferry Rd	PM Peak	B	B	B	B	**B**	0.49
Sunkist CC Rd/	AM Peak	A	A	C	**E**	**B**	0.60
Popp's Ferry Rd	PM Peak	A	A	D	C	**A**	0.53
Atkinson-Old Bay/	AM Peak	A	A	C	C	**A**	0.45
Popp's Ferry Rd	PM Peak	C	B	**E**	C	**C**	0.77
Pass Rd/	AM Peak	C	D	C	C	**C**	0.63
Popp's Ferry Rd	PM Peak	D	**E**	C	D	**D**	0.86

Source: Neel-Schaffer, 2008

Table 8
Year 2030 (Improved Geometrics) Traffic Level-of-Service

Signalized Intersection	Time Period	Intersection Level of Service					
		NB	SB	EB	WB	Intersection	v/c
Riverview Dr/	AM Peak	A	B	B	B	**B**	0.48
Popp's Ferry Rd	PM Peak	B	B	B	B	**B**	0.64
Sunkist CC Rd/	AM Peak	A	B	C	**F**	**C**	0.75
Popp's Ferry Rd	PM Peak	A	A	D	C	**A**	0.65
Atkinson-Old Bay/	AM Peak	A	A	C	C	**A**	0.55
Popp's Ferry Rd	PM Peak	C	B	**F**	C	**D**	0.99
Pass Rd/	AM Peak	D	**E**	D	D	**D**	0.90
Popp's Ferry Rd	PM Peak	**F**	**F**	D	D	**F**	**1.08**

Source: Neel-Schaffer, 2008

The intersection LOS analysis shows a significant improvement with the widening of Popp's Ferry Road from two lanes to four lanes. Year 2018 traffic analysis reveals that each intersection is forecast to operate at acceptable levels. The westbound movement of Sunkist Country Club Drive is shown to operate with a deficient westbound movement. This is the result of a heavy left turning volume, without a westbound left turn lane. Due to the fact that the east approach has increased in volume, there are more westbound vehicles resulting in the increased delays of

westbound left turning traffic. A westbound left turn lane is recommended, concurrent with a dedicated left turn phase to accommodate this volume. The alignment of the widened Popp's Ferry Road may need to shift to the east, to accommodate a dedicated eastbound left turn lane on Sunkist Country Club Drive, to alleviate this deficient turning movement.

The Year 2018 eastbound traffic on Old Bay Road, turning left onto Popp's Ferry Road is forecast to operate with significant delays. Again, this is the result of the lack of a dedicated left turn lane and a heavy left turn volume. Sufficient right-of-way does not exist to provide a dedicated left turn lane, without the acquisition adjacent property, and potential a residence. This turning volume (229 vph in the pm peak in 2008) is likely the result of the congestion that exists at the Popp's Ferry Road/Pass Road intersection. Vehicles are likely avoiding the Pass Road/Popp's Ferry Road intersection and utilizing Big Lake Road and Old Bay Road to access Popp's Ferry Road. Improvements to Popp's Ferry Road through widening and extension to Highway 90, are anticipated to alleviate the delays and queues at the Pass Road/Popp's Ferry Road, and could reduce the left turning volume in future years.

Year 2030 volumes show similar results to the 2018 volumes, as they are simply increased by percentage over the horizon years. Each intersection is shown to operate at acceptable levels in 2030, with the exception of the Pass Road/Popp's Ferry Road during the PM Peak in 2030 (LOS F). The extension of Popp's Ferry Road directly to Highway 90 is anticipated to be in place by 2030, thus reducing the turning volumes at the Pass Road/Popp's Ferry Road intersection. While turning volumes from Pass Road are likely to still be high, a large percentage of the traffic will continue through on Popp's Ferry Road, thus improving the intersection delays.

4.8 Signal Warrants

An analysis of the existing (2008) traffic volumes was conducted to determine if the traffic signal warrants outlined in the Manual on Uniform Traffic Control Devices (MUTCD), are met for the existing signalized intersections within the study corridor on Popp's Ferry Road at Riverview Drive, Sunkist Country Club Drive, Atkinson Road/Old Bay Road, and Pass Road. The volume warrants are based on the higher volume minor street approach and the combined two-way major street approach volumes.

The MUTCD outlines eight warrants for installation of traffic signals.

Warrant	**Applicable**
1) Eight-Hour Vehicle Volume	**Yes**
2) Four-Hour Vehicle Volume	**Yes**
3) Peak Hour	**Yes**
4) Pedestrian Volume	No
5) School Crossing	No
6) Coordinated Signal System	No
7) Crash Experience	No
8) Roadway Network	No

Three of the signal warrants are based exclusively on vehicular traffic volumes. These three volume warrants are:

1) Eight Hour Warrant – evaluates traffic volumes during the eight highest hours of the day,
2) Four Hour Warrant – evaluates traffic volumes during the four highest hours of the day,
3) Peak Hour Warrant – evaluates traffic volumes during the peak hour of the day.

The traffic volumes at the study intersections on Popp's Ferry Road were compared to the threshold criteria of the 8 hour, 4 hour and peak hour warrants. A review of the traffic signal warrant evaluation is listed in Table 9 for the three volume warrants outlined in the MUTCD.

Table 9
Traffic Signal Warrant Analysis

Location	Intersection	Year	Traffic Signal Warrants Met?		
			Warrant 1	Warrant 2	Warrant 3
1	Popp's Ferry Rd/Riverview Dr.[1]	2008	**No**	**No**	**No**
2	Popp's Ferry Rd/Sunkist CC Dr.	2008	Yes	Yes	Yes
3	Popp's Ferry Rd/Atkinson Road	2008	Yes[2]	Yes	Yes
4	Popp's Ferry Rd/Pass Road	2008	Yes	Yes	Yes

[1] Does not meet the full or reduced warrant based on weekday 12-hour count.
[2] Not counted for 12-hours, but volumes anticipated to meet 8 hour totals on minor street.
Source: Neel-Schaffer, Inc., 2008.

The traffic signal warrant analysis revealed that three of the intersections meet signal warrants, while the intersection of Riverview Drive at Popp's Ferry Road does not meet warrants based on the typical weekday traffic. However, two other factors affect the potential satisfaction of warrants at Riverview Drive: 1) The fire station located on Riverview Drive at the Margaret Sherry Library, and 2) the City soccer fields located on Riverview Drive. The fire station utilizes the traffic signal to access Popp's Ferry Road when they respond to emergency calls. Additionally, soccer events at the City fields generate significant traffic volumes on Riverview Drive that are anticipated to meet at least one MUTCD warrant. The signal warrant analysis sheets are contained in the Appendix.

5.0 Recommendations and Conclusions

The widening of Popp's Ferry Road to a four-lane roadway between Riverview Drive and Pass Road is needed to improve the existing roadway delays and capacity deficiencies. The interaction of the existing drawbridge with commuting traffic, emergency service response times, and hurricane evacuations is significantly degrading the operation of marine and automobile traffic. Current volumes are near the upper limits of capacity of a two-lane roadway. Widening Popp's Ferry Road to a four-lane divided facility with an elevated bridge over the Back Bay is desperately needed to accommodate future growth and evacuation routes. The limited alternatives to access to the Biloxi peninsula creates excessive pressure on Popp's Ferry Road. Parallel corridors of Cowan-Lorrain Road and Interstate 110 are both 4 lane roadways with drawbridges that are operating near capacity.

The widening to four lanes will provide the capacity needed to accommodate the growth forecast through Year 2030. Each of the Alternates B-E, provide the necessary capacity, while Alternate A is the no-build condition. The elimination of driveways that directly front the roadway will significantly improve the traffic operations of the corridor by decreasing the number of conflict points. The elimination of the private driveways in the northern corridor is recommended, and the removal of the residences that directly front this roadway is recommended. Widening Popp's Ferry Road will increase the travel speeds and move the roadway closer to these existing homes, and increase the potential for errant automobiles to strike the adjacent residences. Acquisition of the residences in the north corridor north of the Back Bay is recommended.

An eastbound left turn lane and protected/permitted left turn phasing are recommended to be constructed on Sunkist Country Club Drive at Popp's Ferry Road, to alleviate the delays anticipated for left turning traffic at this location.

The bridge over the Back Bay is recommended to be raised to a height that would allow tugboats moving barges to and from the power plant in Gulfport to travel under the bridge without opening the draw. The demands during hurricane evacuation peak for both marine traffic and automobile traffic at similar times. An elevated, fixed span bridge, would allow both to move concurrently. A bascule draw bridge would limit the ability of marine and automobile traffic to evacuate the low-lying coastal areas.

Shifting the alignment along the southern portion of the corridor to minimize the acquisition of residences is recommended, as there is sufficient opportunity to shift the roadway and maintain acceptable horizontal clearance from existing structures. Due to grade transitions in the vicinity of the Anatole Bay development, a connecting roadway is recommended beneath the new bridge, to allow traffic to travel under the bridge to access Popp's Ferry Road to travel north, rather than allow a median opening to serve this site.

The extension of Popp's Ferry Road south of Pass Road to Highway 90 is recommended to improve the efficiency and operation of the intersection of Pass Road/Popp's Ferry Road by increasing the through traffic volumes while decreasing the turning volumes at this intersection.

Appendix

Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popp's Ferry/Riverview
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Riverview
Site Code : 00000000
Start Date : 10/2/2008
Page No : 1

Groups Printed- Unshifted

	Popp's Ferry Rd Northbound				Popp's Ferry Rd Southbound				Riverview Dr Eastbound				Riverview Dr Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:00 AM	0	45	1	46	0	56	1	57	4	0	0	4	0	0	0	0	107
06:15 AM	0	67	3	70	1	94	0	95	1	0	1	2	1	0	3	4	171
06:30 AM	0	106	1	107	4	169	3	176	6	0	1	7	4	0	6	10	300
06:45 AM	2	171	0	173	1	160	2	163	13	0	0	13	1	0	7	8	357
Total	2	389	5	396	6	479	6	491	24	0	2	26	6	0	16	22	935
07:00 AM	1	148	1	150	1	166	4	171	8	0	2	10	1	0	1	2	333
07:15 AM	1	116	0	117	1	227	2	230	2	0	0	2	0	0	0	0	349
07:30 AM	0	118	2	120	0	239	4	243	4	2	5	11	2	0	1	3	377
07:45 AM	0	145	0	145	6	180	0	186	12	0	2	14	3	1	2	6	351
Total	2	527	3	532	8	812	10	830	26	2	9	37	6	1	4	11	1410
08:00 AM	0	158	2	160	2	183	6	191	12	0	2	14	1	1	4	6	371
08:15 AM	0	128	1	129	0	180	3	183	13	0	1	14	0	0	3	3	329
08:30 AM	0	121	1	122	4	148	6	158	8	2	1	11	3	0	1	4	295
08:45 AM	2	123	0	125	2	179	1	182	1	0	0	1	1	0	3	4	312
Total	2	530	4	536	8	690	16	714	34	2	4	40	5	1	11	17	1307
09:00 AM	0	96	1	97	1	140	1	142	1	0	1	2	3	0	5	8	249
09:15 AM	1	84	1	86	4	154	1	159	3	0	1	4	2	0	2	4	253
09:30 AM	8	150	0	158	1	150	1	152	5	1	0	6	3	1	2	6	322
09:45 AM	0	120	1	121	3	169	1	173	2	1	2	5	3	0	3	6	305
Total	9	450	3	462	9	613	4	626	11	2	4	17	11	1	12	24	1129
10:00 AM	1	135	1	137	2	150	7	159	4	0	1	5	2	0	3	5	306
10:15 AM	1	134	3	138	7	121	5	133	4	0	1	5	2	0	4	6	282
10:30 AM	0	132	4	136	4	137	1	142	4	0	0	4	2	1	1	4	286
10:45 AM	0	125	0	125	3	133	2	138	1	0	2	3	4	1	2	7	273
Total	2	526	8	536	16	541	15	572	13	0	4	17	10	2	10	22	1147
11:00 AM	1	147	3	151	2	132	4	138	6	0	1	7	2	0	0	2	298
11:15 AM	1	138	3	142	3	141	3	147	2	0	2	4	1	2	2	5	298
11:30 AM	1	127	2	130	7	143	2	152	3	0	4	7	3	0	4	7	296
11:45 AM	0	145	3	148	2	166	5	173	4	0	1	5	6	0	5	11	337
Total	3	557	11	571	14	582	14	610	15	0	8	23	12	2	11	25	1229
12:00 PM	0	167	3	170	3	137	7	147	3	0	0	3	3	0	3	6	326
12:15 PM	0	151	1	152	2	174	4	180	2	0	1	3	6	0	4	10	345
12:30 PM	0	179	1	180	1	157	1	159	4	0	3	7	1	0	2	3	349
12:45 PM	0	162	1	163	1	137	4	142	5	0	2	7	3	1	1	5	317
Total	0	659	6	665	7	605	16	628	14	0	6	20	13	1	10	24	1337
01:00 PM	4	158	3	165	3	162	3	168	4	0	2	6	4	0	4	8	347
01:15 PM	1	142	4	147	3	162	3	168	2	0	2	4	3	0	6	9	328
01:30 PM	2	169	3	174	3	149	4	156	3	1	1	5	2	0	2	4	339
01:45 PM	2	180	3	185	4	160	5	169	7	0	1	8	3	0	1	4	366
Total	9	649	13	671	13	633	15	661	16	1	6	23	12	0	13	25	1380
02:00 PM	1	144	5	150	3	152	2	157	4	0	2	6	4	1	6	11	324
02:15 PM	0	179	2	181	1	204	6	211	6	0	2	8	1	0	3	4	404
02:30 PM	0	179	1	180	4	174	7	185	1	1	5	7	1	0	4	5	377
02:45 PM	0	138	2	140	2	142	0	144	3	0	0	3	3	0	3	6	293
Total	1	640	10	651	10	672	15	697	14	1	9	24	9	1	16	26	1398
03:00 PM	7	250	4	261	1	169	8	178	4	0	4	8	0	0	5	5	452
03:15 PM	2	186	3	191	2	164	4	170	5	0	1	6	1	0	1	2	369
03:30 PM	3	227	3	233	1	177	2	180	5	0	0	5	3	0	3	6	424
03:45 PM	2	242	3	247	1	192	4	197	10	0	2	12	2	1	1	4	460
Total	14	905	13	932	5	702	18	725	24	0	7	31	6	1	10	17	1705

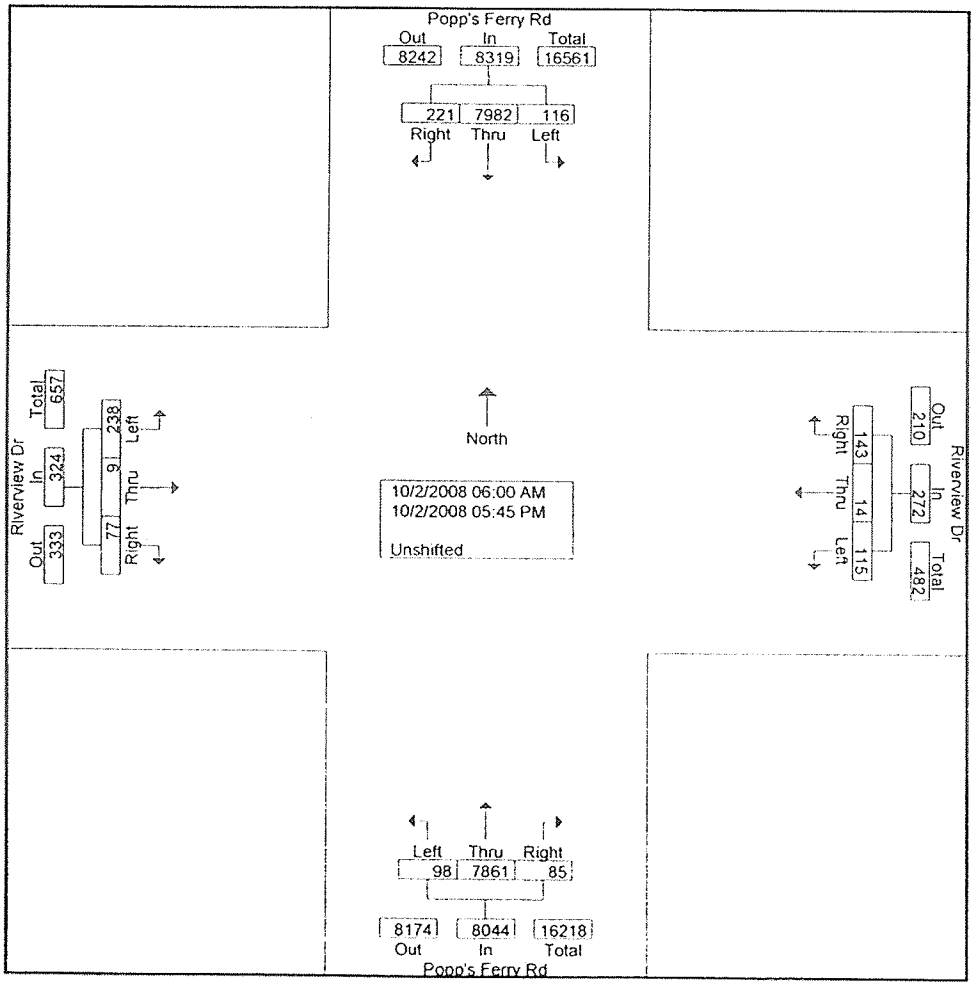
Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popp's Ferry/Riverview
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Riverview
Site Code : 00000000
Start Date : 10/2/2008
Page No : 2

Groups Printed- Unshifted

	Popp's Ferry Rd Northbound				Popp's Ferry Rd Southbound				Riverview Dr Eastbound				Riverview Dr Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	2	240	0	242	7	206	8	221	6	0	1	7	4	0	2	6	476
04:15 PM	1	236	0	237	1	193	2	196	6	0	0	6	1	0	0	1	440
04:30 PM	0	255	2	257	5	164	4	173	2	0	4	6	5	0	7	12	448
04:45 PM	3	307	1	311	1	208	4	213	7	0	1	8	5	0	6	11	543
Total	6	1038	3	1047	14	771	18	803	21	0	6	27	15	0	15	30	1907
05:00 PM	4	273	1	278	2	227	10	239	7	0	2	9	4	0	6	10	536
05:15 PM	11	260	2	273	1	242	14	257	2	0	5	7	0	1	2	3	540
05:30 PM	11	226	2	239	0	217	18	235	7	1	3	11	2	3	3	8	493
05:45 PM	22	232	1	255	3	196	32	231	10	0	2	12	4	0	4	8	506
Total	48	991	6	1045	6	882	74	962	26	1	12	39	10	4	15	29	2075
Grand Total	98	7861	85	8044	116	7982	221	8319	238	9	77	324	115	14	143	272	16959
Apprch %	1.2	97.7	1.1		1.4	95.9	2.7		73.5	2.8	23.8		42.3	5.1	52.6		
Total %	0.6	46.4	0.5	47.4	0.7	47.1	1.3	49.1	1.4	0.1	0.5	1.9	0.7	0.1	0.8	1.6	



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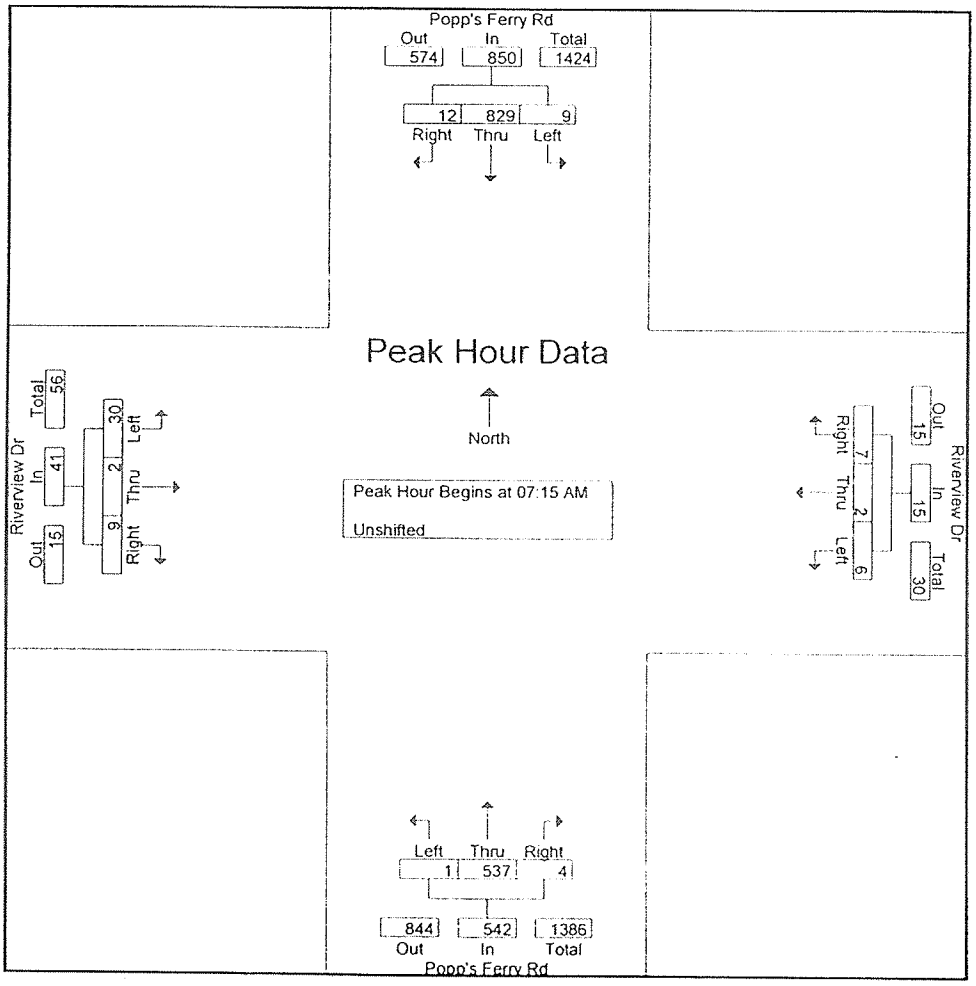
Intersection: Popp's Ferry/Riverview
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Riverview
Site Code : 00000000
Start Date : 10/2/2008
Page No : 3

	Popp's Ferry Rd Northbound				Popp's Ferry Rd Southbound				Riverview Dr Eastbound				Riverview Dr Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	1	116	0	117	1	227	2	230	2	0	0	2	0	0	0	0	349
07:30 AM	0	118	2	120	0	239	4	243	4	2	5	11	2	0	1	3	377
07:45 AM	0	145	0	145	6	180	0	186	12	0	2	14	3	1	2	6	351
08:00 AM	0	158	2	160	2	183	6	191	12	0	2	14	1	1	4	6	371
Total Volume	1	537	4	542	9	829	12	850	30	2	9	41	6	2	7	15	1448
% App. Total	0.2	99.1	0.7		1.1	97.5	1.4		73.2	4.9	22		40	13.3	46.7		
PHF	.250	.850	.500	.847	.375	.867	.500	.874	.625	.250	.450	.732	.500	.500	.438	.625	.960



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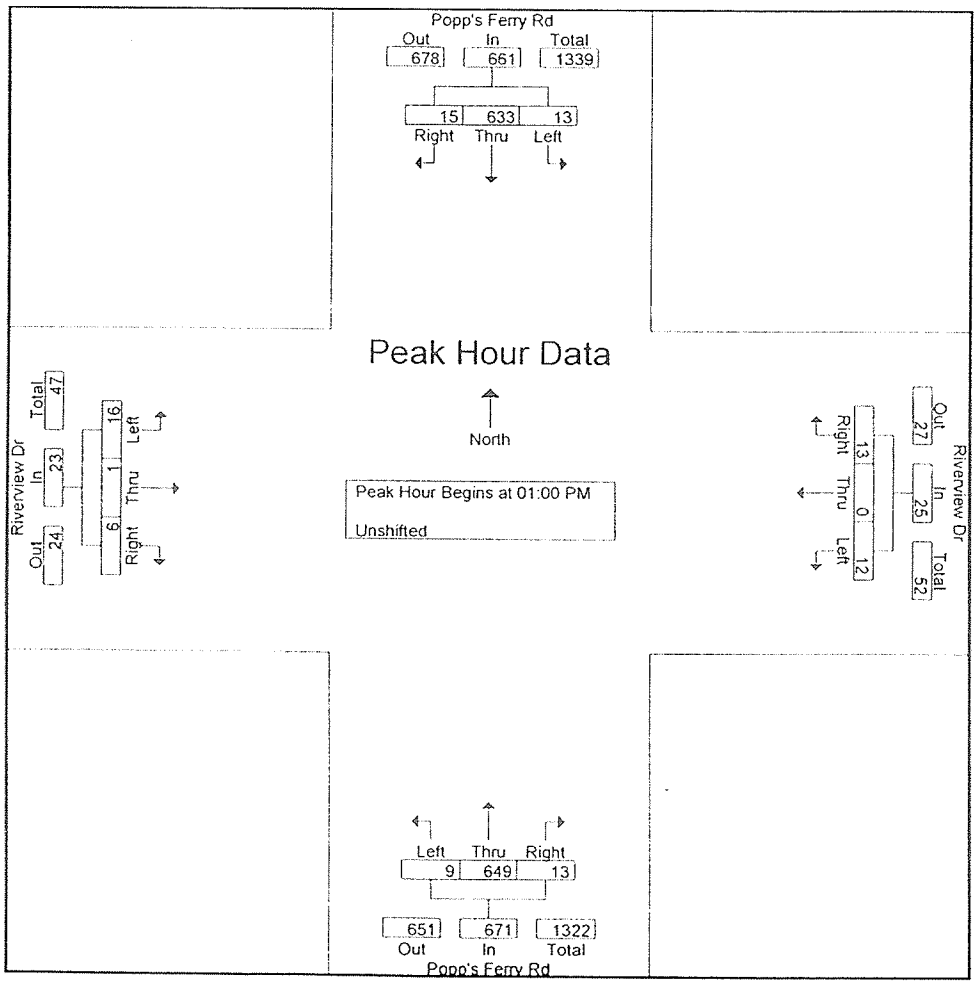
Intersection: Popp's Ferry/Riverview
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Riverview
Site Code : 00000000
Start Date : 10/2/2008
Page No : 4

	Popp's Ferry Rd Northbound				Popp's Ferry Rd Southbound				Riverview Dr Eastbound				Riverview Dr Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 01:00 PM																	
01:00 PM	4	158	3	165	3	162	3	168	4	0	2	6	4	0	4	8	347
01:15 PM	1	142	4	147	3	162	3	168	2	0	2	4	3	0	6	9	328
01:30 PM	2	169	3	174	3	149	4	156	3	1	1	5	2	0	2	4	339
01:45 PM	2	180	3	185	4	160	5	169	7	0	1	8	3	0	1	4	366
Total Volume	9	649	13	671	13	633	15	661	16	1	6	23	12	0	13	25	1380
% App. Total	1.3	96.7	1.9		2	95.8	2.3		69.6	4.3	26.1		48	0	52		
PHF	.563	.901	.813	.907	.813	.977	.750	.978	.571	.250	.750	.719	.750	.000	.542	.694	.943



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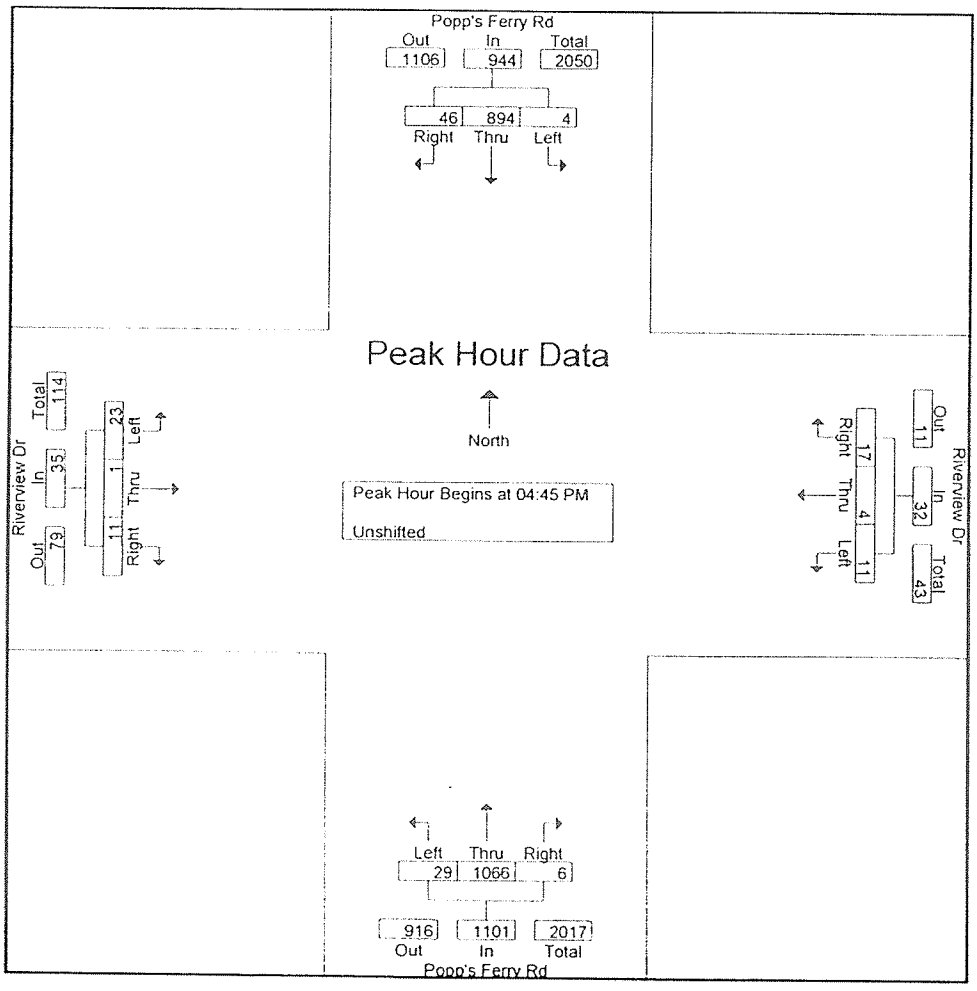
Intersection: Popp's Ferry/Riverview
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Riverview
Site Code : 00000000
Start Date : 10/2/2008
Page No : 5

	Popp's Ferry Rd Northbound				Popp's Ferry Rd Southbound				Riverview Dr Eastbound				Riverview Dr Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	3	**307**	1	**311**	1	208	4	213	**7**	0	1	8	**5**	0	**6**	**11**	**543**
05:00 PM	4	273	1	278	**2**	227	10	239	7	0	2	9	4	0	6	10	536
05:15 PM	**11**	260	**2**	273	1	**242**	14	**257**	2	0	**5**	7	0	1	2	3	540
05:30 PM	11	226	2	239	0	217	**18**	235	7	**1**	3	**11**	2	**3**	3	8	493
Total Volume	29	1066	6	1101	4	894	46	944	23	1	11	35	11	4	17	32	2112
% App. Total	2.6	96.8	0.5		0.4	94.7	4.9		65.7	2.9	31.4		34.4	12.5	53.1		
PHF	.659	.868	.750	.885	.500	.924	.639	.918	.821	.250	.550	.795	.550	.333	.708	.727	.972



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Biloxi, MS 39530
(228) 374-1211

Intersection: Popps Ferry/Sunkist
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry_Sunkist
Site Code : 00000000
Start Date : 9/30/2008
Page No : 1

Groups Printed- Unshifted

	POPP'S FERRY ROAD Northbound				POPP'S FERRY ROAD Southbound				SUNKIST CC RD Eastbound				SUNKIST CC RD Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
06:00 AM	0	39	0	39	0	82	2	84	6	0	7	13	1	0	3	4	140
06:15 AM	3	56	0	59	0	129	5	134	9	0	10	19	7	0	4	11	223
06:30 AM	1	111	1	113	1	171	2	174	14	0	14	28	10	0	0	10	325
06:45 AM	2	135	1	138	0	178	5	183	21	1	8	30	17	0	5	22	373
Total	6	341	2	349	1	560	14	575	50	1	39	90	35	0	12	47	1061
07:00 AM	2	77	1	80	0	186	5	191	23	0	18	41	10	2	6	18	330
07:15 AM	4	63	0	67	0	226	1	227	16	0	19	35	23	0	1	24	353
07:30 AM	5	95	0	100	0	218	5	223	28	0	26	54	44	1	4	49	426
07:45 AM	9	92	2	103	0	205	4	209	17	0	53	70	48	0	4	52	434
Total	20	327	3	350	0	835	15	850	84	0	116	200	125	3	15	143	1543
08:00 AM	5	120	1	126	2	175	6	183	24	1	19	44	19	0	3	22	375
08:15 AM	5	98	0	103	2	167	8	177	19	0	16	35	12	1	6	19	334
08:30 AM	4	112	0	116	2	134	18	154	17	0	7	24	9	2	4	15	309
08:45 AM	12	102	0	114	3	168	10	181	21	1	8	30	9	0	5	14	339
Total	26	432	1	459	9	644	42	695	81	2	50	133	49	3	18	70	1357
09:00 AM	5	92	1	98	3	149	17	169	14	0	12	26	9	0	2	11	304
09:15 AM	4	93	0	97	0	141	14	155	10	0	13	23	3	0	2	5	280
09:30 AM	7	128	0	135	2	146	10	158	16	1	18	35	9	0	5	14	342
09:45 AM	8	108	1	117	2	141	11	154	10	1	8	19	9	1	0	10	300
Total	24	421	2	447	7	577	52	636	50	2	51	103	30	1	9	40	1226
10:00 AM	13	107	2	122	2	143	7	152	9	0	17	26	2	1	1	4	304
10:15 AM	8	103	0	111	0	124	5	129	13	0	15	28	4	0	0	4	272
10:30 AM	7	113	2	122	0	130	6	136	9	0	6	15	5	0	3	8	281
10:45 AM	13	134	2	149	0	121	14	135	13	1	14	28	9	1	2	12	324
Total	41	457	6	504	2	518	32	552	44	1	52	97	20	2	6	28	1181
11:00 AM	13	145	2	160	1	144	9	154	9	0	13	22	6	0	1	7	343
11:15 AM	8	133	0	141	3	131	13	147	13	0	14	27	6	0	3	9	324
11:30 AM	4	158	0	162	2	145	10	157	15	0	11	26	4	0	1	5	350
11:45 AM	7	126	0	133	3	120	12	135	11	0	10	21	13	0	0	13	302
Total	32	562	2	596	9	540	44	593	48	0	48	96	29	0	5	34	1319
12:00 PM	10	110	2	122	3	135	12	150	18	1	8	27	6	1	1	8	307
12:15 PM	17	178	1	196	2	129	4	135	8	0	7	15	7	0	1	8	354
12:30 PM	10	144	2	156	0	162	14	176	7	0	12	19	9	0	2	11	362
12:45 PM	11	122	2	135	2	135	13	150	12	0	11	23	15	0	5	20	328
Total	48	554	7	609	7	561	43	611	45	1	38	84	37	1	9	47	1351
01:00 PM	8	123	1	132	2	161	12	175	11	0	13	24	5	0	1	6	337
01:15 PM	12	164	0	176	2	146	9	157	11	0	6	17	4	1	3	8	358
01:30 PM	7	141	2	150	2	126	9	137	14	0	12	26	2	0	0	2	315
01:45 PM	11	174	0	185	2	142	10	154	13	0	9	22	8	0	3	11	372
Total	38	602	3	643	8	575	40	623	49	0	40	89	19	1	7	27	1382
02:00 PM	7	198	1	206	1	145	8	154	14	1	7	22	10	1	0	11	393
02:15 PM	12	121	1	134	2	171	13	186	11	0	9	20	6	1	3	10	350
02:30 PM	10	144	0	154	0	156	15	171	15	0	11	26	9	1	0	10	361
02:45 PM	15	199	0	214	3	161	18	182	15	1	11	27	13	3	5	21	444
Total	44	662	2	708	6	633	54	693	55	2	38	95	38	6	8	52	1548
03:00 PM	10	218	1	229	0	159	13	172	22	1	10	33	7	0	1	8	442
03:15 PM	7	201	3	211	2	162	18	182	12	0	7	19	8	0	1	9	421
03:30 PM	13	227	0	240	0	160	21	181	10	2	11	23	12	1	3	16	460
03:45 PM	18	195	0	213	4	155	13	172	17	1	10	28	6	3	0	9	422
Total	48	841	4	893	6	636	65	707	61	4	38	103	33	4	5	42	1745

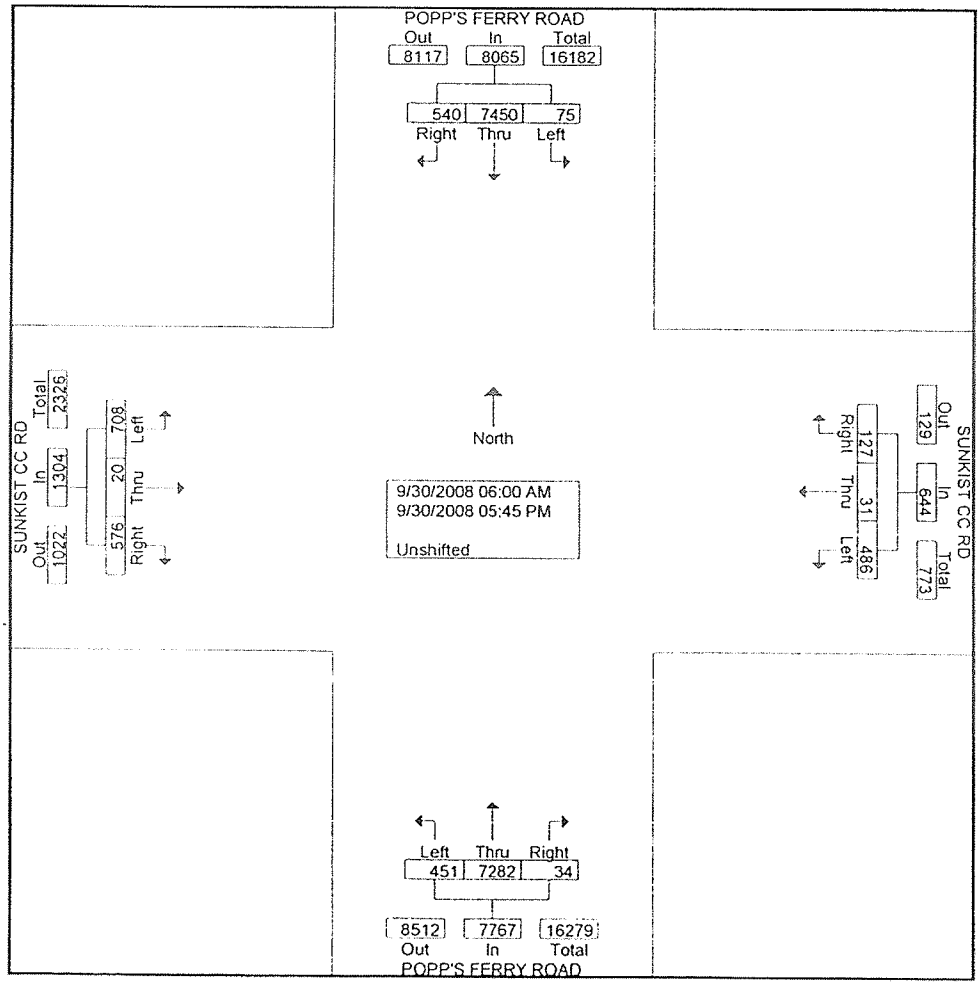
Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popps Ferry/Sunkist
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry_Sunkist
Site Code : 00000000
Start Date : 9/30/2008
Page No : 2

Groups Printed- Unshifted

	POPP'S FERRY ROAD Northbound				POPP'S FERRY ROAD Southbound				SUNKIST CC RD Eastbound				SUNKIST CC RD Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Factor	1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		1.0	1.0	1.0		
04:00 PM	13	191	0	204	6	176	17	199	18	0	12	30	10	3	4	17	450
04:15 PM	19	279	1	299	1	167	18	186	10	0	5	15	9	1	5	15	515
04:30 PM	13	276	0	289	2	169	12	183	14	2	8	24	6	1	5	12	508
04:45 PM	20	285	0	305	1	153	18	172	17	1	8	26	5	0	4	9	512
Total	65	1031	1	1097	10	665	65	740	59	3	33	95	30	5	18	53	1985
05:00 PM	16	290	0	306	2	177	17	196	22	1	6	29	9	2	6	17	548
05:15 PM	12	290	0	302	3	184	22	209	17	1	7	25	14	1	3	18	554
05:30 PM	17	250	0	267	5	186	22	213	26	2	10	38	9	2	1	12	530
05:45 PM	14	222	1	237	0	159	13	172	17	0	10	27	9	0	5	14	450
Total	59	1052	1	1112	10	706	74	790	82	4	33	119	41	5	15	61	2082
Grand Total	451	7282	34	7767	75	7450	540	8065	708	20	576	1304	486	31	127	644	17780
Apprch %	5.8	93.8	0.4		0.9	92.4	6.7		54.3	1.5	44.2		75.5	4.8	19.7		
Total %	2.5	41	0.2	43.7	0.4	41.9	3	45.4	4	0.1	3.2	7.3	2.7	0.2	0.7	3.6	

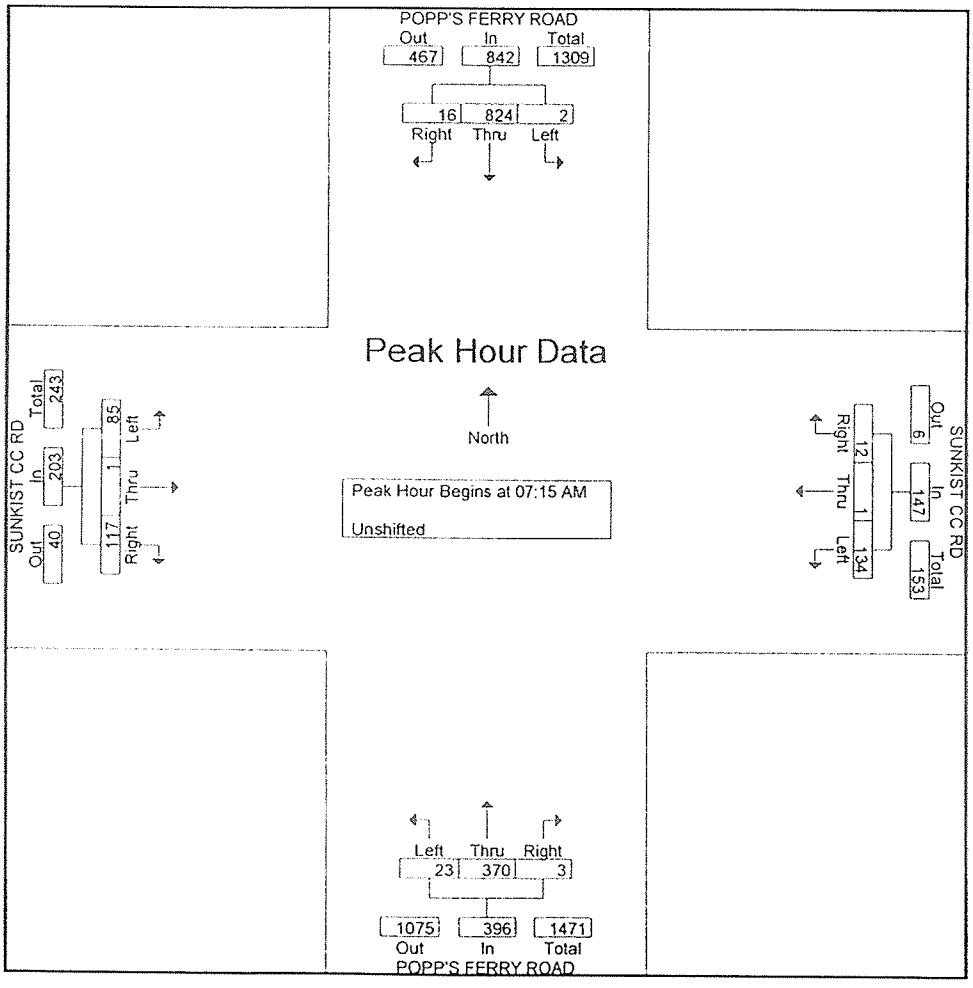


Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popps Ferry/Sunkist
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry_Sunkist
Site Code : 00000000
Start Date : 9/30/2008
Page No : 3

	POPP'S FERRY ROAD Northbound				POPP'S FERRY ROAD Southbound				SUNKIST CC RD Eastbound				SUNKIST CC RD Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	4	63	0	67	0	226	1	227	16	0	19	35	23	0	1	24	353
07:30 AM	5	95	0	100	0	218	5	223	28	0	26	54	44	1	4	49	426
07:45 AM	9	92	2	103	0	205	4	209	17	0	53	70	48	0	4	52	434
08:00 AM	5	120	1	126	2	175	6	183	24	1	19	44	19	0	3	22	375
Total Volume	23	370	3	396	2	824	16	842	85	1	117	203	134	1	12	147	1588
% App. Total	5.8	93.4	0.8		0.2	97.9	1.9		41.9	0.5	57.6		91.2	0.7	8.2		
PHF	.639	.771	.375	.786	.250	.912	.667	.927	.759	.250	.552	.725	.698	.250	.750	.707	.915

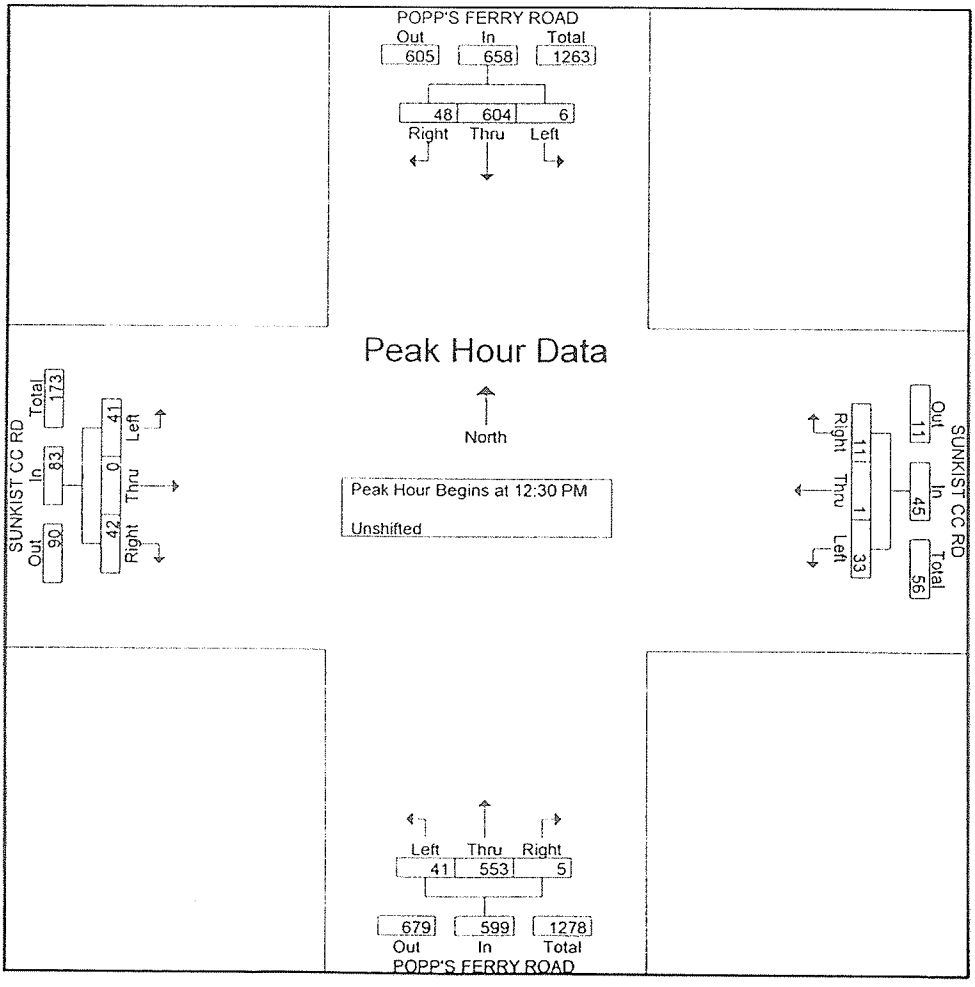


Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popps Ferry/Sunkist
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry_Sunkist
Site Code : 00000000
Start Date : 9/30/2008

	POPP'S FERRY ROAD Northbound				POPP'S FERRY ROAD Southbound				SUNKIST CC RD Eastbound				SUNKIST CC RD Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:30 PM																	
12:30 PM	10	144	2	156	0	162	14	176	7	0	12	19	9	0	2	11	362
12:45 PM	11	122	2	135	2	135	13	150	12	0	11	23	15	0	5	20	328
01:00 PM	8	123	1	132	2	161	12	175	11	0	13	24	5	0	1	6	337
01:15 PM	12	164	0	176	2	146	9	157	11	0	6	17	4	1	3	8	358
Total Volume	41	553	5	599	6	604	48	658	41	0	42	83	33	1	11	45	1385
% App. Total	6.8	92.3	0.8		0.9	91.8	7.3		49.4	0	50.6		73.3	2.2	24.4		
PHF	.854	.843	.625	.851	.750	.932	.857	.935	.854	.000	.808	.865	.550	.250	.550	.563	.956

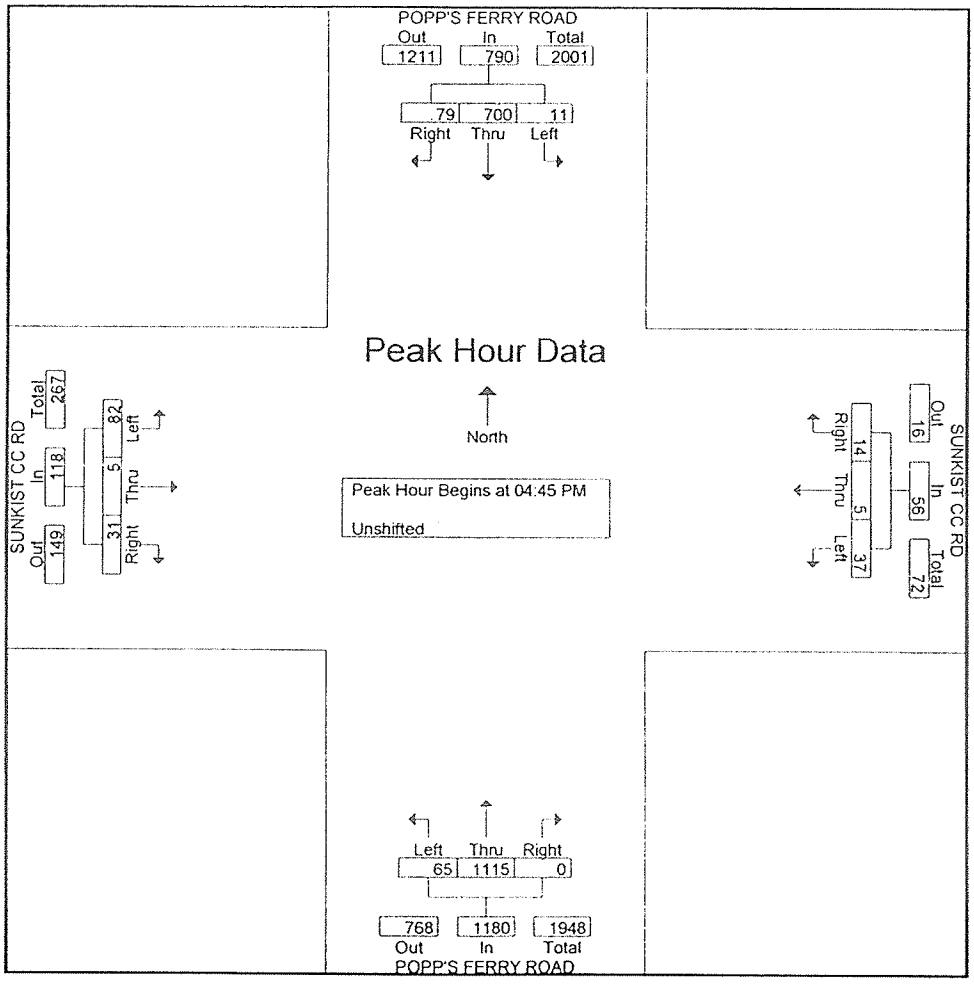


Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popps Ferry/Sunkist
Counter: Cody Courts
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry_Sunkist
Site Code : 00000000
Start Date : 9/30/2008

	POPP'S FERRY ROAD Northbound				POPP'S FERRY ROAD Southbound				SUNKIST CC RD Eastbound				SUNKIST CC RD Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**20**	285	0	305	1	153	18	172	17	1	8	26	5	0	4	9	512
05:00 PM	16	**290**	0	**306**	2	177	17	196	22	1	6	29	9	**2**	**6**	17	548
05:15 PM	12	290	0	302	3	184	**22**	209	17	1	7	25	**14**	1	3	**18**	**554**
05:30 PM	17	250	0	267	**5**	**186**	22	**213**	**26**	**2**	**10**	**38**	9	2	1	12	530
Total Volume	65	1115	0	1180	11	700	79	790	82	5	31	118	37	5	14	56	2144
% App. Total	5.5	94.5	0		1.4	88.6	10		69.5	4.2	26.3		66.1	8.9	25		
PHF	.813	.961	.000	.964	.550	.941	.898	.927	.788	.625	.775	.776	.661	.625	.583	.778	.968



Neel-Schaffer, Inc.
772 Howard Avenue
Biloxi, MS 39530

Intersection: Popp's Ferry/Atkinson
Counter: B. Milling
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Aktinson
Site Code : 00000000
Start Date : 6/3/2008
Page No : 1

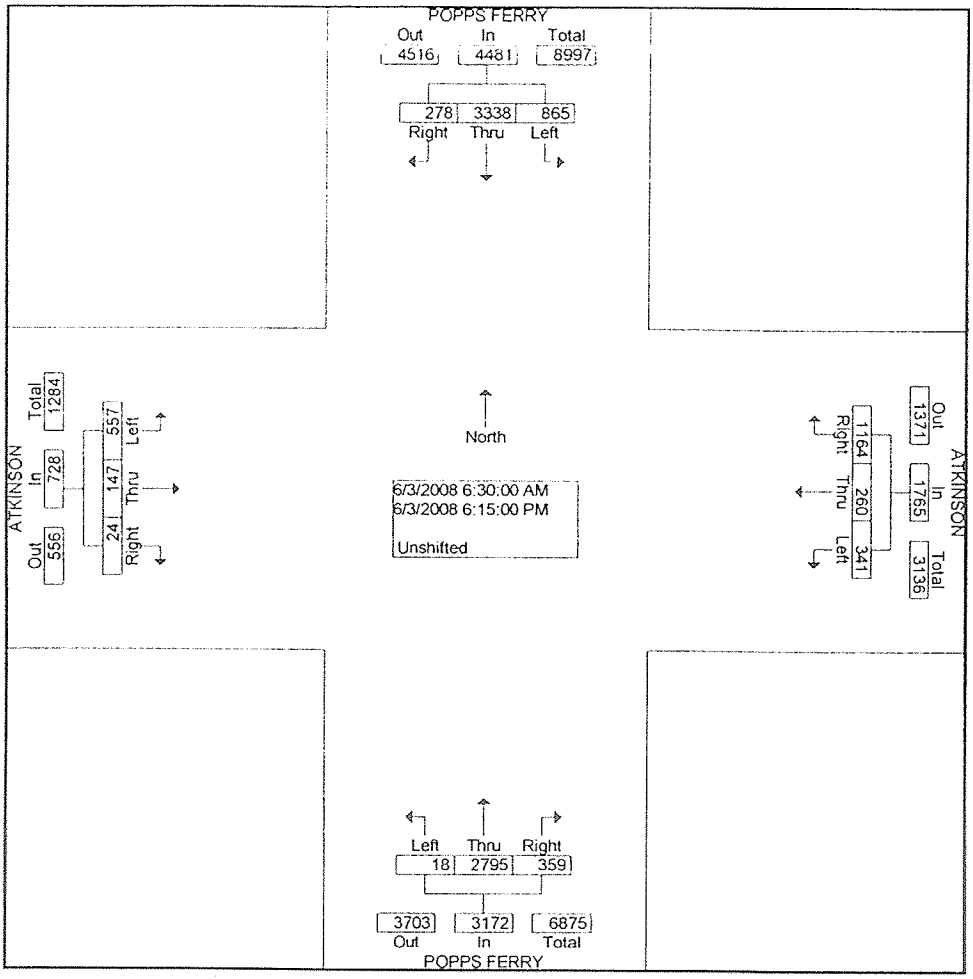
Groups Printed- Unshifted

	POPPS FERRY Northbound				POPPS FERRY Southbound				ATKINSON Eastbound				ATKINSON Westbound				
Start Time	Left	Thru	Right	App Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:30 AM	0	45	17	62	58	90	3	151	6	5	1	12	14	2	17	33	258
06:45 AM	0	53	14	67	68	137	7	212	7	7	0	14	11	1	11	23	316
Total	0	98	31	129	126	227	10	363	13	12	1	26	25	3	28	56	574
07:00 AM	0	57	17	74	54	105	10	169	5	7	1	13	9	4	21	34	290
07:15 AM	0	66	9	75	60	145	10	215	8	4	1	13	10	4	11	25	328
07:30 AM	1	60	10	71	54	196	17	267	12	9	2	23	11	13	30	54	415
07:45 AM	1	72	19	92	63	209	18	290	9	4	0	13	12	4	20	36	431
Total	2	255	55	312	231	655	55	941	34	24	4	62	42	25	82	149	1464
08:00 AM	2	66	9	77	33	197	7	237	6	5	1	12	13	1	15	29	355
08:15 AM	2	66	9	77	30	178	14	222	8	5	0	13	12	8	17	37	349
08:30 AM	0	71	19	90	38	169	4	211	8	4	0	12	10	0	22	32	345
08:45 AM	0	73	12	85	22	111	12	145	4	7	0	11	15	10	25	50	291
Total	4	276	49	329	123	655	37	815	26	21	1	48	50	19	79	148	1340
09:00 AM	2	77	10	89	30	162	10	202	5	2	1	8	18	2	24	44	343
09:15 AM	0	84	8	92	29	166	10	205	6	2	1	9	7	9	38	54	360
Total	2	161	18	181	59	328	20	407	11	4	2	17	25	11	62	98	703
03:30 PM	0	142	17	159	22	130	15	167	18	5	0	23	27	19	62	108	457
03:45 PM	1	153	18	172	25	127	12	164	30	5	2	37	18	12	43	73	446
Total	1	295	35	331	47	257	27	331	48	10	2	60	45	31	105	181	903
04:00 PM	4	192	18	214	20	117	10	147	38	8	0	46	25	24	84	133	540
04:15 PM	2	164	24	190	35	140	13	188	33	8	2	43	22	25	69	116	537
04:30 PM	1	174	17	192	26	115	12	153	54	12	0	66	26	31	128	185	596
04:45 PM	0	180	10	190	39	124	23	186	44	12	2	58	20	18	131	169	603
Total	7	710	69	786	120	496	58	674	169	40	4	213	93	98	412	603	2276
05:00 PM	0	176	10	186	23	123	17	163	73	5	3	81	19	18	103	140	570
05:15 PM	0	177	16	193	29	127	15	171	58	9	1	68	12	20	93	125	557
05:30 PM	0	177	17	194	34	145	12	191	54	11	4	69	10	16	69	95	549
05:45 PM	0	194	15	209	26	105	10	141	33	3	2	38	6	11	62	79	467
Total	0	724	58	782	112	500	54	666	218	28	10	256	47	65	327	439	2143
06:00 PM	1	158	32	191	23	130	14	167	26	5	0	31	9	2	44	55	444
06:15 PM	1	118	12	131	24	90	3	117	12	3	0	15	5	6	25	36	299
Grand Total	18	2795	359	3172	865	3338	278	4481	557	147	24	728	341	260	1164	1765	10146
Apprch %	0.6	88.1	11.3		19.3	74.5	6.2		76.5	20.2	3.3		19.3	14.7	65.9		
Total %	0.2	27.5	3.5	31.3	8.5	32.9	2.7	44.2	5.5	1.4	0.2	7.2	3.4	2.6	11.5	17.4	

Neel-Schaffer, Inc.
772 Howard Avenue
Biloxi, MS 39530

Intersection: Popp's Ferry/Atkinson
Counter: B. Milling
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Aktinson
Site Code : 00000000
Start Date : 6/3/2008
Page No : 2

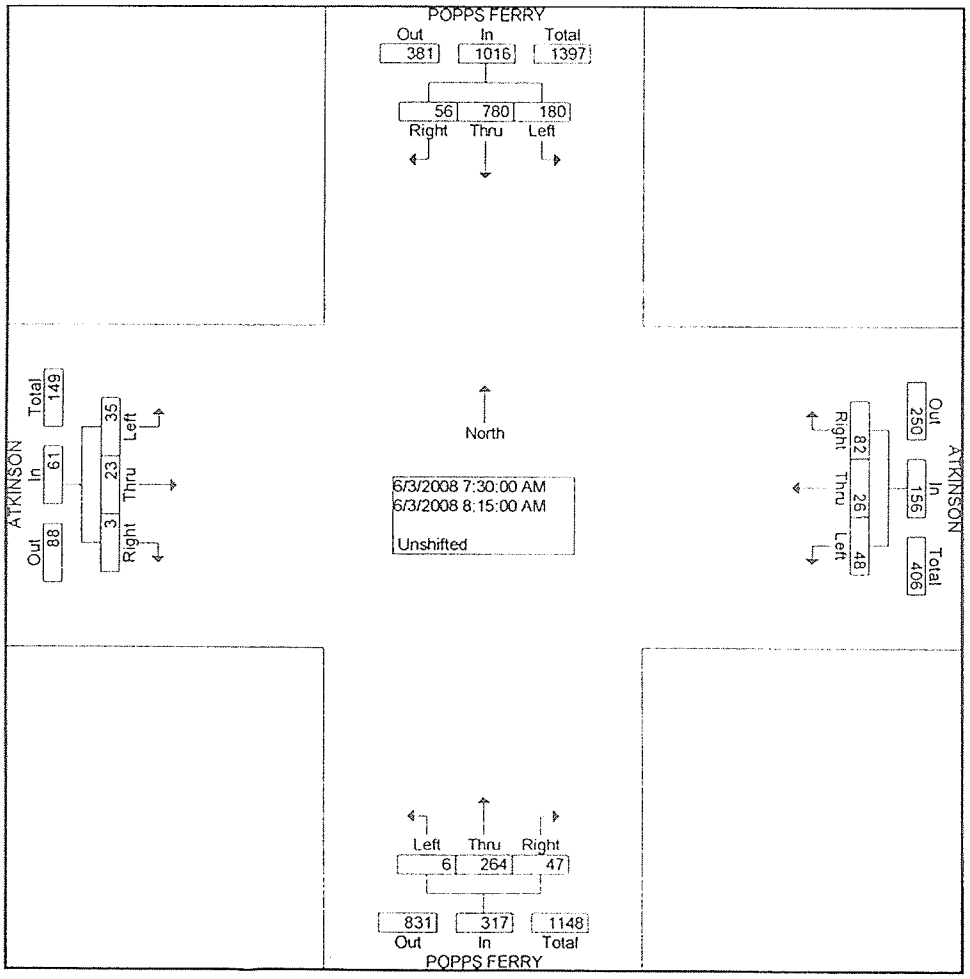


Neel-Schaffer, Inc.
772 Howard Avenue
Biloxi, MS 39530

Intersection: Popp's Ferry/Atkinson
Counter: B. Milling
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Aktinson
Site Code : 00000000
Start Date : 6/3/2008
Page No : 3

	POPPS FERRY Northbound				POPPS FERRY Southbound				ATKINSON Eastbound				ATKINSON Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 06:30 AM to 11:45 AM - Peak 1 of 1																	
Intersection 07:30 AM																	
Volume	6	264	47	317	180	780	56	1016	35	23	3	61	48	26	82	156	1550
Percent	1.9	83.3	14.8		17.7	76.8	5.5		57.4	37.7	4.9		30.8	16.7	52.6		
07:45 Volume	1	72	19	92	63	209	18	290	9	4	0	13	12	4	20	36	431
Peak Factor																	0.899
High Int.	07:45 AM				07:45 AM				07:30 AM				07:30 AM				
Volume	1	72	19	92	63	209	18	290	12	9	2	23	11	13	30	54	
Peak Factor				0.861				0.876				0.663				0.722	

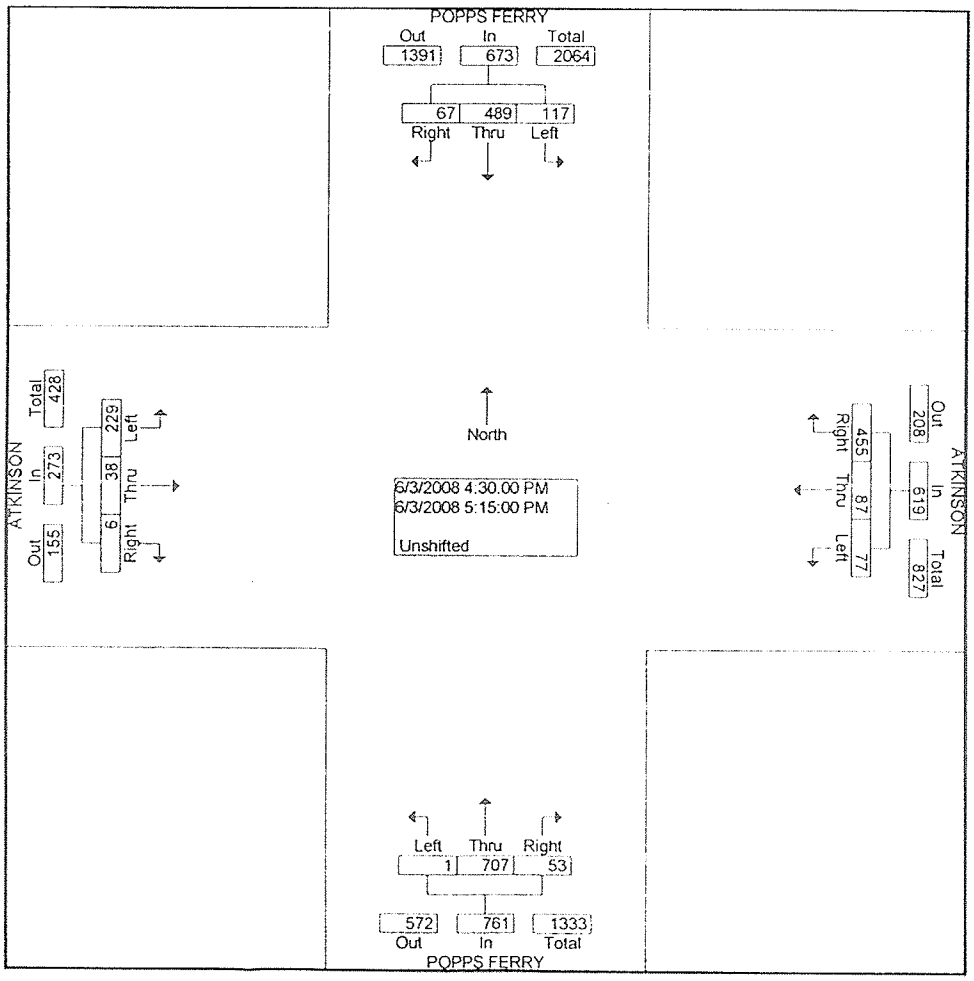


Neel-Schaffer, Inc.
772 Howard Avenue
Biloxi, MS 39530

Intersection: Popp's Ferry/Atkinson
Counter: B. Milling
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Aktinson
Site Code : 00000000
Start Date : 6/3/2008
Page No : 4

	POPPS FERRY Northbound				POPPS FERRY Southbound				ATKINSON Eastbound				ATKINSON Westbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour From 12:00 PM to 06:15 PM - Peak 1 of 1																	
Intersection 04:30 PM																	
Volume	1	707	53	761	117	489	67	673	229	38	6	273	77	87	455	619	2326
Percent	0.1	92.9	7.0		17.4	72.7	10.0		83.9	13.9	2.2		12.4	14 1	73.5		
04:45 Volume	0	180	10	190	39	124	23	186	44	12	2	58	20	18	131	169	603
Peak Factor																	0.964
High Int.	05:15 PM				04:45 PM				05:00 PM				04:30 PM				
Volume	0	177	16	193	39	124	23	186	73	5	3	81	26	31	128	185	
Peak Factor				0.986				0.905				0.843				0.836	



Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popp's Ferry Rd/Pass Rd
unter: W. Potter
eather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Pass
Site Code : 00000000
Start Date : 2/19/2008
Page No : 1

Groups Printed- Unshifted

	PASS RD Westbound			PASS RD Eastbound			POPP'S FERRY RD Southbound			POPP'S FERRY RD Northbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
06:00 AM	0	40	6	19	75	7	17	4	33	2	1	2	206
06:15 AM	2	41	7	33	128	7	49	4	37	0	3	1	312
06:30 AM	5	62	23	29	157	14	52	15	47	5	5	1	415
06:45 AM	2	81	37	53	222	28	66	13	49	5	8	1	565
Total	9	224	73	134	582	56	184	36	166	12	17	5	1498
07:00 AM	11	70	19	48	174	28	41	20	84	10	13	7	525
07:15 AM	6	93	24	59	172	26	61	23	87	14	5	8	578
07:30 AM	9	122	21	43	199	37	63	22	90	18	3	5	632
07:45 AM	25	139	21	53	204	41	79	37	131	26	11	10	777
Total	51	424	85	203	749	132	244	102	392	68	32	30	2512
08:00 AM	24	150	27	44	152	38	71	35	101	12	9	7	670
08:15 AM	6	145	30	42	134	24	65	15	89	21	10	10	591
08:30 AM	6	130	23	32	140	29	57	11	109	19	14	9	579
08:45 AM	15	124	32	51	149	19	61	16	103	18	13	5	606
Total	51	549	112	169	575	110	254	77	402	70	46	31	2446
09:00 AM	6	141	25	37	125	28	36	10	76	20	12	7	523
09:15 AM	9	104	30	51	119	20	54	9	87	28	15	8	534
09:30 AM	8	149	36	47	164	31	38	13	68	33	8	5	600
09:45 AM	6	140	26	51	158	24	77	24	89	26	14	12	647
Total	29	534	117	186	566	103	205	56	320	107	49	32	2304
10:00 AM	12	129	50	56	144	18	67	14	93	34	26	11	654
10:15 AM	8	157	42	48	144	25	62	23	57	33	17	13	629
10:30 AM	18	155	44	66	123	25	56	14	73	23	24	11	632
10:45 AM	10	173	40	63	187	20	56	9	75	30	24	8	695
Total	48	614	176	233	598	88	241	60	298	120	91	43	2610
11:00 AM	12	194	44	72	177	28	36	15	56	40	22	18	714
11:15 AM	7	193	29	71	193	25	80	21	110	51	32	13	825
11:30 AM	14	186	54	60	164	22	80	23	86	43	28	20	780
11:45 AM	13	188	28	81	205	34	90	18	87	51	30	23	848
Total	46	761	155	284	739	109	286	77	339	185	112	74	3167
12:15 PM	17	194	44	77	207	27	60	19	77	59	27	18	826
12:30 PM	16	156	24	70	192	36	98	21	75	58	28	26	800
12:45 PM	19	209	28	73	271	43	64	23	82	58	26	30	926
Total	52	559	96	220	670	106	222	63	234	175	81	74	2552
01:00 PM	9	145	21	62	155	27	56	14	67	37	32	14	639
01:15 PM	0	0	0	0	0	0	0	0	2	0	0	0	2
01:30 PM	2	113	18	38	102	11	32	15	20	28	21	6	406
01:45 PM	20	177	30	45	188	17	53	22	48	55	29	21	705
Total	31	435	69	145	445	55	141	51	137	120	82	41	1752
02:00 PM	13	215	46	81	214	28	61	27	86	35	21	17	844
02:15 PM	12	159	49	78	176	26	52	25	73	42	30	12	734
02:30 PM	14	146	58	70	180	31	62	12	84	47	26	16	746
02:45 PM	23	178	59	86	182	26	73	23	62	31	30	21	794
Total	62	698	212	315	752	111	248	87	305	155	107	66	3118
03:00 PM	11	172	49	90	176	25	46	16	60	50	34	10	739
03:15 PM	6	189	44	63	159	27	54	29	87	40	35	21	754
03:30 PM	14	228	20	87	163	28	68	21	79	49	34	19	810
03:45 PM	9	230	42	93	191	41	65	15	82	55	44	11	878
Total	40	819	155	333	689	121	233	81	308	194	147	61	3181

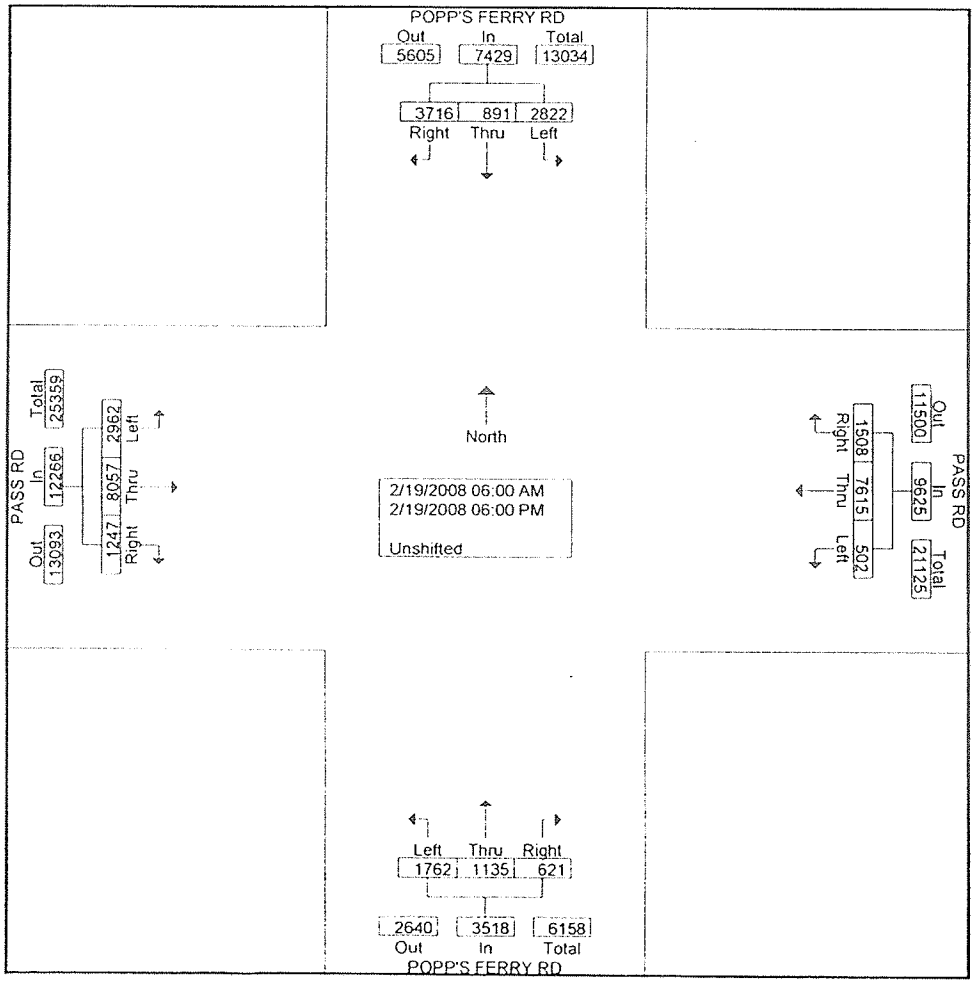
Neel-Schaffer, Inc
772 Howard Avenue
Biloxi, MS 39530
(228) 374-1211

Intersection: Popp's Ferry Rd/Pass Rd
Counter: W. Potter
Weather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Pass
Site Code : 00000000
Start Date : 2/19/2008

Groups Printed- Unshifted

	PASS RD Westbound			PASS RD Eastbound			POPP'S FERRY RD Southbound			POPP'S FERRY RD Northbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
04:00 PM	9	198	28	82	151	32	82	24	82	63	43	11	805
04:15 PM	9	265	24	92	160	37	51	24	92	40	31	12	837
04:30 PM	10	207	24	86	212	26	70	18	69	62	44	20	848
04:45 PM	15	230	24	83	153	26	60	19	100	72	48	18	848
Total	43	900	100	343	676	121	263	85	343	237	166	61	3338
05:00 PM	8	240	37	85	220	28	57	18	101	71	37	20	922
05:15 PM	8	232	36	87	212	27	43	22	100	69	39	20	895
05:30 PM	6	221	30	71	199	31	50	28	73	57	42	16	824
05:45 PM	9	204	21	67	202	23	89	22	108	70	44	26	885
Total	31	897	124	310	833	109	239	90	382	267	162	82	3526
06:00 PM	9	201	34	87	183	26	62	26	90	52	43	21	834
Grand Total	502	7615	1508	2962	8057	1247	2822	891	3716	1762	1135	621	32838
Apprch %	5.2	79.1	15.7	24.1	65.7	10.2	38	12	50	50.1	32.3	17.7	
Total %	1.5	23.2	4.6	9	24.5	3.8	8.6	2.7	11.3	5.4	3.5	1.9	



Neel-Schaffer, Inc
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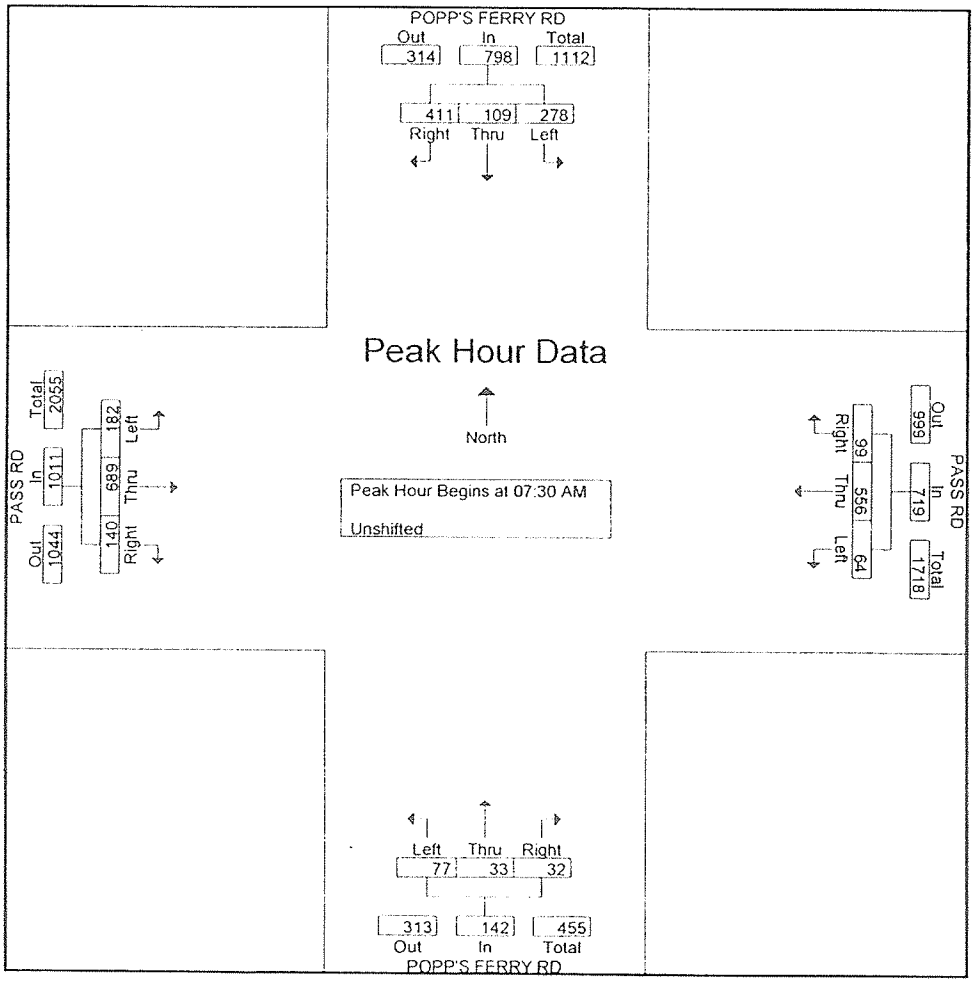
(228) 374-1211

Intersection: Popp's Ferry Rd/Pass Rd
unter: W. Potter
.eather: Clear
City/State: Biloxi, MS

File Name : Popps Ferry-Pass
Site Code : 00000000
Start Date : 2/19/2008
Page No : 3

	PASS RD Westbound				PASS RD Eastbound				POPP'S FERRY RD Southbound				POPP'S FERRY RD Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 09:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	9	122	21	152	43	199	37	279	63	22	90	175	18	3	5	26	632
07:45 AM	25	139	21	185	53	204	41	298	79	37	131	247	26	11	10	47	777
08:00 AM	24	150	27	201	44	152	38	234	71	35	101	207	12	9	7	28	670
08:15 AM	6	145	30	181	42	134	24	200	65	15	89	169	21	10	10	41	591
Total Volume	64	556	99	719	182	689	140	1011	278	109	411	798	77	33	32	142	2670
% App. Total	8.9	77.3	13.8		18	68.2	13.8		34.8	13.7	51.5		54.2	23.2	22.5		
PHF	.640	.927	.825	.894	.858	.844	.854	.848	.880	.736	.784	.808	.740	.750	.800	.755	.859



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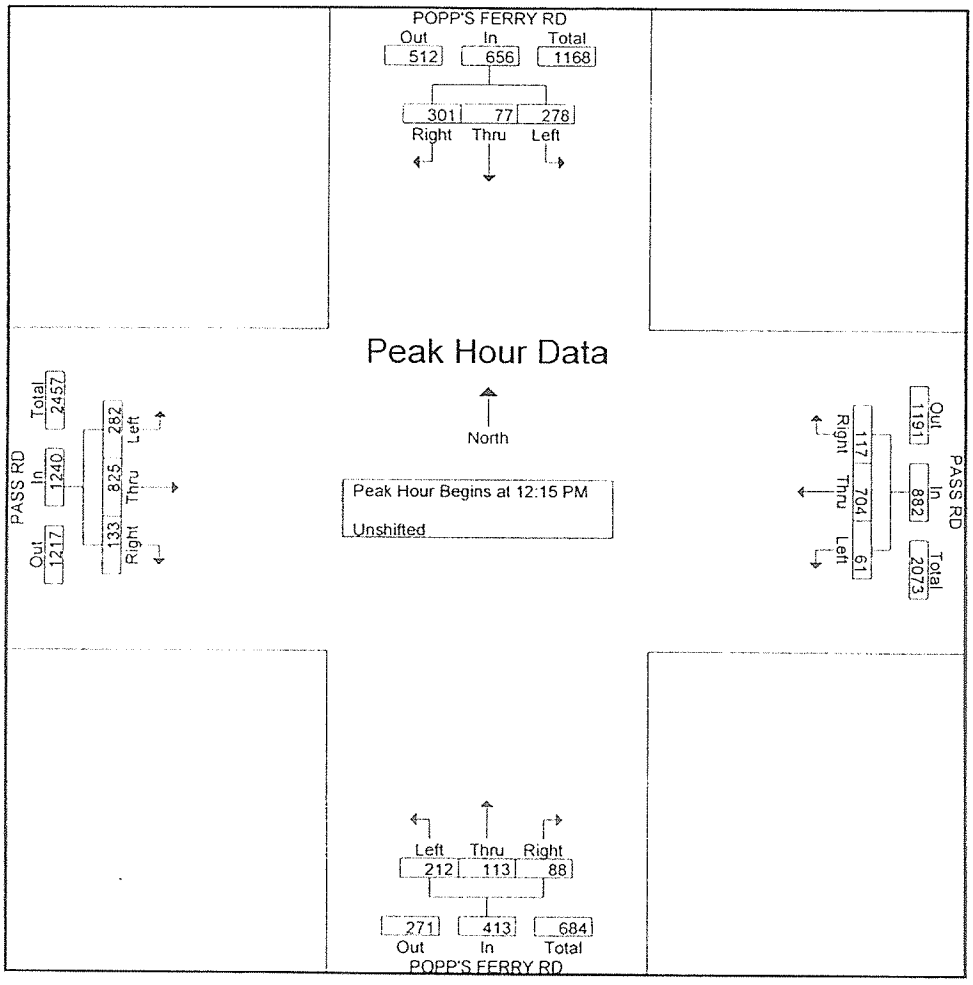
File Name : Popps Ferry-Pass
Site Code : 00000000
Start Date : 2/19/2008
Page No : 4

	PASS RD Westbound				PASS RD Eastbound				POPP'S FERRY RD Southbound				POPP'S FERRY RD Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 10:00 AM to 01:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 12:15 PM																	
12:15 PM	17	194	**44**	255	**77**	207	27	311	60	19	77	156	**59**	27	18	104	826
12:30 PM	16	156	24	196	70	192	36	298	**98**	21	75	**194**	58	28	26	112	800
12:45 PM	**19**	**209**	28	**256**	73	**271**	**43**	**387**	64	**23**	**82**	169	58	26	**30**	**114**	**926**
01:00 PM	9	145	21	175	62	155	27	244	56	14	67	137	37	**32**	14	83	639
Total Volume	61	704	117	882	282	825	133	1240	278	77	301	656	212	113	88	413	3191
% App. Total	6.9	79.8	13.3		22.7	66.5	10.7		42.4	11.7	45.9		51.3	27.4	21.3		
PHF	.803	.842	.665	.861	.916	.761	.773	.801	.709	.837	.918	.845	.898	.883	.733	.906	.862



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File Name : Popps Ferry-Pass
Site Code : 00000000
Start Date : 2/19/2008
Page No : 5

	PASS RD Westbound				PASS RD Eastbound				POPP'S FERRY RD Southbound				POPP'S FERRY RD Northbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 02:00 PM to 06:00 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	8	**240**	**37**	**285**	85	**220**	28	**333**	57	18	101	176	**71**	37	20	128	**922**
05:15 PM	8	232	36	276	**87**	212	27	326	43	22	100	165	69	39	20	128	895
05:30 PM	6	221	30	257	71	199	**31**	301	50	**28**	73	151	57	42	16	115	824
05:45 PM	**9**	204	21	234	67	202	23	292	**89**	22	**108**	**219**	70	**44**	**26**	**140**	885
Total Volume	31	897	124	1052	310	833	109	1252	239	90	382	711	267	162	82	511	3526
% App. Total	2.9	85.3	11.8		24.8	66.5	8.7		33.6	12.7	53.7		52.3	31.7	16		
PHF	.861	.934	.838	.923	.891	.947	.879	.940	.671	.804	.884	.812	.940	.920	.788	.913	.956

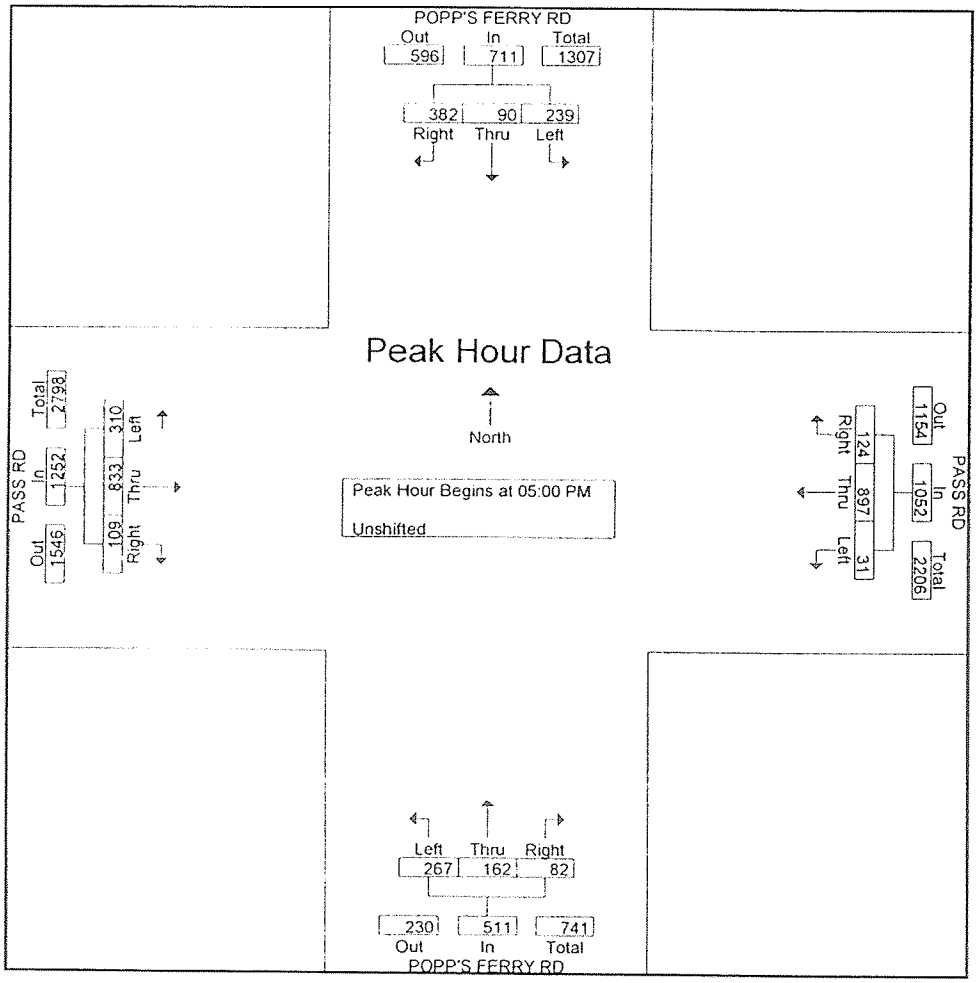


TABLE 4 - 1
GENERALIZED **ANNUAL AVERAGE DAILY** VOLUMES FOR FLORIDA'S **URBANIZED AREAS***

UNINTERRUPTED FLOW HIGHWAYS

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	2,000	7,000	13,800	19,600	27,000
4	Divided	20,400	33,000	47,800	61,800	70,200
6	Divided	30,500	49,500	71,600	92,700	105,400

STATE TWO-WAY ARTERIALS

Class I (>0.00 to 1.99 signalized intersections per mile)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	4,200	13,800	16,400	16,900
4	Divided	4,800	29,300	34,700	35,700	***
6	Divided	7,300	44,700	52,100	53,500	***
8	Divided	9,400	58,000	66,100	67,800	***

Class II (2.00 to 4.50 signalized intersections per mile)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	1,900	11,200	15,400	16,300
4	Divided	**	4,100	26,000	32,700	34,500
6	Divided	**	6,500	40,300	49,200	51,800
8	Divided	**	8,500	53,300	63,800	67,000

Class III (more than 4.5 signalized intersections per mile and not within primary city central business district of an urbanized area over 750,000)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	**	5,300	12,600	15,500
4	Divided	**	**	12,400	28,900	32,800
6	Divided	**	**	19,500	44,700	49,300
8	Divided	**	**	25,800	58,700	63,800

Class IV (more than 4.5 signalized intersections per mile and within primary city central business district of an urbanized area over 750,000)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	**	5,200	13,700	15,000
4	Divided	**	**	12,300	30,300	31,700
6	Divided	**	**	19,100	45,800	47,600
8	Divided	**	**	25,900	59,900	62,200

NON-STATE ROADWAYS

Major City/County Roadways

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	**	9,100	14,600	15,600
4	Divided	**	**	21,400	31,100	32,900
6	Divided	**	**	33,400	46,800	49,300

Other Signalized Roadways
(signalized intersection analysis)

Lanes	Divided	Level of Service A	B	C	D	E
2	Undivided	**	**	4,800	10,000	12,600
4	Divided	**	**	11,100	21,700	25,200

Source: Florida Department of Transportation 02/22/02
Systems Planning Office
605 Suwannee Street, MS 19
Tallahassee, FL 32399-0450
http://www11.myflorida.com/planning/systems/sm/los/default.htm

FREEWAYS

Interchange spacing ≥ 2 mi. apart

Lanes	Level of Service A	B	C	D	E
4	23,800	39,600	55,200	67,100	74,600
6	36,900	61,100	85,300	103,600	115,300
8	49,900	82,700	115,300	140,200	156,000
10	63,000	104,200	145,500	176,900	196,400
12	75,900	125,800	175,500	213,500	237,100

Interchange spacing < 2 mi. apart

Lanes	Level of Service A	B	C	D	E
4	22,000	36,000	52,000	67,200	76,500
6	34,800	56,500	81,700	105,800	120,200
8	47,500	77,000	111,400	144,300	163,900
10	60,200	97,500	141,200	182,600	207,600
12	72,900	118,100	170,900	221,100	251,200

BICYCLE MODE

(**Note**: Level of service for the bicycle mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of bicyclists using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Paved Shoulder/ Bicycle Lane Coverage	Level of Service A	B	C	D	E
0-49%	**	**	3,200	13,800	>13,800
50-84%	**	2,500	4,100	>4,100	***
85-100%	3,100	7,200	>7,200	***	***

PEDESTRIAN MODE

(**Note:** Level of service for the pedestrian mode in this table is based on roadway geometrics at 40 mph posted speed and traffic conditions, not number of pedestrians using the facility.) (Multiply motorized vehicle volumes shown below by number of directional roadway lanes to determine two-way maximum service volumes.)

Sidewalk Coverage	Level of Service A	B	C	D	E
0-49%	**	**	**	6,400	15,500
50-84%	**	**	**	9,900	19,000
85-100%	**	2,200	11,300	>11,300	***

BUS MODE (Scheduled Fixed Route)

(Buses per hour)

(**Note:** Buses per hour shown are only for the **peak hour** in the **single direction** of the higher traffic flow.)

Sidewalk Coverage	Level of Service A	B	C	D	E
0-84%	**	>5	≥4	≥3	≥2
85-100%	>6	>4	≥3	≥2	≥1

ARTERIAL/NON-STATE ROADWAY ADJUSTMENTS

DIVIDED/UNDIVIDED

(alter corresponding volume by the indicated percent)

Lanes	Median	Left Turns Lanes	Adjustment Factors
2	Divided	Yes	+5%
2	Undivided	No	-20%
Multi	Undivided	Yes	-5%
Multi	Undivided	No	-25%

ONE-WAY FACILITIES

Decrease corresponding two-directional volumes in this table by 40% to obtain the equivalent one directional volume for one-way facilities.

*This table does not constitute a standard and should be used only for general planning applications. The computer models from which this table is derived should be used for more specific planning applications. The table and deriving computer models should not be used for corridor or intersection design, where more refined techniques exist. Values shown are two-way annual average daily volumes (based on K_{100} factors) for levels of service and are for the automobile/truck modes unless specifically stated. Level of service letter grade thresholds are probably not comparable across modes and, therefore, cross modal comparisons should be made with caution. Furthermore, combining levels of service of different modes into one overall roadway level of service is not recommended. The table's input value defaults and level of service criteria appear on the following page. Calculations are based on planning applications of the Highway Capacity Manual, Bicycle LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Manual, respectively for the automobile/truck, bicycle, pedestrian and bus modes.

**Cannot be achieved using table input value defaults.

***Not applicable for that level of service letter grade. For automobile/truck modes, volumes greater than level of service D become F because intersection capacities have been reached. For bicycle and pedestrian modes, the level of service letter grade (including F) is not achievable, because there is no maximum vehicle volume threshold using table input value defaults.

Signal Warrants - Summary

Major Street Approaches

Northbound: **Popp's Ferry Rd**
Number of Lanes: **2**
Approach Speed: **35**
Total Approach Volume: **8,044**

Southbound: **Popp's Ferry Rd**
Number of Lanes: **2**
Approach Speed: **35**
Total Approach Volume: **8,319**

Minor Street Approaches

Eastbound: **Riverview Dr**
Number of Lanes: **1**

Total Approach Volume: **324**

Westbound: **Riverview Dr**
Number of Lanes: **1**

Total Approach Volume: **272**

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes ..... Not Satisfied

Warrant 1A - Minimum Vehicular Volume ..... Not Satisfied
Required volumes reached for 0 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic ..... Not Satisfied
Required volumes reached for 0 hours, 8 are needed

Warrant 1 A&B - Combination of Warrants ..... Not Satisfied
Required volumes reached for 0 hours, 8 are needed

Warrant 2 - Four Hour Volumes ..... Not Satisfied
Number of hours (0) volumes exceed minimum < minimum required (4).

Warrant 3 - Peak Hour ..... Not Satisfied

Warrant 3A - Peak Hour Delay ..... Not Satisfied
Total approach volumes and delays on minor street do not exceed minimums for any hour.

Warrant 3B - Peak Hour Volumes ..... Not Satisfied
Volumes do not exceed minimums for any hour.

Warrant 4 - Pedestrian Volumes ..... Not Evaluated

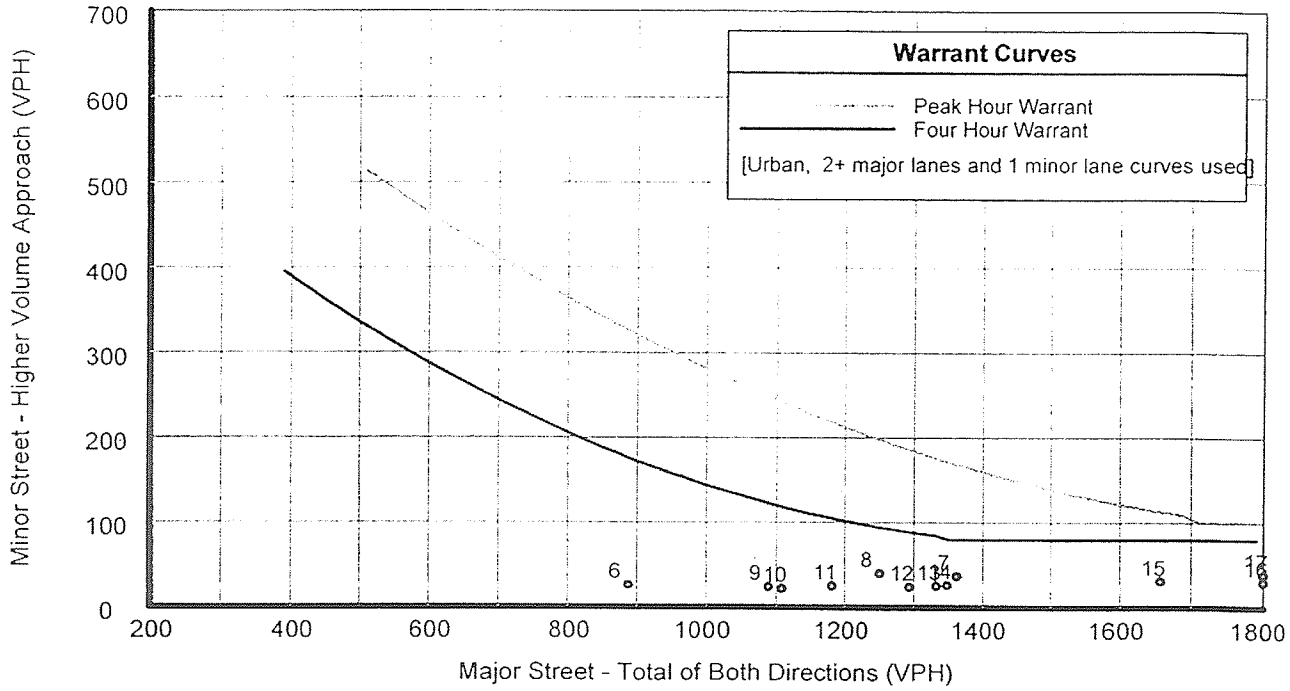
Warrant 5 - School Crossing ..... Not Evaluated

Warrant 6 - Coordinated Signal System ..... Not Evaluated

Warrant 7 - Crash Experience ..... Not Evaluated

Warrant 8 - Roadway Network ..... Not Evaluated

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher Minor		War-1A			War-1B			War-1A&B		
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	**0**	**0**	**EB**	**600-No**	**150-No**	—	**900-No**	**75-No**	—	**720-No**	**120-No**	—
01:00	**0**	**0**	**EB**	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
02:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
03:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
04:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
05:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
06:00	887	26	EB	600-Yes	150-No	Major	900-No	75-No	—	720-Yes	120-No	Major
07:00	1,362	37	EB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
08:00	1,250	40	EB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
09:00	1,088	24	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
10:00	1,108	22	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
11:00	1,181	25	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
12:00	1,293	24	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
13:00	1,332	25	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
14:00	1,348	26	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
15:00	1,657	31	EB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
16:00	1,850	30	WB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
17:00	2,007	39	EB	600-Yes	150-No	Major	900-Yes	75-No	Major	720-Yes	120-No	Major
18:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
19:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
20:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
21:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
22:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
23:00	0	0	EB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—

Signal Warrants - Summary

Major Street Approaches

Northbound: **POPP'S FERRY ROAD**
Number of Lanes: **1**
Approach Speed: **35**
Total Approach Volume: **7,767**

Southbound: **POPP'S FERRY ROAD**
Number of Lanes: **1**
Approach Speed: **35**
Total Approach Volume: **8,065**

Minor Street Approaches

Eastbound: **SUNKIST CC RD**
Number of Lanes: **1**
Total Approach Volume: **1,304**

Westbound: **SUNKIST CC RD**
Number of Lanes: **1**
Total Approach Volume: **644**

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes ..... Satisfied

Warrant 1A - Minimum Vehicular Volume ..... Not Satisfied
Required volumes reached for 1 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic ..... Satisfied
Required volumes reached for 12 hours, 8 are needed

Warrant 1 A&B - Combination of Warrants ..... Not Satisfied
Required volumes reached for 2 hours, 8 are needed

Warrant 2 - Four Hour Volumes ..... Satisfied
Number of hours (11) volumes exceed minimum >= minimum required (4).

Warrant 3 - Peak Hour ..... Satisfied

Warrant 3A - Peak Hour Delay ..... Not Satisfied
Total approach volumes and delays on minor street do not exceed minimums for any hour.

Warrant 3B - Peak Hour Volumes ..... Satisfied
Volumes exceed minimums for at least one hour.

Warrant 4 - Pedestrian Volumes ..... Not Evaluated

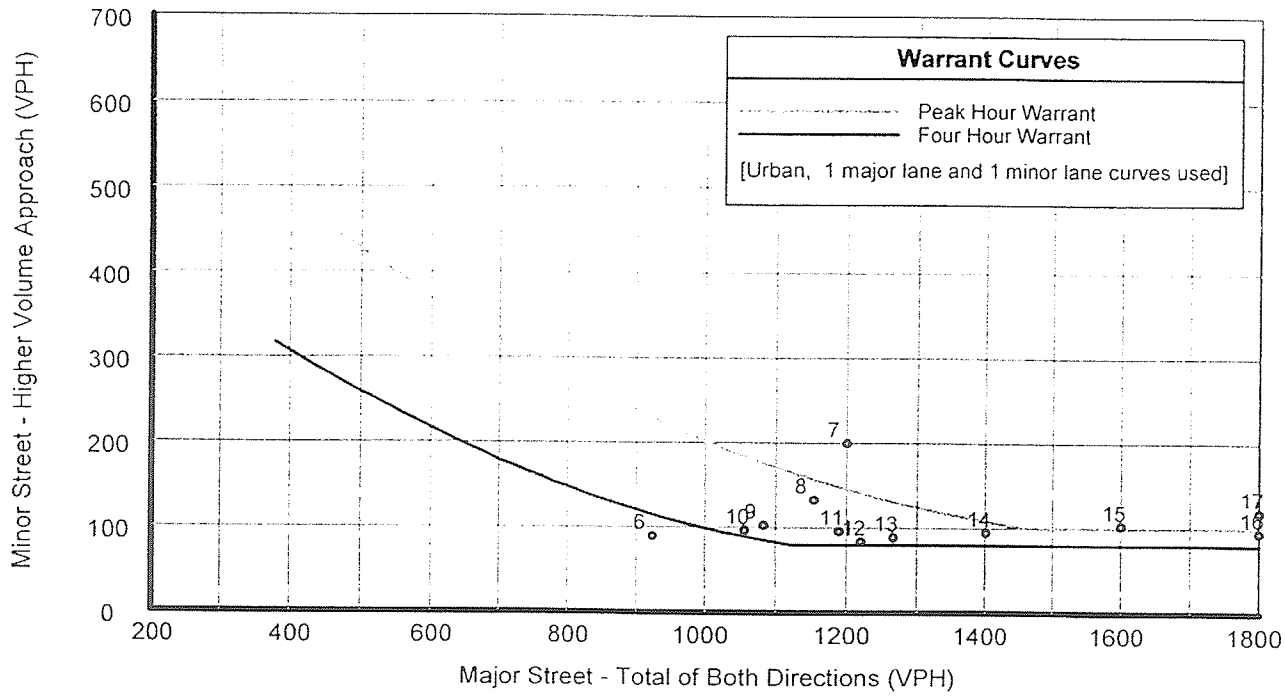
Warrant 5 - School Crossing ..... Not Evaluated

Warrant 6 - Coordinated Signal System ..... Not Evaluated

Warrant 7 - Crash Experience ..... Not Evaluated

Warrant 8 - Roadway Network ..... Not Evaluated

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour	Major	Higher Minor		War-1A			War-1B			War-1A&B		
Begin	Total	Vol	Dir	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?	Major Crit	Minor Crit	Meets?
00:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
01:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
02:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
03:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
04:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
05:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
06:00	924	90	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
07:00	1,200	200	EB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
08:00	1,154	133	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
09:00	1,083	103	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
10:00	1,056	97	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
11:00	1,189	96	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
12:00	1,220	84	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
13:00	1,266	89	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
14:00	1,401	95	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
15:00	1,600	103	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
16:00	1,837	95	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
17:00	1,902	119	EB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-No	Major
18:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
19:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
20:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
21:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
22:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
23:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---

Signal Warrants - Summary

Major Street Approaches

Northbound: POPPS FERRY
Number of Lanes: 1
Approach Speed: 35
Total Approach Volume: 3,172

Southbound: POPPS FERRY
Number of Lanes: 1
Approach Speed: 35
Total Approach Volume: 4,481

Minor Street Approaches

Eastbound: ATKINSON
Number of Lanes: 1

Total Approach Volume: 728

Westbound: ATKINSON
Number of Lanes: 1

Total Approach Volume: 1,765

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes ..... Not Satisfied

Warrant 1A - Minimum Vehicular Volume ..... Not Satisfied
Required volumes reached for 3 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic ..... Not Satisfied
Required volumes reached for 4 hours, 8 are needed

Warrant 1 A&B - Combination of Warrants ..... Not Satisfied
Required volumes reached for 5 hours, 8 are needed

Warrant 2 - Four Hour Volumes ..... Satisfied
Number of hours (4) volumes exceed minimum >= minimum required (4).

Warrant 3 - Peak Hour ..... Satisfied

Warrant 3A - Peak Hour Delay ..... Not Satisfied
Total approach volumes and delays on minor street do not exceed minimums for any hour.

Warrant 3B - Peak Hour Volumes ..... Satisfied
Volumes exceed minimums for at least one hour.

Warrant 4 - Pedestrian Volumes ..... Not Evaluated

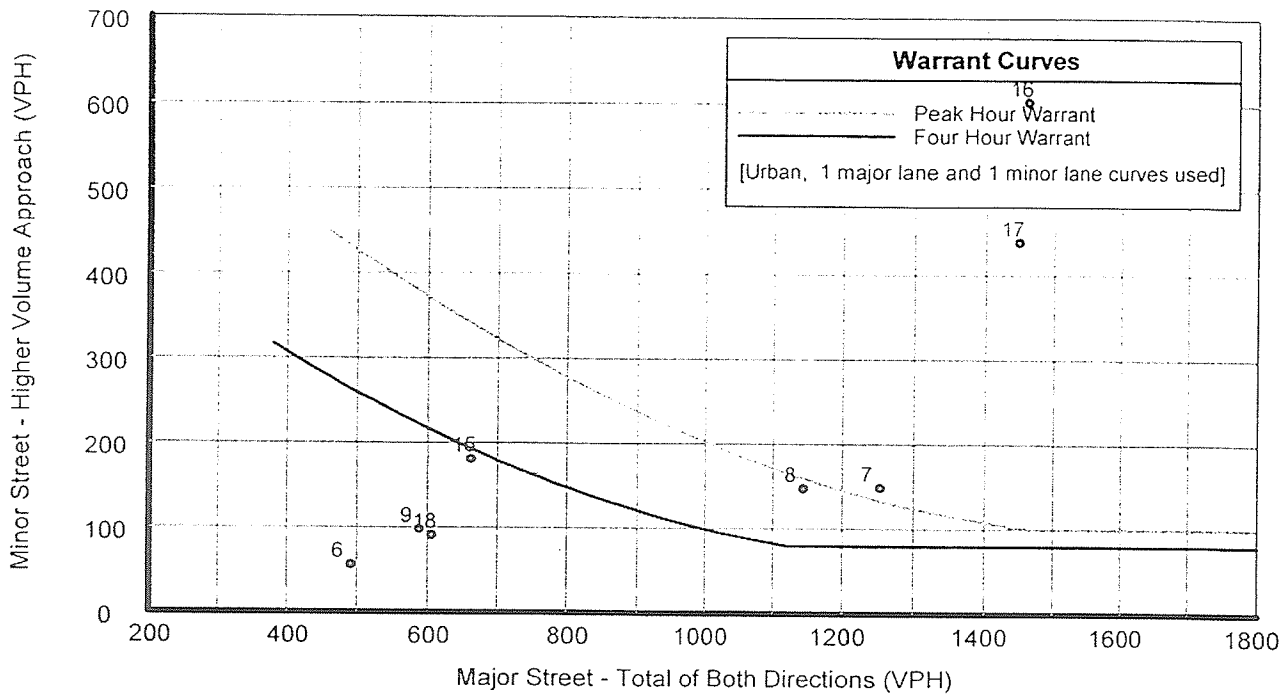
Warrant 5 - School Crossing ..... Not Evaluated

Warrant 6 - Coordinated Signal System ..... Not Evaluated

Warrant 7 - Crash Experience ..... Not Evaluated

Warrant 8 - Roadway Network ..... Not Evaluated

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour Begin	Major Total	Higher Minor Vol	Higher Minor Dir	War-1A Major Crit	War-1A Minor Crit	War-1A Meets?	War-1B Major Crit	War-1B Minor Crit	War-1B Meets?	War-1A&B Major Crit	War-1A&B Minor Crit	War-1A&B Meets?
00:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
01:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
02:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
03:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
04:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
05:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
06:00	492	56	WB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
07:00	1,253	149	WB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
08:00	1,144	148	WB	500-Yes	150-No	Major	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
09:00	588	98	WB	500-Yes	150-No	Major	750-No	75-Yes	Minor	600-No	120-No	---
10:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
11:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
12:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
13:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
14:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
15:00	662	181	WB	500-Yes	150-Yes	Both	750-No	75-Yes	Minor	600-Yes	120-Yes	Both
16:00	1,460	603	WB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
17:00	1,448	439	WB	500-Yes	150-Yes	Both	750-Yes	75-Yes	Both	600-Yes	120-Yes	Both
18:00	606	91	WB	500-Yes	150-No	Major	750-No	75-Yes	Minor	600-Yes	120-No	Major
19:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
20:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
21:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
22:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---
23:00	0	0	EB	500-No	150-No	---	750-No	75-No	---	600-No	120-No	---

Signal Warrants - Summary

Major Street Approaches

Eastbound: PASS RD
Number of Lanes: **2**
Approach Speed: **35**
Total Approach Volume: **12,266**

Westbound: PASS RD
Number of Lanes: **2**
Approach Speed: **35**
Total Approach Volume: **9,625**

Minor Street Approaches

Northbound: POPP'S FERRY RD
Number of Lanes: **1**

Total Approach Volume: **3,518**

Southbound: POPP'S FERRY RD
Number of Lanes: **1**

Total Approach Volume: **7,429**

Warrant Summary (Urban values apply.)

Warrant 1 - Eight Hour Vehicular Volumes ..... **Satisfied**

Warrant 1A - Minimum Vehicular Volume ..... Satisfied
Required volumes reached for 12 hours, 8 are needed

Warrant 1B - Interruption of Continuous Traffic ..... Satisfied
Required volumes reached for 12 hours, 8 are needed

Warrant 1 A&B - Combination of Warrants ..... Satisfied
Required volumes reached for 12 hours, 8 are needed

Warrant 2 - Four Hour Volumes ..... **Satisfied**
Number of hours (12) volumes exceed minimum >= minimum required (4).

Warrant 3 - Peak Hour ..... **Satisfied**

Warrant 3A - Peak Hour Delay ..... Not Satisfied
Total approach volumes and delays on minor street do not exceed minimums for any hour.

Warrant 3B - Peak Hour Volumes ..... Satisfied
Volumes exceed minimums for at least one hour.

Warrant 4 - Pedestrian Volumes ..... Not Evaluated

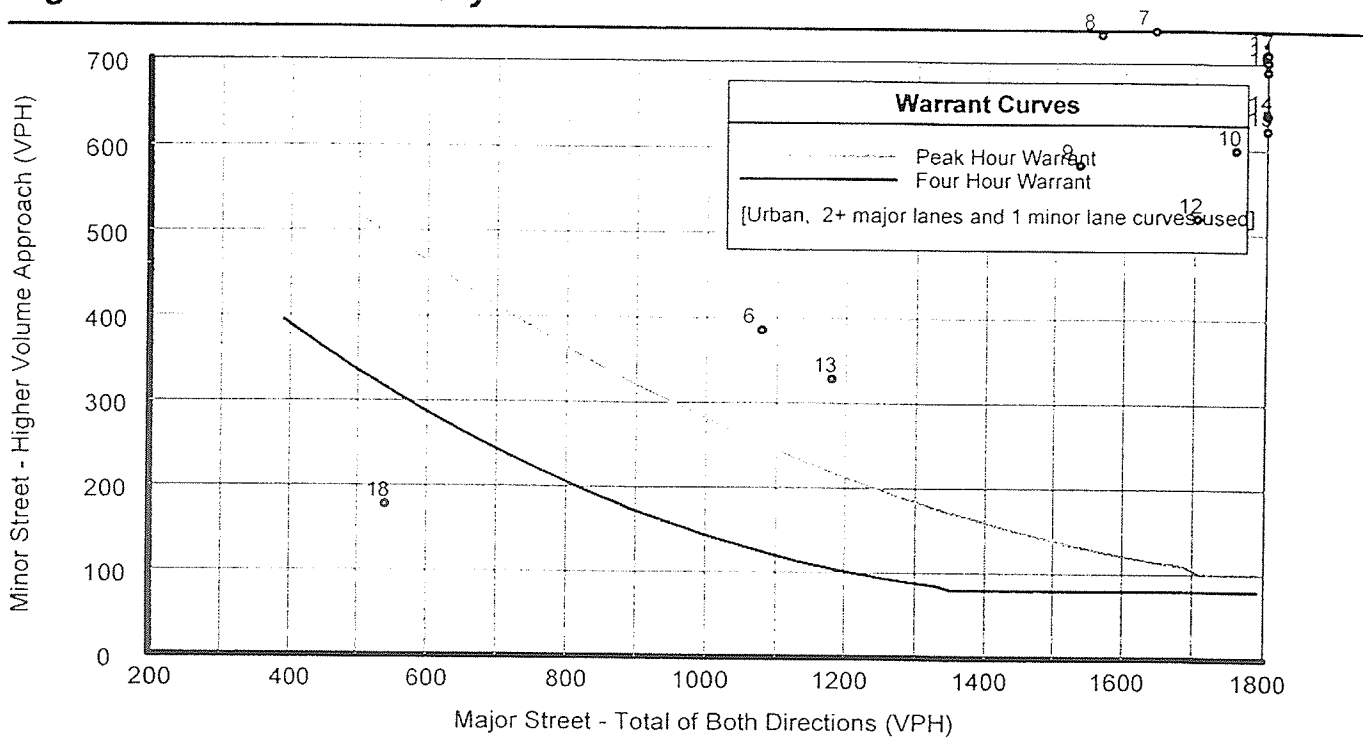
Warrant 5 - School Crossing ..... Not Evaluated

Warrant 6 - Coordinated Signal System ..... Not Evaluated

Warrant 7 - Crash Experience ..... Not Evaluated

Warrant 8 - Roadway Network ..... Not Evaluated

Signal Warrants - Summary



Analysis of 8-Hour Volume Warrants:

Hour Begin	Major Total	Higher Minor Vol	Higher Minor Dir	War-1A Major Crit	War-1A Minor Crit	War-1A Meets?	War-1B Major Crit	War-1B Minor Crit	War-1B Meets?	War-1A&B Major Crit	War-1A&B Minor Crit	War-1A&B Meets?
00:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
01:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
02:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
03:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
04:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
05:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
06:00	1,078	386	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
07:00	1,644	738	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
08:00	1,566	733	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
09:00	1,535	581	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
10:00	1,757	599	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
11:00	2,094	702	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
12:00	1,703	519	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
13:00	1,180	329	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
14:00	2,150	640	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
15:00	2,157	622	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
16:00	2,183	691	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
17:00	2,304	711	SB	600-Yes	150-Yes	Both	900-Yes	75-Yes	Both	720-Yes	120-Yes	Both
18:00	540	178	SB	600-No	150-Yes	Minor	900-No	75-Yes	Minor	720-No	120-Yes	Minor
19:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
20:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
21:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
22:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—
23:00	0	0	NB	600-No	150-No	—	900-No	75-No	—	720-No	120-No	—

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1724	1538		1711		1719	1808		1719	1804	
Flt Permitted		0.76	1.00		0.68		0.13	1.00		0.52	1.00	
Satd. Flow (perm)		1379	1538		1209		242	1808		933	1804	
Volume (vph)	85	1	117	134	1	12	23	370	3	2	824	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	97	1	133	152	1	14	26	420	3	2	936	18
RTOR Reduction (vph)	0	0	110	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	98	23	0	163	0	26	423	0	2	953	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		13.9	13.9		13.9		58.2	58.2		51.7	51.7	
Effective Green, g (s)		13.9	13.9		13.9		58.2	58.2		51.7	51.7	
Actuated g/C Ratio		0.17	0.17		0.17		0.73	0.73		0.65	0.65	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		239	267		210		222	1314		602	1164	
v/s Ratio Prot							0.00	c0.23			c0.53	
v/s Ratio Perm		0.07	0.02		c0.13		0.08			0.00		
v/c Ratio		0.41	0.09		0.78		0.12	0.32		0.00	0.82	
Uniform Delay, d1		29.5	27.8		31.6		9.7	3.9		5.0	10.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.1	0.1		16.3		0.2	0.6		0.0	6.5	
Delay (s)		30.6	27.9		47.9		10.0	4.6		5.1	17.2	
Level of Service		C	C		D		A	A		A	B	
Approach Delay (s)		29.1			47.9			4.9			17.1	
Approach LOS		C			D			A			B	

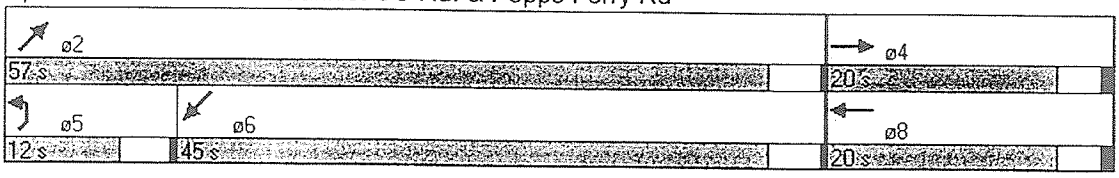
Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	70

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.97			0.94		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.96			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1693			1660		1719	2707	
Flt Permitted	0.38	0.95	1.00		0.84			0.93		0.12	1.00	
Satd. Flow (perm)	689	1719	1538		1475			1576		212	2707	
Volume (vph)	9	829	12	30	2	9	6	2	7	1	537	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	901	13	33	2	10	7	2	8	1	584	4
RTOR Reduction (vph)	0	0	6	0	7	0	0	6	0	0	0	0
Lane Group Flow (vph)	10	901	7	0	38	0	0	11	0	1	588	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	35.3	34.2	34.2		16.1			16.1		35.1	34.1	
Effective Green, g (s)	34.3	34.2	34.2		16.1			16.1		34.1	34.1	
Actuated g/C Ratio	0.55	0.55	0.55		0.26			0.26		0.55	0.55	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	381	944	844		381			407		116	1482	
v/s Ratio Prot	c0.00	c0.52									0.22	
v/s Ratio Perm	0.01		0.00		c0.03			0.01		0.00		
v/c Ratio	0.03	0.95	0.01		0.10			0.03		0.01	0.40	
Uniform Delay, d1	6.8	13.3	6.4		17.6			17.3		6.4	8.2	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	19.1	0.0		0.1			0.1		0.0	0.8	
Delay (s)	6.9	32.4	6.4		17.7			17.4		6.4	8.9	
Level of Service	A	C	A		B			B		A	A	
Approach Delay (s)		31.7			17.7			17.4		8.9		
Approach LOS		C			B			B		A		

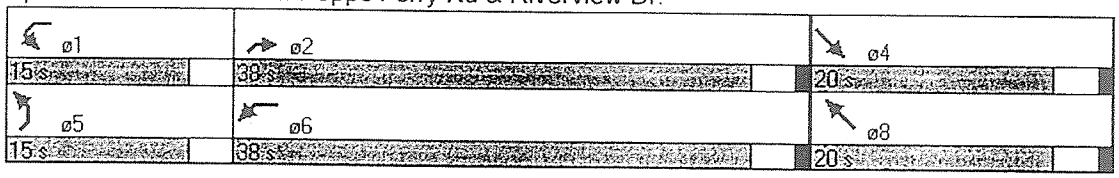
Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	75

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3239		1662	3248		1633	1684	1538	1633	1681	1538
Flt Permitted	0.16	1.00		0.20	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (perm)	287	3239		342	3248		1633	1684	1538	1633	1681	1538
Volume (vph)	182	689	140	64	556	99	77	33	32	278	109	411
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	202	766	156	71	618	110	86	37	36	309	121	457
RTOR Reduction (vph)	0	17	0	0	14	0	0	0	29	0	0	324
Lane Group Flow (vph)	202	905	0	71	714	0	60	63	7	210	220	133
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	40.1	31.9		30.4	25.2		16.8	16.8	16.8	17.1	17.1	17.1
Effective Green, g (s)	40.1	31.9		29.4	25.2		16.8	16.8	16.8	17.1	17.1	17.1
Actuated g/C Ratio	0.47	0.37		0.34	0.29		0.20	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	308	1201		181	952		319	329	300	325	334	306
v/s Ratio Prot	c0.08	c0.28		0.02	0.22		0.04	c0.04		0.13	c0.13	
v/s Ratio Perm	0.22			0.11					0.00			0.09
v/c Ratio	0.66	0.75		0.39	0.75		0.19	0.19	0.02	0.65	0.66	0.44
Uniform Delay, d1	16.2	23.6		20.0	27.5		28.9	28.9	28.0	31.7	31.8	30.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	2.7		1.4	3.3		1.3	1.3	0.1	4.4	4.6	1.0
Delay (s)	21.2	26.3		21.4	30.8		30.2	30.2	28.1	36.0	36.4	31.2
Level of Service	C	C		C	C		C	C	C	D	D	C
Approach Delay (s)		25.4			30.0			29.7			33.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

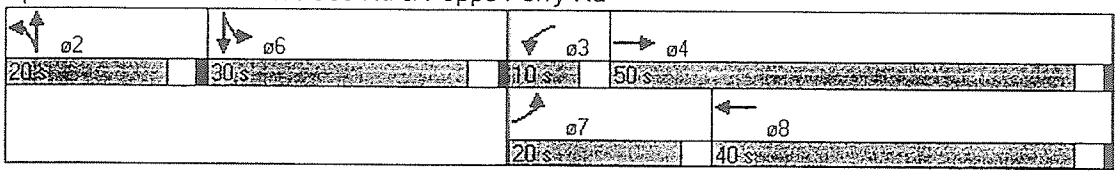
c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary

Cycle Length		110
Control Type	Actuated-Uncoordinated	
Natural Cycle		60

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1690			1753	1538	1719	1810	1538	1662	1732	
Flt Permitted		0.78			0.83	1.00	0.30	1.00	1.00	0.51	1.00	
Satd. Flow (perm)		1351			1510	1538	547	1810	1538	900	1732	
Volume (vph)	35	23	3	48	26	82	6	264	47	180	780	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	39	26	3	53	29	91	7	293	52	200	867	62
RTOR Reduction (vph)	0	3	0	0	0	80	0	0	20	0	3	0
Lane Group Flow (vph)	0	65	0	0	82	11	7	293	32	200	926	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		8.1			8.1	8.1	41.5	41.5	41.5	51.6	51.6	
Effective Green, g (s)		8.1			8.1	8.1	41.5	41.5	41.5	52.1	52.1	
Actuated g/C Ratio		0.12			0.12	0.12	0.61	0.61	0.61	0.76	0.76	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		160			179	183	333	1101	936	761	1323	
v/s Ratio Prot								0.16		0.03	c0.53	
v/s Ratio Perm		0.05			c0.05	0.01	0.01		0.02	0.18		
v/c Ratio		0.41			0.46	0.06	0.02	0.27	0.03	0.26	0.70	
Uniform Delay, d1		27.8			28.0	26.7	5.3	6.2	5.3	2.4	4.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.7			1.9	0.1	0.1	0.6	0.1	0.2	3.1	
Delay (s)		29.5			29.9	26.8	5.4	6.8	5.4	2.6	7.2	
Level of Service		C			C	C	A	A	A	A	A	
Approach Delay (s)		29.5			28.3			6.6			6.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	68.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		

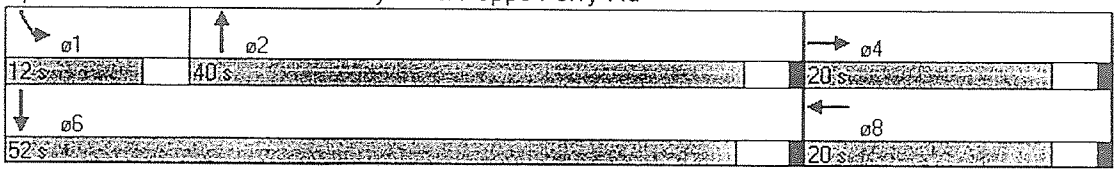
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary

Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		60

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728	1538		1692		1719	1810		1719	1782	
Flt Permitted		0.76	1.00		0.76		0.24	1.00		0.16	1.00	
Satd. Flow (perm)		1378	1538		1323		442	1810		289	1782	
Volume (vph)	82	5	31	37	5	14	23	1115	0	11	700	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	86	5	33	39	5	15	24	1174	0	12	737	83
RTOR Reduction (vph)	0	0	29	0	13	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	91	4	0	46	0	24	1174	0	12	817	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		10.2	10.2		10.2		69.2	69.2		62.4	62.4	
Effective Green, g (s)		10.2	10.2		10.2		69.2	69.2		62.4	62.4	
Actuated g/C Ratio		0.12	0.12		0.12		0.79	0.79		0.71	0.71	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		161	179		154		391	1433		206	1272	
v/s Ratio Prot							0.00	c0.65			0.46	
v/s Ratio Perm		c0.07	0.00		0.03		0.05			0.04		
v/c Ratio		0.57	0.02		0.30		0.06	0.82		0.06	0.64	
Uniform Delay, d1		36.5	34.2		35.3		4.5	5.4		3.7	6.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		4.5	0.0		1.1		0.1	5.3		0.5	2.5	
Delay (s)		41.0	34.2		36.4		4.6	10.7		4.3	9.1	
Level of Service		D	C		D		A	B		A	A	
Approach Delay (s)		39.2			36.4			10.6			9.0	
Approach LOS		D			D			B			A	

Intersection Summary

HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	87.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

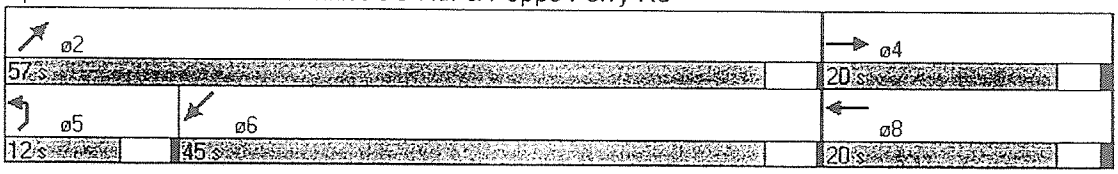
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary

Cycle Length		77
Control Type	Actuated-Uncoordinated	
Natural Cycle		60

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.96			0.93		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.97			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1677			1651		1719	2707	
Flt Permitted	0.15	0.95	1.00		0.86			0.93		0.11	1.00	
Satd. Flow (perm)	272	1719	1538		1485			1563		201	2707	
Volume (vph)	4	894	46	23	1	11	11	4	17	29	1066	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	972	50	25	1	12	12	4	18	32	1159	7
RTOR Reduction (vph)	0	0	23	0	9	0	0	13	0	0	0	0
Lane Group Flow (vph)	4	972	27	0	29	0	0	21	0	32	1166	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	35.9	34.8	34.8		16.1			16.1		38.5	36.1	
Effective Green, g (s)	34.9	34.8	34.8		16.1			16.1		37.5	36.1	
Actuated g/C Ratio	0.54	0.54	0.54		0.25			0.25		0.58	0.56	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	150	930	832		372			391		150	1520	
v/s Ratio Prot	0.00	c0.57								c0.00	0.43	
v/s Ratio Perm	0.01		0.02		c0.02			0.01		0.12		
v/c Ratio	0.03	1.05	0.03		0.08			0.05		0.21	0.77	
Uniform Delay, d1	7.7	14.7	6.9		18.4			18.3		13.8	10.9	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	42.0	0.0		0.1			0.3		0.7	3.8	
Delay (s)	7.8	56.7	6.9		18.5			18.6		14.5	14.6	
Level of Service	A	E	A		B			B		B	B	
Approach Delay (s)		54.1			18.5			18.6		14.6		
Approach LOS		D			B			B		B		

Intersection Summary

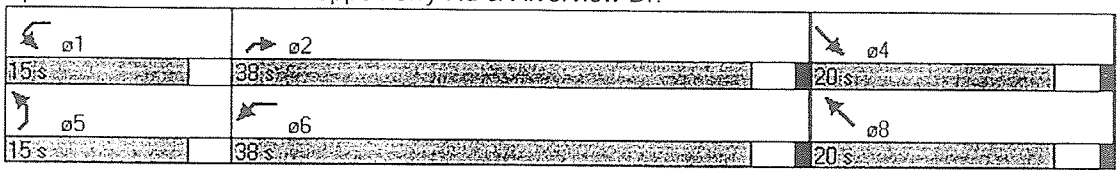
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3266		1662	3263		1633	1697	1538	1633	1680	1538
Flt Permitted	0.10	1.00		0.26	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	169	3266		448	3263		1633	1697	1538	1633	1680	1538
Volume (vph)	310	833	109	31	897	124	267	162	82	239	90	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	326	877	115	33	944	131	281	171	86	252	95	402
RTOR Reduction (vph)	0	8	0	0	10	0	0	0	73	0	0	219
Lane Group Flow (vph)	326	984	0	33	1065	0	220	232	13	169	178	183
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	57.5	50.6		41.3	37.4		16.1	16.1	16.1	17.4	17.4	17.4
Effective Green, g (s)	57.5	50.6		40.3	37.4		16.1	16.1	16.1	17.4	17.4	17.4
Actuated g/C Ratio	0.56	0.49		0.39	0.36		0.16	0.16	0.16	0.17	0.17	0.17
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	328	1604		209	1185		255	265	240	276	284	260
v/s Ratio Prot	c0.16	0.30		0.00	0.33		0.13	c0.14		0.10	0.11	
v/s Ratio Perm	c0.40			0.06					0.01			c0.12
v/c Ratio	0.99	0.61		0.16	0.90		0.86	0.88	0.06	0.61	0.63	0.70
Uniform Delay, d1	31.1	19.1		19.6	31.0		42.4	42.5	37.0	39.7	39.8	40.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	47.8	0.7		0.4	9.3		29.9	30.8	0.4	4.0	4.3	8.3
Delay (s)	78.9	19.8		19.9	40.3		72.3	73.3	37.4	43.7	44.1	48.7
Level of Service	E	B		B	D		E	E	D	D	D	D
Approach Delay (s)		34.4			39.7			67.1			46.4	
Approach LOS		C			D			E			D	

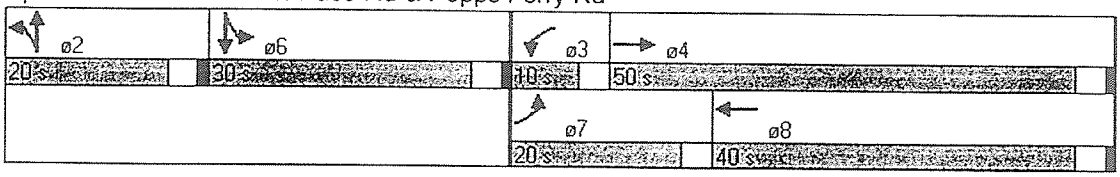
Intersection Summary			
HCM Average Control Delay	43.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary	
Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96			0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1674			1768	1538	1719	1810	1538	1662	1717	
Flt Permitted		0.56			0.85	1.00	0.44	1.00	1.00	0.18	1.00	
Satd. Flow (perm)		985			1542	1538	802	1810	1538	309	1717	
Volume (vph)	229	38	6	77	87	455	1	707	53	117	489	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	241	40	6	81	92	479	1	744	56	123	515	71
RTOR Reduction (vph)	0	1	0	0	0	268	0	0	26	0	7	0
Lane Group Flow (vph)	0	286	0	0	173	211	1	744	30	123	579	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		16.0			16.0	16.0	39.4	39.4	39.4	48.1	48.1	
Effective Green, g (s)		16.0			16.0	16.0	39.4	39.4	39.4	48.6	48.6	
Actuated g/C Ratio		0.22			0.22	0.22	0.54	0.54	0.54	0.67	0.67	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		217			340	339	435	982	835	304	1149	
v/s Ratio Prot								c0.41		0.03	c0.34	
v/s Ratio Perm		c0.29			0.11	0.14	0.00		0.02	0.24		
v/c Ratio		1.32			0.51	0.62	0.00	0.76	0.04	0.40	0.50	
Uniform Delay, d1		28.3			24.8	25.6	7.6	12.9	7.7	8.9	6.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		172.1			1.2	3.5	0.0	5.5	0.1	0.9	1.6	
Delay (s)		200.4			26.0	29.1	7.6	18.3	7.8	9.8	7.6	
Level of Service		F			C	C	A	B	A	A	A	
Approach Delay (s)		200.4			28.3			17.6			8.0	
Approach LOS		F			C			B			A	

Intersection Summary			
HCM Average Control Delay	39.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

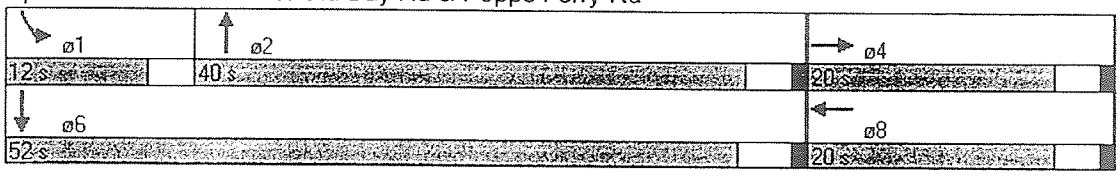
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary

Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		75

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1724	1538		1711		1719	1807		1719	1804	
Flt Permitted		0.77	1.00		0.65		0.07	1.00		0.48	1.00	
Satd. Flow (perm)		1390	1538		1155		134	1807		869	1804	
Volume (vph)	85	1	117	134	1	12	23	370	3	2	824	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	114	1	157	180	1	16	31	496	4	3	1105	21
RTOR Reduction (vph)	0	0	127	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	115	30	0	193	0	31	500	0	3	1125	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		15.0	15.0		15.0		56.8	56.8		50.2	50.2	
Effective Green, g (s)		15.0	15.0		15.0		56.8	56.8		50.2	50.2	
Actuated g/C Ratio		0.19	0.19		0.19		0.71	0.71		0.63	0.63	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		261	289		217		147	1286		547	1135	
v/s Ratio Prot							0.01	c0.28			c0.62	
v/s Ratio Perm		0.08	0.02		c0.17		0.14			0.00		
v/c Ratio		0.44	0.10		0.89		0.21	0.39		0.01	0.99	
Uniform Delay, d1		28.7	26.8		31.6		19.0	4.6		5.5	14.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2	0.2		32.5		0.7	0.9		0.0	24.7	
Delay (s)		29.9	27.0		64.1		19.7	5.5		5.5	39.3	
Level of Service		C	C		E		B	A		A	D	
Approach Delay (s)		28.2			64.1			6.3			39.2	
Approach LOS		C			E			A			D	

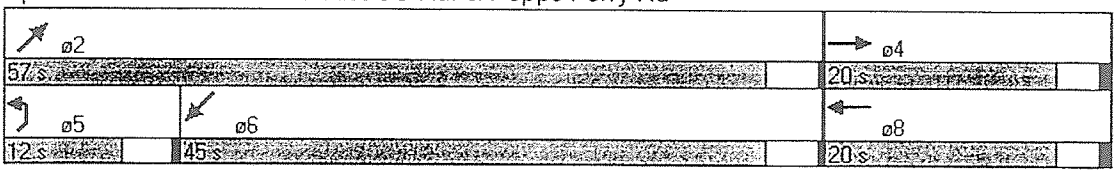
Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.97			0.94		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.97			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1694			1666		1719	2707	
Flt Permitted	0.32	0.95	1.00		0.84			0.93		0.12	1.00	
Satd. Flow (perm)	587	1719	1538		1465			1577		212	2707	
Volume (vph)	9	829	12	30	2	9	6	2	7	1	537	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	12	1063	15	38	3	12	8	3	9	1	689	5
RTOR Reduction (vph)	0	0	6	0	9	0	0	7	0	0	0	0
Lane Group Flow (vph)	12	1063	9	0	44	0	0	13	0	1	694	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	35.3	34.2	34.2		16.1			16.1		35.1	34.1	
Effective Green, g (s)	34.3	34.2	34.2		16.1			16.1		34.1	34.1	
Actuated g/C Ratio	0.55	0.55	0.55		0.26			0.26		0.55	0.55	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	325	944	844		379			408		116	1482	
v/s Ratio Prot	c0.00	c0.62									0.26	
v/s Ratio Perm	0.02		0.01		c0.03			0.01		0.00		
v/c Ratio	0.04	1.13	0.01		0.12			0.03		0.01	0.47	
Uniform Delay, d1	7.4	14.0	6.4		17.7			17.3		6.4	8.6	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.0	70.4	0.0		0.1			0.1		0.0	1.1	
Delay (s)	7.4	84.5	6.4		17.8			17.4		6.4	9.6	
Level of Service	A	F	A		B			B		A	A	
Approach Delay (s)		82.6			17.8			17.4		9.6		
Approach LOS		F			B			B		A		

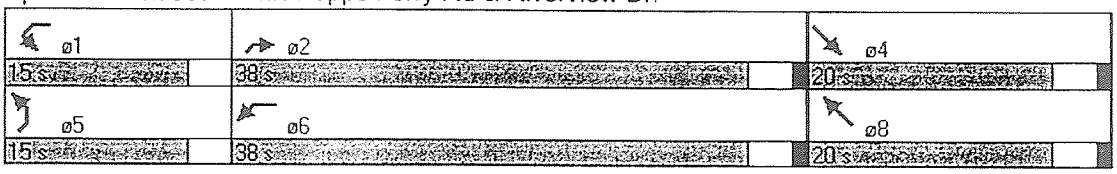
Intersection Summary			
HCM Average Control Delay	52.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3239		1662	3248		1633	1684	1538	1633	1681	1538
Flt Permitted	0.12	1.00		0.14	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (perm)	206	3239		249	3248		1633	1684	1538	1633	1681	1538
Volume (vph)	182	689	140	64	556	99	77	33	32	278	109	411
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	239	903	184	84	729	130	101	43	42	364	143	539
RTOR Reduction (vph)	0	16	0	0	14	0	0	0	35	0	0	293
Lane Group Flow (vph)	239	1071	0	84	845	0	70	74	7	247	260	246
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	46.9	38.7		35.2	30.0		16.6	16.6	16.6	19.9	19.9	19.9
Effective Green, g (s)	46.9	38.7		34.2	30.0		16.6	16.6	16.6	19.9	19.9	19.9
Actuated g/C Ratio	0.49	0.41		0.36	0.31		0.17	0.17	0.17	0.21	0.21	0.21
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	1314		151	1021		284	293	268	341	351	321
v/s Ratio Prot	c0.11	c0.33		0.02	0.26		0.04	c0.04		0.15	0.15	
v/s Ratio Perm	0.29			0.17					0.00			c0.16
v/c Ratio	0.80	0.82		0.56	0.83		0.25	0.25	0.03	0.72	0.74	0.77
Uniform Delay, d1	21.4	25.2		21.9	30.3		34.0	34.0	32.7	35.2	35.3	35.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.3	4.0		4.4	5.6		2.1	2.1	0.2	7.4	8.2	10.5
Delay (s)	35.8	29.2		26.3	35.9		36.1	36.1	32.9	42.6	43.5	46.0
Level of Service	D	C		C	D		D	D	C	D	D	D
Approach Delay (s)		30.4			35.1			35.4			44.6	
Approach LOS		C			D			D			D	

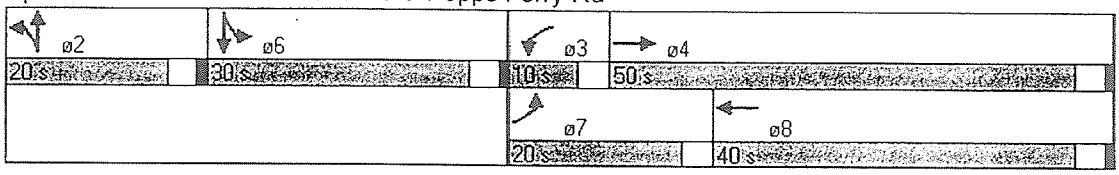
Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	95.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary	
Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	80

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1689			1753	1538	1719	1810	1538	1662	1732	
Flt Permitted		0.77			0.81	1.00	0.20	1.00	1.00	0.47	1.00	
Satd. Flow (perm)		1335			1474	1538	360	1810	1538	825	1732	
Volume (vph)	35	23	3	48	26	82	6	264	47	180	780	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	46	30	4	63	34	108	8	346	62	236	1023	73
RTOR Reduction (vph)	0	3	0	0	0	94	0	0	25	0	3	0
Lane Group Flow (vph)	0	77	0	0	97	14	8	346	37	236	1093	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		8.7			8.7	8.7	40.5	40.5	40.5	50.8	50.8	
Effective Green, g (s)		8.7			8.7	8.7	40.5	40.5	40.5	51.3	51.3	
Actuated g/C Ratio		0.13			0.13	0.13	0.60	0.60	0.60	0.75	0.75	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		171			189	197	214	1078	916	706	1307	
v/s Ratio Prot								0.19		0.03	c0.63	
v/s Ratio Perm		0.06			c0.07	0.01	0.02		0.02	0.22		
v/c Ratio		0.45			0.51	0.07	0.04	0.32	0.04	0.33	0.84	
Uniform Delay, d1		27.4			27.7	26.1	5.7	6.9	5.7	2.8	5.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.9			2.3	0.2	0.3	0.8	0.1	0.3	6.5	
Delay (s)		29.3			30.0	26.2	6.0	7.7	5.8	3.1	12.0	
Level of Service		C			C	C	A	A	A	A	B	
Approach Delay (s)		29.3			28.0			7.3			10.4	
Approach LOS		C			C			A			B	

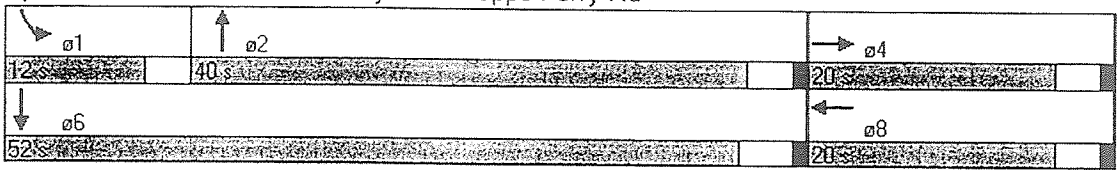
Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary		
Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		80

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728	1538		1693		1719	1810		1719	1782	
Flt Permitted		0.74	1.00		0.74		0.13	1.00		0.07	1.00	
Satd. Flow (perm)		1345	1538		1293		235	1810		134	1782	
Volume (vph)	82	5	31	37	5	14	65	1115	0	11	700	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	102	6	39	46	6	17	81	1385	0	14	869	98
RTOR Reduction (vph)	0	0	34	0	15	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	108	5	0	54	0	81	1385	0	14	963	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		11.0	11.0		11.0		64.2	64.2		54.1	54.1	
Effective Green, g (s)		11.0	11.0		11.0		64.2	64.2		54.1	54.1	
Actuated g/C Ratio		0.13	0.13		0.13		0.77	0.77		0.65	0.65	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		178	203		171		290	1397		87	1159	
v/s Ratio Prot							0.02	c0.77			0.54	
v/s Ratio Perm		c0.08	0.00		0.04		0.19			0.10		
v/c Ratio		0.61	0.03		0.32		0.28	0.99		0.16	0.83	
Uniform Delay, d1		34.1	31.4		32.7		10.3	9.2		5.7	11.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.7	0.1		1.1		0.5	22.1		3.9	7.0	
Delay (s)		39.8	31.5		33.8		10.8	31.4		9.6	18.1	
Level of Service		D	C		C		B	C		A	B	
Approach Delay (s)		37.6			33.8			30.2			17.9	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd

Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.96			0.93		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.97			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1678			1650		1719	2707	
Flt Permitted	0.11	0.95	1.00		0.84			0.93		0.11	1.00	
Satd. Flow (perm)	208	1719	1538		1464			1557		200	2707	
Volume (vph)	4	894	46	23	1	11	11	4	17	29	1066	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	5	1147	59	30	1	14	14	5	22	37	1367	8
RTOR Reduction (vph)	0	0	24	0	11	0	0	17	0	0	0	0
Lane Group Flow (vph)	5	1147	35	0	35	0	0	25	0	37	1375	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	35.9	34.8	34.8		16.1			16.1		38.7	36.2	
Effective Green, g (s)	34.9	34.8	34.8		16.1			16.1		37.7	36.2	
Actuated g/C Ratio	0.54	0.54	0.54		0.25			0.25		0.59	0.56	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	115	929	831		366			389		152	1522	
v/s Ratio Prot	0.00	c0.67								c0.01	0.51	
v/s Ratio Perm	0.02		0.02		c0.02			0.02		0.14		
v/c Ratio	0.04	1.23	0.04		0.09			0.06		0.24	0.90	
Uniform Delay, d1	8.8	14.8	7.0		18.5			18.4		31.4	12.5	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.2	115.0	0.0		0.1			0.3		0.8	9.1	
Delay (s)	9.0	129.8	7.0		18.7			18.7		32.2	21.7	
Level of Service	A	F	A		B			B		C	C	
Approach Delay (s)		123.3			18.7			18.7		21.9		
Approach LOS		F			B			B		C		

Intersection Summary

HCM Average Control Delay	67.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

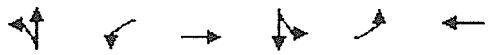
Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3266		1662	3263		1633	1697	1538	1633	1680	1538
Flt Permitted	0.10	1.00		0.16	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	169	3266		282	3263		1633	1697	1538	1633	1680	1538
Volume (vph)	310	833	109	31	897	124	267	162	82	239	90	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	385	1035	135	39	1114	154	332	201	102	297	112	474
RTOR Reduction (vph)	0	8	0	0	10	0	0	0	87	0	0	199
Lane Group Flow (vph)	385	1162	0	39	1258	0	260	273	15	199	210	275
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	57.5	50.5		41.4	37.4		16.1	16.1	16.1	21.7	21.7	21.7
Effective Green, g (s)	57.5	50.5		40.4	37.4		16.1	16.1	16.1	21.7	21.7	21.7
Actuated g/C Ratio	0.54	0.47		0.38	0.35		0.15	0.15	0.15	0.20	0.20	0.20
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	315	1537		145	1137		245	255	231	330	340	311
v/s Ratio Prot	c0.18	0.36		0.01	0.39		0.16	c0.16		0.12	0.13	
v/s Ratio Perm	c0.47			0.09					0.01			c0.18
v/c Ratio	1.22	0.76		0.27	1.11		1.06	1.07	0.07	0.60	0.62	0.89
Uniform Delay, d1	33.6	23.3		22.2	35.0		45.6	45.6	39.1	38.9	39.0	41.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	125.1	2.2		1.0	60.9		74.6	76.3	0.6	3.1	3.3	24.5
Delay (s)	158.7	25.5		23.2	95.9		120.2	121.9	39.7	42.0	42.3	66.1
Level of Service	F	C		C	F		F	F	D	D	D	E
Approach Delay (s)		58.5			93.7			108.0			55.0	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM Average Control Delay	75.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	107.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary	
Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 21: Pass Rd & Popps Ferry Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96			0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1674			1768	1538	1719	1810	1538	1662	1718	
Flt Permitted		0.50			0.87	1.00	0.39	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		874			1571	1538	702	1810	1538	162	1718	
Volume (vph)	229	38	6	77	87	455	1	707	53	117	489	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	284	47	7	96	108	565	1	878	66	145	607	83
RTOR Reduction (vph)	0	1	0	0	0	239	0	0	30	0	7	0
Lane Group Flow (vph)	0	337	0	0	204	326	1	878	36	145	683	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		16.0			16.0	16.0	39.1	39.1	39.1	48.1	48.1	
Effective Green, g (s)		16.0			16.0	16.0	39.1	39.1	39.1	48.6	48.6	
Actuated g/C Ratio		0.22			0.22	0.22	0.54	0.54	0.54	0.67	0.67	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		193			346	339	378	975	828	222	1150	
v/s Ratio Prot								c0.49		0.05	c0.40	
v/s Ratio Perm		c0.39			0.13	0.21	0.00		0.02	0.39		
v/c Ratio		1.75			0.59	0.96	0.00	0.90	0.04	0.65	0.59	
Uniform Delay, d1		28.3			25.4	28.0	7.7	15.0	7.9	13.5	6.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		356.8			2.6	38.8	0.0	13.0	0.1	6.7	2.3	
Delay (s)		385.1			27.9	66.8	7.8	28.0	8.0	20.2	8.8	
Level of Service		F			C	E	A	C	A	C	A	
Approach Delay (s)		385.1			56.5			26.6			10.8	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM Average Control Delay	72.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	72.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary

Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		90

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1725	1538		1711		1719	1807		1719	1804	
Flt Permitted		0.78	1.00		0.60		0.08	1.00		0.43	1.00	
Satd. Flow (perm)		1405	1538		1067		142	1807		781	1804	
Volume (vph)	85	1	117	134	1	12	23	370	3	2	824	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	138	2	190	218	2	20	37	601	5	3	1339	26
RTOR Reduction (vph)	0	0	151	0	4	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	140	39	0	236	0	37	606	0	3	1364	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		16.0	16.0		16.0		54.8	54.8		47.0	47.0	
Effective Green, g (s)		16.0	16.0		16.0		54.8	54.8		47.0	47.0	
Actuated g/C Ratio		0.20	0.20		0.20		0.70	0.70		0.60	0.60	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		285	312		217		175	1257		466	1076	
v/s Ratio Prot							0.01	c0.34			c0.76	
v/s Ratio Perm		0.10	0.03		c0.22		0.14			0.00		
v/c Ratio		0.49	0.12		1.09		0.21	0.48		0.01	1.27	
Uniform Delay, d1		27.8	25.7		31.4		36.5	5.5		6.4	15.9	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3	0.2		86.4		0.6	1.3		0.0	128.0	
Delay (s)		29.1	25.8		117.8		37.1	6.8		6.5	143.9	
Level of Service		C	C		F		D	A		A	F	
Approach Delay (s)		27.2			117.8			8.6			143.6	
Approach LOS		C			F			A			F	

Intersection Summary			
HCM Average Control Delay	92.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.5%	ICU Level of Service	F
Analysis Period (min)	15		

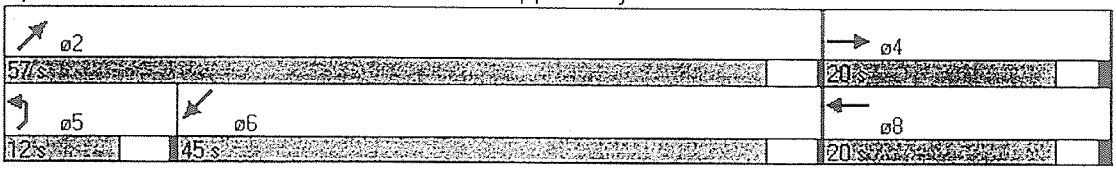
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary

Cycle Length		77
Control Type	Actuated-Uncoordinated	
Natural Cycle		150

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.97			0.94		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.96			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1694			1660		1719	2707	
Flt Permitted	0.26	0.95	1.00		0.82			0.92		0.12	1.00	
Satd. Flow (perm)	464	1719	1538		1440			1565		212	2707	
Volume (vph)	9	829	12	30	2	9	6	2	7	1	537	4
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	14	1289	19	47	3	14	9	3	11	2	835	6
RTOR Reduction (vph)	0	0	7	0	10	0	0	8	0	0	0	0
Lane Group Flow (vph)	14	1289	12	0	54	0	0	15	0	2	841	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	35.3	34.2	34.2		16.1			16.1		35.1	34.1	
Effective Green, g (s)	34.3	34.2	34.2		16.1			16.1		34.1	34.1	
Actuated g/C Ratio	0.55	0.55	0.55		0.26			0.26		0.55	0.55	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	257	944	844		372			404		116	1482	
v/s Ratio Prot	c0.00	c0.75									0.31	
v/s Ratio Perm	0.03		0.01		c0.04			0.01		0.01		
v/c Ratio	0.05	1.37	0.01		0.14			0.04		0.02	0.57	
Uniform Delay, d1	8.3	14.0	6.4		17.8			17.3		6.4	9.3	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.1	171.3	0.0		0.2			0.2		0.1	1.6	
Delay (s)	8.4	185.3	6.4		18.0			17.5		6.5	10.8	
Level of Service	A	F	A		B			B		A	B	
Approach Delay (s)		180.9			18.0			17.5		10.8		
Approach LOS		F			B			B		B		

Intersection Summary

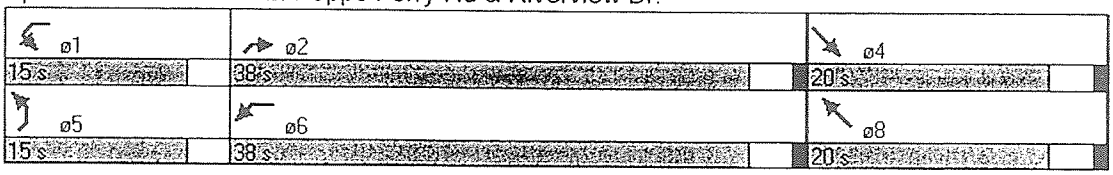
HCM Average Control Delay	110.9	HCM Level of Service	F
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	120

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3239		1662	3248		1633	1684	1538	1633	1681	1538
Flt Permitted	0.10	1.00		0.11	1.00		0.95	0.98	1.00	0.95	0.98	1.00
Satd. Flow (perm)	175	3239		194	3248		1633	1684	1538	1633	1681	1538
Volume (vph)	182	689	140	64	556	99	77	33	32	278	109	411
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	289	1095	222	102	883	157	122	52	51	442	173	653
RTOR Reduction (vph)	0	16	0	0	13	0	0	0	44	0	0	256
Lane Group Flow (vph)	289	1301	0	102	1027	0	85	89	7	300	315	397
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	55.8	45.9		42.9	36.0		16.0	16.0	16.0	26.0	26.0	26.0
Effective Green, g (s)	55.8	45.9		41.9	36.0		16.0	16.0	16.0	26.0	26.0	26.0
Actuated g/C Ratio	0.51	0.42		0.38	0.33		0.15	0.15	0.15	0.24	0.24	0.24
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	303	1354		153	1065		238	245	224	387	398	364
v/s Ratio Prot	c0.14	c0.40		0.04	0.32		0.05	c0.05		0.18	0.19	
v/s Ratio Perm	0.35			0.22					0.00			c0.26
v/c Ratio	0.95	0.96		0.67	0.96		0.36	0.36	0.03	0.78	0.79	1.09
Uniform Delay, d1	32.1	31.1		26.0	36.3		42.3	42.3	40.3	39.2	39.4	41.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.1	16.0		10.5	19.3		4.1	4.1	0.3	9.4	10.3	73.3
Delay (s)	71.3	47.1		36.5	55.6		46.4	46.4	40.5	48.5	49.7	115.2
Level of Service	E	D		D	E		D	D	D	D	D	F
Approach Delay (s)		51.5			53.9			45.1			83.2	
Approach LOS		D			D			D			F	

Intersection Summary			
HCM Average Control Delay	61.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	109.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		

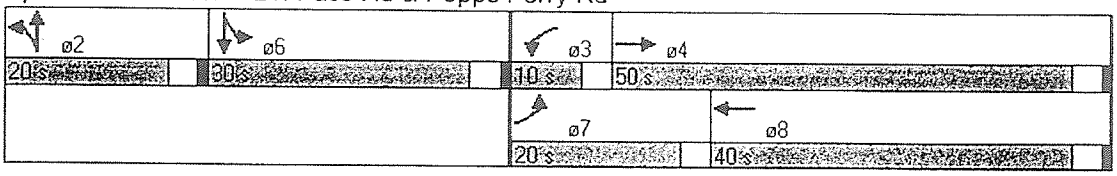
c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary

Cycle Length		110
Control Type	Actuated-Uncoordinated	
Natural Cycle		90

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1689			1753	1538	1719	1810	1538	1662	1732	
Flt Permitted		0.76			0.79	1.00	0.10	1.00	1.00	0.41	1.00	
Satd. Flow (perm)		1313			1425	1538	186	1810	1538	724	1732	
Volume (vph)	35	23	3	48	26	82	6	264	47	180	780	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	56	37	5	76	41	130	10	419	75	286	1239	89
RTOR Reduction (vph)	0	3	0	0	0	112	0	0	32	0	3	0
Lane Group Flow (vph)	0	95	0	0	117	18	10	419	43	286	1325	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		9.2			9.2	9.2	38.9	38.9	38.9	49.5	49.5	
Effective Green, g (s)		9.2			9.2	9.2	38.9	38.9	38.9	50.0	50.0	
Actuated g/C Ratio		0.14			0.14	0.14	0.58	0.58	0.58	0.74	0.74	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		180			195	211	108	1048	890	638	1289	
v/s Ratio Prot								0.23		0.05	c0.77	
v/s Ratio Perm		0.07			c0.08	0.01	0.05		0.03	0.29		
v/c Ratio		0.53			0.60	0.08	0.09	0.40	0.05	0.45	1.03	
Uniform Delay, d1		27.0			27.3	25.3	6.3	7.8	6.1	3.5	8.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		3.0			5.1	0.2	1.7	1.1	0.1	0.5	32.5	
Delay (s)		30.0			32.4	25.5	8.0	8.9	6.2	4.0	41.1	
Level of Service		C			C	C	A	A	A	A	D	
Approach Delay (s)		30.0			28.8			8.5			34.5	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

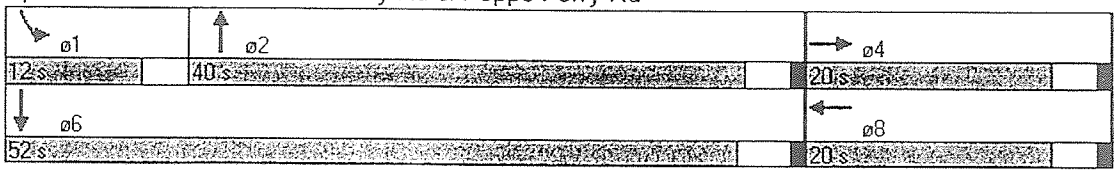
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary

Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		100

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.96	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728	1538		1693		1719	1810		1719	1782	
Flt Permitted		0.72	1.00		0.65		0.07	1.00		0.08	1.00	
Satd. Flow (perm)		1301	1538		1144		130	1810		140	1782	
Volume (vph)	82	5	31	37	5	14	65	1115	0	11	700	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	123	8	47	56	8	21	98	1678	0	17	1054	119
RTOR Reduction (vph)	0	0	40	0	16	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	131	7	0	69	0	98	1678	0	17	1169	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		11.6	11.6		11.6		61.9	61.9		51.8	51.8	
Effective Green, g (s)		11.6	11.6		11.6		61.9	61.9		51.8	51.8	
Actuated g/C Ratio		0.14	0.14		0.14		0.76	0.76		0.64	0.64	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		185	219		163		218	1375		89	1133	
v/s Ratio Prot							0.03	c0.93			0.66	
v/s Ratio Perm		c0.10	0.00		0.06		0.31			0.12		
v/c Ratio		0.71	0.03		0.42		0.45	1.22		0.19	1.03	
Uniform Delay, d1		33.3	30.1		31.9		21.5	9.8		6.2	14.8	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.7	0.1		1.8		1.5	105.9		4.7	35.2	
Delay (s)		45.0	30.2		33.6		23.0	115.7		10.9	50.1	
Level of Service		D	C		C		C	F		B	D	
Approach Delay (s)		41.1			33.6			110.6			49.5	
Approach LOS		D			C			F			D	

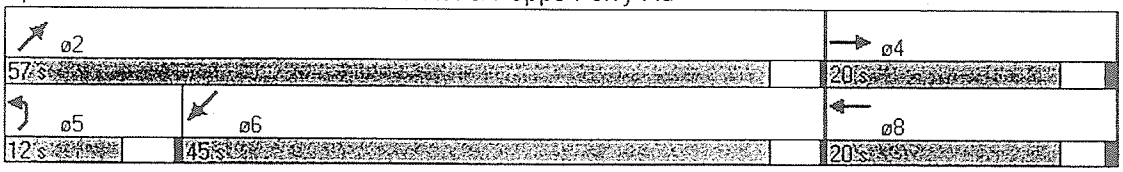
Intersection Summary			
HCM Average Control Delay	82.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER	NER2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00		1.00			1.00		1.00	0.88	
Frt	1.00	1.00	0.85		0.96			0.93		1.00	0.85	
Flt Protected	0.95	0.95	1.00		0.97			0.98		0.95	1.00	
Satd. Flow (prot)	1719	1719	1538		1679			1651		1719	2707	
Flt Permitted	0.11	0.95	1.00		0.83			0.92		0.10	1.00	
Satd. Flow (perm)	204	1719	1538		1445			1544		190	2707	
Volume (vph)	4	894	46	23	1	11	11	4	17	29	1066	6
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	6	1390	72	36	2	17	17	6	26	45	1657	9
RTOR Reduction (vph)	0	0	25	0	13	0	0	20	0	0	0	0
Lane Group Flow (vph)	6	1390	47	0	42	0	0	29	0	45	1666	0
Turn Type	pm+pt		Perm	Perm			Perm			pm+pt		
Protected Phases	1	6			4			8		5	2	
Permitted Phases	6		6	4			8			2		
Actuated Green, G (s)	36.5	35.4	35.4		16.1			16.1		41.9	38.1	
Effective Green, g (s)	35.5	35.4	35.4		16.1			16.1		40.9	38.1	
Actuated g/C Ratio	0.54	0.53	0.53		0.24			0.24		0.62	0.57	
Clearance Time (s)	3.0	4.0	4.0		4.0			4.0		3.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0		3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	112	918	821		351			375		182	1556	
v/s Ratio Prot	0.00	c0.81								c0.01	0.62	
v/s Ratio Perm	0.03		0.03		c0.03			0.02		0.14		
v/c Ratio	0.05	1.51	0.06		0.12			0.08		0.25	1.07	
Uniform Delay, d1	12.6	15.4	7.4		19.6			19.4		31.2	14.1	
Progression Factor	1.00	1.00	1.00		1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.2	237.0	0.0		0.2			0.4		0.7	44.3	
Delay (s)	12.8	252.5	7.5		19.7			19.8		31.9	58.4	
Level of Service	B	F	A		B			B		C	E	
Approach Delay (s)		239.5			19.7			19.8		57.7		
Approach LOS		F			B			B		E		

Intersection Summary

HCM Average Control Delay	137.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		

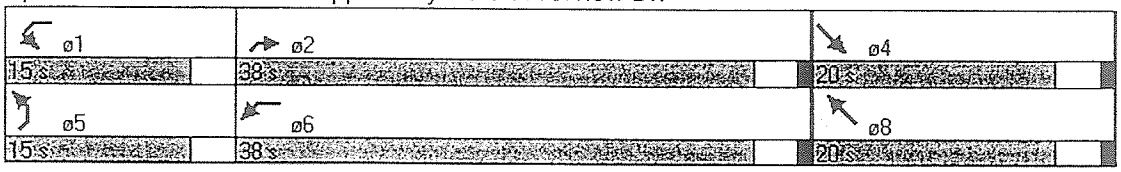
c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	WBL	NEL	SETL	NEL	WBL	NWTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary

Cycle Length		73
Control Type	Actuated-Uncoordinated	
Natural Cycle		150

Splits and Phases: 12: Popps Ferry Rd & Riverview Dr.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		0.95	0.95	1.00	0.95	0.95	1.00
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (prot)	1662	3266		1662	3263		1633	1697	1538	1633	1680	1538
Flt Permitted	0.10	1.00		0.11	1.00		0.95	0.99	1.00	0.95	0.98	1.00
Satd. Flow (perm)	172	3266		191	3263		1633	1697	1538	1633	1680	1538
Volume (vph)	310	833	109	31	897	124	267	162	82	239	90	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	467	1254	164	47	1350	187	402	244	123	360	135	575
RTOR Reduction (vph)	0	9	0	0	10	0	0	0	105	0	0	184
Lane Group Flow (vph)	467	1409	0	47	1527	0	315	331	18	241	254	391
Turn Type	pm+pt			pm+pt			Split		Perm	Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	56.6	48.1		42.1	36.6		16.0	16.0	16.0	26.0	26.0	26.0
Effective Green, g (s)	56.6	48.1		41.1	36.6		16.0	16.0	16.0	26.0	26.0	26.0
Actuated g/C Ratio	0.51	0.43		0.37	0.33		0.14	0.14	0.14	0.24	0.24	0.24
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	304	1420		131	1080		236	245	222	384	395	362
v/s Ratio Prot	c0.22	0.43		0.01	0.47		0.19	c0.20		0.15	0.15	
v/s Ratio Perm	c0.56			0.12					0.01			c0.25
v/c Ratio	1.54	0.99		0.36	1.41		1.33	1.35	0.08	0.63	0.64	1.08
Uniform Delay, d1	49.5	31.1		26.4	37.0		47.3	47.3	40.9	38.0	38.1	42.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	257.2	21.9		1.7	191.8		176.6	182.4	0.7	3.2	3.6	70.8
Delay (s)	306.7	53.0		28.1	228.8		223.9	229.7	41.6	41.1	41.7	113.1
Level of Service	F	D		C	F		F	F	D	D	D	F
Approach Delay (s)		115.8			222.8			197.3			79.9	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	152.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.37		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.5%	ICU Level of Service	G
Analysis Period (min)	15		

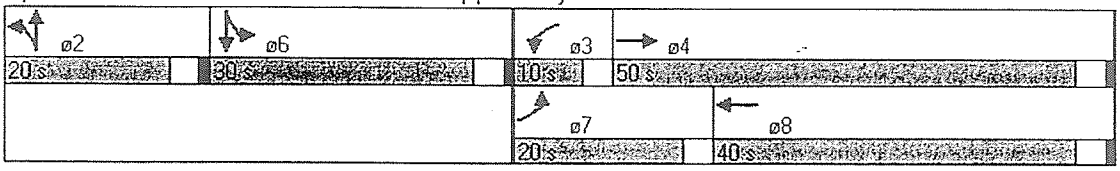
c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary

Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	150

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.96			0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1674			1768	1538	1719	1810	1538	1662	1718	
Flt Permitted		0.42			0.90	1.00	0.30	1.00	1.00	0.10	1.00	
Satd. Flow (perm)		730			1627	1538	536	1810	1538	171	1718	
Volume (vph)	229	38	6	77	87	455	1	707	53	117	489	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	345	57	9	116	131	685	2	1064	80	176	736	101
RTOR Reduction (vph)	0	1	0	0	0	211	0	0	39	0	7	0
Lane Group Flow (vph)	0	410	0	0	247	474	2	1064	41	176	830	0
Turn Type	Perm			Perm		Perm	Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)		16.0			16.0	16.0	36.9	36.9	36.9	47.5	47.5	
Effective Green, g (s)		16.0			16.0	16.0	36.9	36.9	36.9	48.0	48.0	
Actuated g/C Ratio		0.22			0.22	0.22	0.51	0.51	0.51	0.67	0.67	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0	4.0	3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		162			362	342	275	928	788	261	1145	
v/s Ratio Prot								c0.59		0.07	c0.48	
v/s Ratio Perm		c0.56			0.15	0.31	0.00		0.03	0.38		
v/c Ratio		2.53			0.68	1.39	0.01	1.15	0.05	0.67	0.72	
Uniform Delay, d1		28.0			25.7	28.0	8.6	17.6	8.8	32.7	7.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		707.4			5.2	191.2	0.0	78.7	0.1	6.7	4.0	
Delay (s)		735.4			30.9	219.2	8.6	96.2	8.9	39.4	11.8	
Level of Service		F			C	F	A	F	A	D	B	
Approach Delay (s)		735.4			169.3			90.0			16.6	
Approach LOS		F			F			F			B	

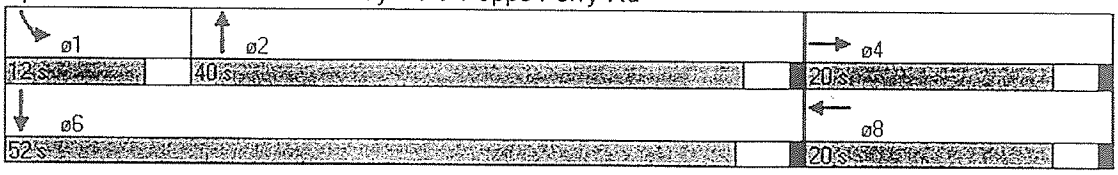
Intersection Summary			
HCM Average Control Delay	165.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	125.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary	
Cycle Length	72
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1724	1538		1711		1719	3434		1719	3428	
Flt Permitted		0.77	1.00		0.65		0.19	1.00		0.47	1.00	
Satd. Flow (perm)		1390	1538		1155		335	3434		848	3428	
Volume (vph)	85	1	117	134	1	12	23	370	3	2	824	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	114	1	157	180	1	16	31	496	4	3	1105	21
RTOR Reduction (vph)	0	0	127	0	4	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	115	30	0	193	0	31	499	0	3	1125	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		15.0	15.0		15.0		56.8	56.8		50.2	50.2	
Effective Green, g (s)		15.0	15.0		15.0		56.8	56.8		50.2	50.2	
Actuated g/C Ratio		0.19	0.19		0.19		0.71	0.71		0.63	0.63	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		261	289		217		284	2444		533	2156	
v/s Ratio Prot							0.00	c0.15			c0.33	
v/s Ratio Perm		0.08	0.02		c0.17		0.07			0.00		
v/c Ratio		0.44	0.10		0.89		0.11	0.20		0.01	0.52	
Uniform Delay, d1		28.7	26.8		31.6		4.8	3.9		5.5	8.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.2	0.2		32.5		0.2	0.2		0.0	0.9	
Delay (s)		29.9	27.0		64.1		5.0	4.1		5.5	9.1	
Level of Service		C	C		E		A	A		A	A	
Approach Delay (s)		28.2			64.1			4.1			9.1	
Approach LOS		C			E			A			A	

Intersection Summary

HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

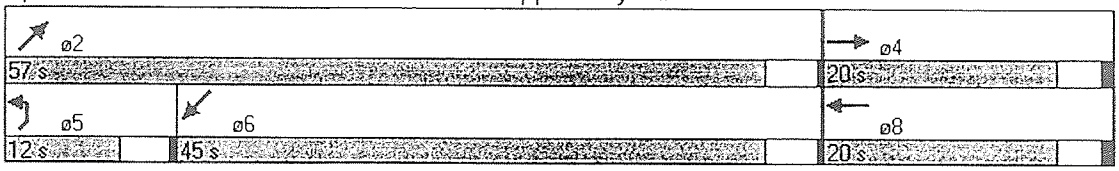
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary

Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1694			1666		1719	3434		1719	3431	
Flt Permitted		0.84			0.93		0.20	1.00		0.35	1.00	
Satd. Flow (perm)		1465			1577		356	3434		634	3431	
Volume (vph)	30	2	9	6	2	7	1	537	4	9	829	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	38	3	12	8	3	9	1	689	5	12	1063	15
RTOR Reduction (vph)	0	9	0	0	7	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	44	0	0	13	0	1	694	0	12	1077	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.1			16.1		35.1	34.1		35.3	34.2	
Effective Green, g (s)		16.1			16.1		34.1	34.1		34.3	34.2	
Actuated g/C Ratio		0.26			0.26		0.55	0.55		0.55	0.55	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		379			408		195	1880		351	1883	
v/s Ratio Prot								0.20		c0.00	c0.31	
v/s Ratio Perm		c0.03			0.01		0.00			0.02		
v/c Ratio		0.12			0.03		0.01	0.37		0.03	0.57	
Uniform Delay, d1		17.7			17.3		6.4	8.0		7.2	9.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.1		0.0	0.6		0.0	0.4	
Delay (s)		17.8			17.4		6.4	8.6		7.2	9.7	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		17.8			17.4			8.6			9.6	
Approach LOS		B			B			A			A	

Intersection Summary

HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

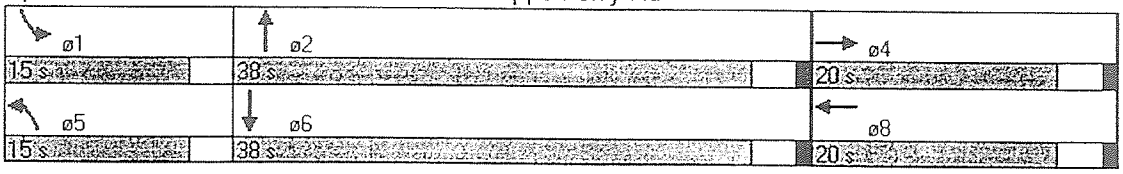
c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBTL	EBTL	NBL	SBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary

Cycle Length		73
Control Type	Actuated-Uncoordinated	
Natural Cycle		55

Splits and Phases: 12: Riverview Dr. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	0.95		1.00	0.95		1.00	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	0.98		1.00	0.93		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	3224	3239		1662	3248		1719	3183		3335	3031	
Flt Permitted	0.15	1.00		0.12	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	520	3239		217	3248		1719	3183		3335	3031	
Volume (vph)	182	689	140	64	556	99	77	33	32	278	109	411
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	239	903	184	84	729	130	101	43	42	364	143	539
RTOR Reduction (vph)	0	16	0	0	13	0	0	34	0	0	299	0
Lane Group Flow (vph)	239	1071	0	84	846	0	101	51	0	364	383	0
Turn Type	pm+pt			pm+pt			Split			Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases	4			8								
Actuated Green, G (s)	44.9	36.7		37.8	32.6		16.7	16.7		17.4	17.4	
Effective Green, g (s)	44.9	36.7		36.8	32.6		16.7	16.7		17.4	17.4	
Actuated g/C Ratio	0.49	0.40		0.40	0.36		0.18	0.18		0.19	0.19	
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	503	1306		154	1164		315	584		638	580	
v/s Ratio Prot	c0.04	c0.33		0.03	0.26		c0.06	0.02		0.11	c0.13	
v/s Ratio Perm	0.19			0.19								
v/c Ratio	0.48	0.82		0.55	0.73		0.32	0.09		0.57	0.91dr	
Uniform Delay, d1	15.3	24.2		19.0	25.3		32.2	30.8		33.4	34.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	4.2		3.9	2.3		2.7	0.3		1.2	2.7	
Delay (s)	16.0	28.4		22.9	27.6		34.9	31.1		34.6	36.8	
Level of Service	B	C		C	C		C	C		C	D	
Approach Delay (s)		26.1			27.2			33.2			36.0	
Approach LOS		C			C			C			D	

Intersection Summary

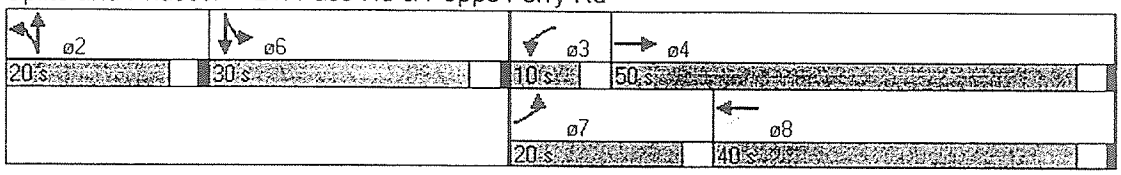
HCM Average Control Delay	29.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Phase Number	2	3	4	6	7	8
Movement	NBTL	WBL	EBTL	SBTL	EBL	WBTL
Lead/Lag		Lead	Lag		Lead	Lag
Lead-Lag Optimize		Yes	Yes		Yes	Yes
Recall Mode	Max	None	None	None	None	None
Maximum Split (s)	20	10	50	30	20	40
Maximum Split (%)	18.2%	9.1%	45.5%	27.3%	18.2%	36.4%
Minimum Split (s)	12	8	20	20	8	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	1	0	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)	5		5	5		5
Flash Dont Walk (s)	11		11	11		11
Dual Entry	Yes	No	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	50	60	20	50	70
End Time (s)	20	60	0	50	70	0
Yield/Force Off (s)	16	57	106	46	67	106
Yield/Force Off 170(s)	5	57	95	35	67	95
Local Start Time (s)	0	50	60	20	50	70
Local Yield (s)	16	57	106	46	67	106
Local Yield 170(s)	5	57	95	35	67	95

Intersection Summary		
Cycle Length		110
Control Type	Actuated-Uncoordinated	
Natural Cycle		70

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1689			1753	1538	1719	3360		1662	3290	
Flt Permitted		0.77			0.81	1.00	0.26	1.00		0.47	1.00	
Satd. Flow (perm)		1335			1474	1538	471	3360		816	3290	
Volume (vph)	35	23	3	48	26	82	6	264	47	180	780	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	46	30	4	63	34	108	8	346	62	236	1023	73
RTOR Reduction (vph)	0	3	0	0	0	94	0	17	0	0	5	0
Lane Group Flow (vph)	0	77	0	0	97	14	8	391	0	236	1091	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		8.7			8.7	8.7	40.5	40.5		50.8	50.8	
Effective Green, g (s)		8.7			8.7	8.7	40.5	40.5		51.3	51.3	
Actuated g/C Ratio		0.13			0.13	0.13	0.60	0.60		0.75	0.75	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		171			189	197	281	2001		700	2482	
v/s Ratio Prot								0.12		0.03	c0.33	
v/s Ratio Perm		0.06			c0.07	0.01	0.02			0.22		
v/c Ratio		0.45			0.51	0.07	0.03	0.20		0.34	0.44	
Uniform Delay, d1		27.4			27.7	26.1	5.7	6.3		2.5	3.1	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9			2.3	0.2	0.2	0.2		0.3	0.6	
Delay (s)		29.3			30.0	26.2	5.8	6.5		2.8	3.6	
Level of Service		C			C	C	A	A		A	A	
Approach Delay (s)		29.3			28.0			6.5			3.5	
Approach LOS		C			C			A			A	

Intersection Summary

HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

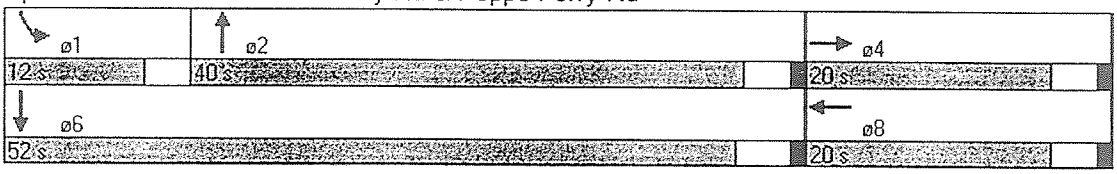
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary

Cycle Length		72
Control Type	Actuated-Uncoordinated	
Natural Cycle		50

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728	1538		1693		1719	3438		1719	3386	
Flt Permitted		0.74	1.00		0.74		0.24	1.00		0.19	1.00	
Satd. Flow (perm)		1345	1538		1293		430	3438		353	3386	
Volume (vph)	82	5	31	37	5	14	65	1115	0	11	700	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	102	6	39	46	6	17	81	1385	0	14	869	98
RTOR Reduction (vph)	0	0	34	0	15	0	0	0	0	0	8	0
Lane Group Flow (vph)	0	108	5	0	54	0	81	1385	0	14	959	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		11.0	11.0		11.0		64.2	64.2		54.1	54.1	
Effective Green, g (s)		11.0	11.0		11.0		64.2	64.2		54.1	54.1	
Actuated g/C Ratio		0.13	0.13		0.13		0.77	0.77		0.65	0.65	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		178	203		171		426	2653		230	2202	
v/s Ratio Prot							0.01	c0.40			0.28	
v/s Ratio Perm		c0.08	0.00		0.04		0.13			0.04		
v/c Ratio		0.61	0.03		0.32		0.19	0.52		0.06	0.44	
Uniform Delay, d1		34.1	31.4		32.7		3.2	3.6		5.3	7.1	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.7	0.1		1.1		0.2	0.7		0.5	0.6	
Delay (s)		39.8	31.5		33.8		3.4	4.4		5.8	7.7	
Level of Service		D	C		C		A	A		A	A	
Approach Delay (s)		37.6			33.8			4.3			7.7	
Approach LOS		D			C			A			A	

Intersection Summary

HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

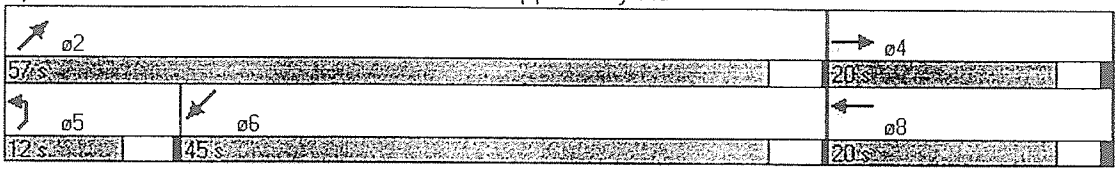
c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary

Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	40

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.93		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1678			1650		1719	3435		1719	3413	
Flt Permitted		0.84			0.93		0.15	1.00		0.12	1.00	
Satd. Flow (perm)		1464			1557		263	3435		216	3413	
Volume (vph)	23	1	11	11	4	17	29	1066	6	4	894	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	30	1	14	14	5	22	37	1367	8	5	1147	59
RTOR Reduction (vph)	0	10	0	0	16	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	35	0	0	25	0	37	1375	0	5	1202	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.1			16.1		38.4	35.9		35.6	34.5	
Effective Green, g (s)		16.1			16.1		37.4	35.9		34.6	34.5	
Actuated g/C Ratio		0.25			0.25		0.58	0.56		0.54	0.54	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		368			391		188	1924		119	1837	
v/s Ratio Prot							c0.00	c0.40		0.00	0.35	
v/s Ratio Perm		c0.02			0.02		0.11			0.02		
v/c Ratio		0.09			0.06		0.20	0.71		0.04	0.65	
Uniform Delay, d1		18.4			18.3		7.2	10.3		8.3	10.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			0.3		0.5	2.3		0.1	0.8	
Delay (s)		18.5			18.6		7.8	12.6		8.4	11.4	
Level of Service		B			B		A	B		A	B	
Approach Delay (s)		18.5			18.6			12.5			11.4	
Approach LOS		B			B			B			B	

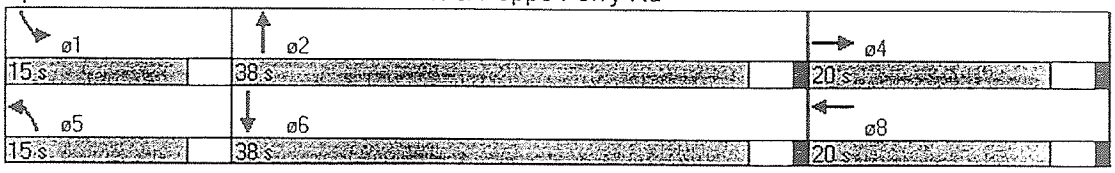
Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBTL	EBTL	NBL	SBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 12: Riverview Dr. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3224	3266		1662	3323	1538	3335	1718		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3224	3266		1662	3323	1538	3335	1718		3335	1810	1538
Volume (vph)	310	833	109	31	897	124	267	162	82	239	90	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	385	1035	135	39	1114	154	332	201	102	297	112	474
RTOR Reduction (vph)	0	9	0	0	0	57	0	15	0	0	0	199
Lane Group Flow (vph)	385	1161	0	39	1114	97	332	288	0	297	112	275
Turn Type	Prot			Prot		Perm	Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						6
Actuated Green, G (s)	15.8	49.3		4.0	37.5	37.5	16.1	23.5		13.9	21.3	21.3
Effective Green, g (s)	14.8	49.3		3.0	37.5	37.5	16.1	23.5		13.9	21.3	21.3
Actuated g/C Ratio	0.14	0.47		0.03	0.35	0.35	0.15	0.22		0.13	0.20	0.20
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	451	1523		47	1179	546	508	382		439	365	310
v/s Ratio Prot	c0.12	0.36		0.02	c0.34		c0.10	0.17		0.09	0.06	
v/s Ratio Perm						0.06						c0.18
v/c Ratio	0.85	0.76		0.83	0.94	0.18	0.65	0.75		0.68	0.31	0.89
Uniform Delay, d1	44.4	23.4		51.1	33.1	23.5	42.2	38.4		43.8	35.9	41.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	14.5	2.3		69.6	14.8	0.2	6.4	13.0		4.1	0.5	24.9
Delay (s)	58.9	25.7		120.7	47.9	23.6	48.6	51.4		47.9	36.4	65.9
Level of Service	E	C		F	D	C	D	D		D	D	E
Approach Delay (s)		33.9			47.2			49.9			56.1	
Approach LOS		C			D			D			E	

Intersection Summary

HCM Average Control Delay	44.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	105.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

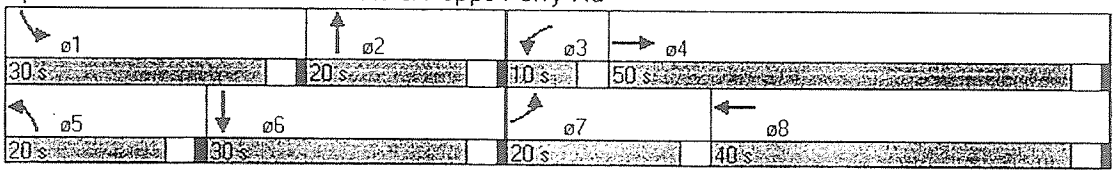
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None
Maximum Split (s)	30	20	10	50	20	30	20	40
Maximum Split (%)	27.3%	18.2%	9.1%	45.5%	18.2%	27.3%	18.2%	36.4%
Minimum Split (s)	20	15	8	20	15	20	8	20
Yellow Time (s)	3	3	3	3	3	3	3	3
All-Red Time (s)	1	1	0	1	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)	5	5		5	5	5		5
Flash Dont Walk (s)	11	11		11	11	11		11
Dual Entry	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	30	50	60	0	20	50	70
End Time (s)	30	50	60	0	20	50	70	0
Yield/Force Off (s)	26	46	57	106	16	46	67	106
Yield/Force Off 170(s)	15	35	57	95	5	35	67	95
Local Start Time (s)	80	0	20	30	80	100	20	40
Local Yield (s)	106	16	27	76	96	16	37	76
Local Yield 170(s)	95	5	27	65	85	5	37	65

Intersection Summary

Cycle Length	110
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1674			1768	1538	1719	3402		1662	3264	
Flt Permitted		0.56			0.78	1.00	0.39	1.00		0.16	1.00	
Satd. Flow (perm)		983			1416	1538	704	3402		281	3264	
Volume (vph)	229	38	6	77	87	455	1	707	53	117	489	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%	118%
Adj. Flow (vph)	284	47	7	96	108	565	1	878	66	145	607	83
RTOR Reduction (vph)	0	1	0	0	0	175	0	6	0	0	12	0
Lane Group Flow (vph)	0	337	0	0	204	390	1	938	0	145	678	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		30.8			30.8	30.8	36.7	36.7		47.5	47.5	
Effective Green, g (s)		30.8			30.8	30.8	36.7	36.7		48.0	48.0	
Actuated g/C Ratio		0.35			0.35	0.35	0.42	0.42		0.55	0.55	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		349			502	546	298	1438		272	1805	
v/s Ratio Prot								c0.28		c0.04	0.21	
v/s Ratio Perm		c0.34			0.14	0.25	0.00			0.25		
v/c Ratio		0.97			0.41	0.71	0.00	0.65		0.53	0.38	
Uniform Delay, d1		27.5			21.1	24.2	14.5	20.0		12.4	10.9	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		38.9			0.5	4.4	0.0	2.3		2.0	0.6	
Delay (s)		66.4			21.6	28.6	14.5	22.3		14.4	11.5	
Level of Service		E			C	C	B	C		B	B	
Approach Delay (s)		66.4			26.7			22.3			12.0	
Approach LOS		E			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	86.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		

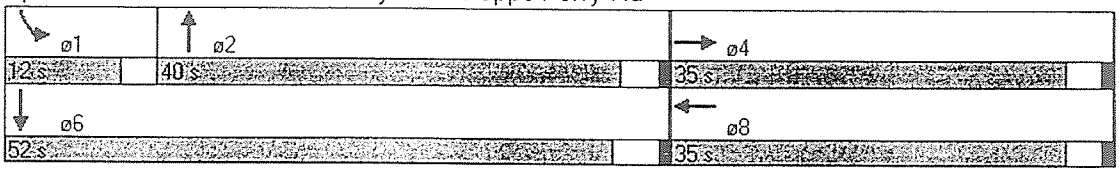
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	35	52	35
Maximum Split (%)	13.8%	46.0%	40.2%	59.8%	40.2%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	83	47.5	83
Yield/Force Off 170(s)	9	37	72	36.5	72
Local Start Time (s)	75	0	40	75	40
Local Yield (s)	84	36	71	35.5	71
Local Yield 170(s)	84	25	60	24.5	60

Intersection Summary

Cycle Length		87
Control Type	Actuated-Uncoordinated	
Natural Cycle		55

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.96		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1725	1538		1711		1719	3434		1719	3428	
Flt Permitted		0.78	1.00		0.60		0.12	1.00		0.42	1.00	
Satd. Flow (perm)		1405	1538		1067		211	3434		765	3428	
Volume (vph)	85	1	117	134	1	12	23	370	3	2	824	16
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	138	2	190	218	2	20	37	601	5	3	1339	26
RTOR Reduction (vph)	0	0	151	0	4	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	140	39	0	236	0	37	605	0	3	1363	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		16.0	16.0		16.0		54.8	54.8		47.0	47.0	
Effective Green, g (s)		16.0	16.0		16.0		54.8	54.8		47.0	47.0	
Actuated g/C Ratio		0.20	0.20		0.20		0.70	0.70		0.60	0.60	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		285	312		217		219	2388		456	2045	
v/s Ratio Prot							0.01	c0.18			c0.40	
v/s Ratio Perm		0.10	0.03		c0.22		0.11			0.00		
v/c Ratio		0.49	0.12		1.09		0.17	0.25		0.01	0.67	
Uniform Delay, d1		27.8	25.7		31.4		6.9	4.4		6.4	10.7	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.3	0.2		86.4		0.4	0.3		0.0	1.7	
Delay (s)		29.1	25.8		117.8		7.3	4.7		6.5	12.4	
Level of Service		C	C		F		A	A		A	B	
Approach Delay (s)		27.2			117.8			4.8			12.4	
Approach LOS		C			F			A			B	

Intersection Summary

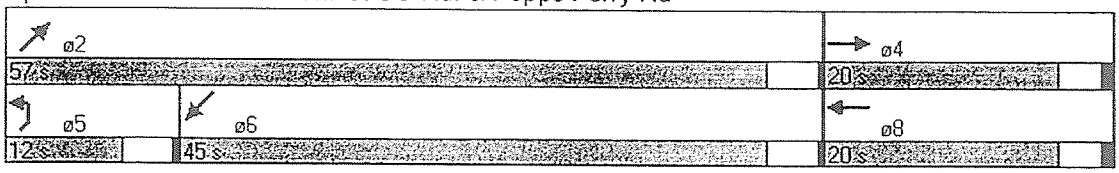
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	78.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.97			0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.96			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1694			1660		1719	3434		1719	3431	
Flt Permitted		0.82			0.92		0.13	1.00		0.28	1.00	
Satd. Flow (perm)		1440			1565		232	3434		513	3431	
Volume (vph)	30	2	9	6	2	7	1	537	4	9	829	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	47	3	14	9	3	11	2	835	6	14	1289	19
RTOR Reduction (vph)	0	10	0	0	8	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	54	0	0	15	0	2	841	0	14	1307	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.1			16.1		35.1	34.1		35.3	34.2	
Effective Green, g (s)		16.1			16.1		34.1	34.1		34.3	34.2	
Actuated g/C Ratio		0.26			0.26		0.55	0.55		0.55	0.55	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		372			404		127	1880		284	1883	
v/s Ratio Prot								0.24		c0.00	c0.38	
v/s Ratio Perm		c0.04			0.01		0.01			0.03		
v/c Ratio		0.14			0.04		0.02	0.45		0.05	0.69	
Uniform Delay, d1		17.8			17.3		6.4	8.5		8.0	10.2	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.2		0.0	0.8		0.1	1.1	
Delay (s)		18.0			17.5		6.5	9.2		8.1	11.4	
Level of Service		B			B		A	A		A	B	
Approach Delay (s)		18.0			17.5			9.2			11.3	
Approach LOS		B			B			A			B	

Intersection Summary

HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

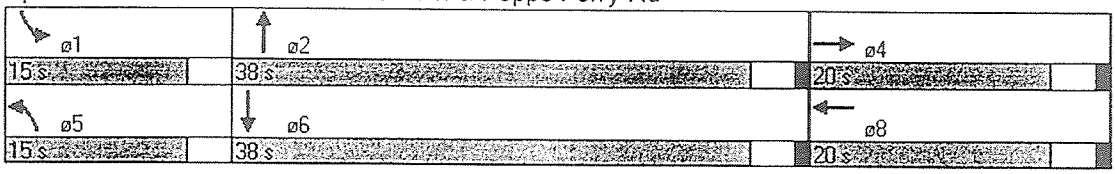
c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBTL	EBTL	NBL	SBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary

Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	60

Splits and Phases: 12: Riverview Dr. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3224	3239		1662	3323	1538	3335	1675		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3224	3239		1662	3323	1538	3335	1675		3335	1810	1538
Volume (vph)	182	689	140	64	556	99	77	33	32	278	109	411
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	289	1095	222	102	883	157	122	52	51	442	173	653
RTOR Reduction (vph)	0	14	0	0	0	70	0	30	0	0	0	82
Lane Group Flow (vph)	289	1303	0	102	883	87	122	73	0	442	173	571
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases						8						6
Actuated Green, G (s)	17.0	46.1		7.0	36.1	36.1	16.0	16.0		18.6	18.6	35.6
Effective Green, g (s)	16.0	46.1		6.0	36.1	36.1	16.0	16.0		18.6	18.6	34.6
Actuated g/C Ratio	0.16	0.45		0.06	0.35	0.35	0.16	0.16		0.18	0.18	0.34
Clearance Time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	502	1454		97	1168	541	520	261		604	328	578
v/s Ratio Prot	0.09	c0.40		0.06	0.27		0.04	0.04		c0.13	0.10	c0.15
v/s Ratio Perm						0.06						0.22
v/c Ratio	0.58	0.90		1.05	0.76	0.16	0.23	0.28		0.73	0.53	0.99
Uniform Delay, d1	40.2	26.1		48.4	29.4	22.9	38.0	38.3		39.7	38.1	33.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.6	7.6		106.0	2.8	0.1	1.1	2.6		4.6	1.5	33.9
Delay (s)	41.8	33.7		154.4	32.2	23.0	39.0	40.9		44.3	39.6	67.7
Level of Service	D	C		F	C	C	D	D		D	D	E
Approach Delay (s)		35.1			41.9			39.9			55.7	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	102.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

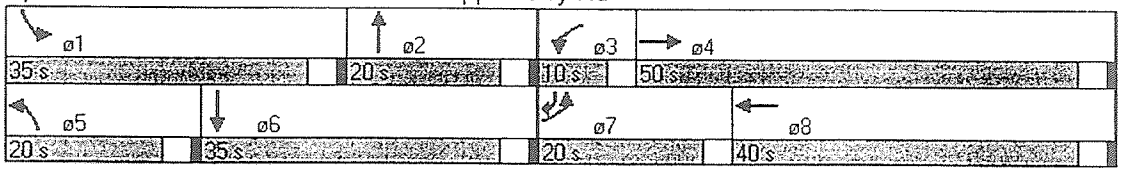
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None
Maximum Split (s)	35	20	10	50	20	35	20	40
Maximum Split (%)	30.4%	17.4%	8.7%	43.5%	17.4%	30.4%	17.4%	34.8%
Minimum Split (s)	20	15	8	20	15	20	8	20
Yellow Time (s)	3	3	3	3	3	3	3	3
All-Red Time (s)	1	1	0	1	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)	5	5		5	5	5		5
Flash Dont Walk (s)	11	11		11	11	11		11
Dual Entry	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	35	55	65	0	20	55	75
End Time (s)	35	55	65	0	20	55	75	0
Yield/Force Off (s)	31	51	62	111	16	51	72	111
Yield/Force Off 170(s)	20	40	62	100	5	40	72	100
Local Start Time (s)	80	0	20	30	80	100	20	40
Local Yield (s)	111	16	27	76	96	16	37	76
Local Yield 170(s)	100	5	27	65	85	5	37	65

Intersection Summary

Cycle Length	115
Control Type	Actuated-Uncoordinated
Natural Cycle	90

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.97			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1689			1753	1538	1719	3360		1662	3290	
Flt Permitted		0.76			0.79	1.00	0.21	1.00		0.42	1.00	
Satd. Flow (perm)		1313			1425	1538	373	3360		733	3290	
Volume (vph)	35	23	3	48	26	82	6	264	47	180	780	56
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	56	37	5	76	41	130	10	419	75	286	1239	89
RTOR Reduction (vph)	0	3	0	0	0	112	0	17	0	0	6	0
Lane Group Flow (vph)	0	95	0	0	117	18	10	477	0	286	1322	0
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		9.2			9.2	9.2	38.9	38.9		49.5	49.5	
Effective Green, g (s)		9.2			9.2	9.2	38.9	38.9		50.0	50.0	
Actuated g/C Ratio		0.14			0.14	0.14	0.58	0.58		0.74	0.74	
Clearance Time (s)		4.0			4.0	4.0	4.0	4.0		3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		180			195	211	216	1945		644	2448	
v/s Ratio Prot								0.14		0.05	c0.40	
v/s Ratio Perm		0.07			c0.08	0.01	0.03			0.28		
v/c Ratio		0.53			0.60	0.08	0.05	0.25		0.44	0.54	
Uniform Delay, d1		27.0			27.3	25.3	6.1	6.9		2.9	3.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.0			4.9	0.2	0.4	0.3		0.5	0.9	
Delay (s)		30.0			32.2	25.5	6.5	7.2		3.4	4.5	
Level of Service		C			C	C	A	A		A	A	
Approach Delay (s)		30.0			28.7			7.2			4.3	
Approach LOS		C			C			A			A	

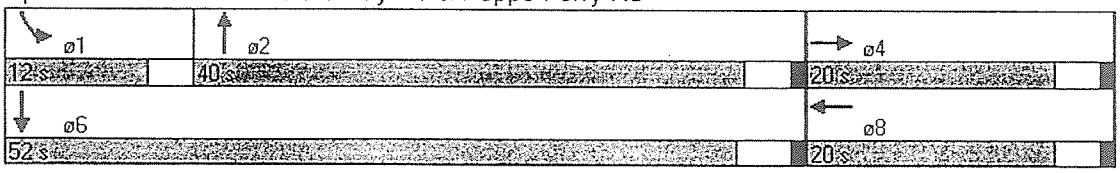
Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	20	52	20
Maximum Split (%)	16.7%	55.6%	27.8%	72.2%	27.8%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	68	47.5	68
Yield/Force Off 170(s)	9	37	57	36.5	57
Local Start Time (s)	60	0	40	60	40
Local Yield (s)	69	36	56	35.5	56
Local Yield 170(s)	69	25	45	24.5	45

Intersection Summary	
Cycle Length	72
Control Type	Actuated-Uncoordinated
Natural Cycle	55

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.97		1.00	1.00		1.00	0.98	
Flt Protected		0.96	1.00		0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1728	1538		1693		1719	3438		1719	3386	
Flt Permitted		0.72	1.00		0.65		0.17	1.00		0.13	1.00	
Satd. Flow (perm)		1301	1538		1144		315	3438		238	3386	
Volume (vph)	82	5	31	37	5	14	65	1115	0	11	700	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	123	8	47	56	8	21	98	1678	0	17	1054	119
RTOR Reduction (vph)	0	0	40	0	16	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	131	7	0	69	0	98	1678	0	17	1164	0
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		11.6	11.6		11.6		61.9	61.9		51.8	51.8	
Effective Green, g (s)		11.6	11.6		11.6		61.9	61.9		51.8	51.8	
Actuated g/C Ratio		0.14	0.14		0.14		0.76	0.76		0.64	0.64	
Clearance Time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		185	219		163		344	2611		151	2152	
v/s Ratio Prot							0.02	c0.49			0.34	
v/s Ratio Perm		c0.10	0.00		0.06		0.19			0.07		
v/c Ratio		0.71	0.03		0.42		0.28	0.64		0.11	0.54	
Uniform Delay, d1		33.3	30.1		31.9		4.4	4.6		5.8	8.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.7	0.1		1.8		0.5	1.2		1.5	1.0	
Delay (s)		45.0	30.2		33.6		4.9	5.8		7.3	9.2	
Level of Service		D	C		C		A	A		A	A	
Approach Delay (s)		41.1			33.6			5.8			9.2	
Approach LOS		D			C			A			A	

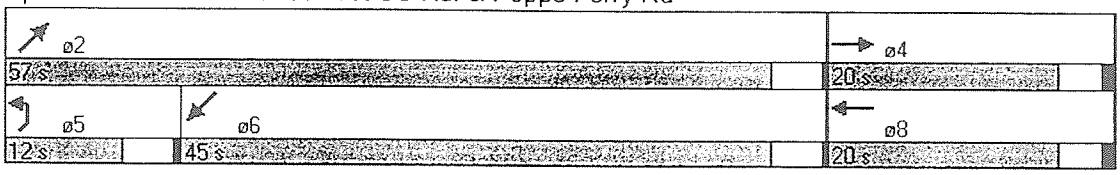
Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	2	4	5	6	8
Movement	NETL	EBTL	NEL	SWTL	WBTL
Lead/Lag			Lead	Lag	
Lead-Lag Optimize			Yes	Yes	
Recall Mode	Max	None	None	Max	None
Maximum Split (s)	57	20	12	45	20
Maximum Split (%)	74.0%	26.0%	15.6%	58.4%	26.0%
Minimum Split (s)	15	7	7	15	7
Yellow Time (s)	3.5	3	3.5	3.5	3
All-Red Time (s)	0.5	1	0.5	0.5	1
Minimum Initial (s)	4	3	3	4	3
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)	5	5		5	5
Flash Dont Walk (s)	11	11		11	11
Dual Entry	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	57	0	12	57
End Time (s)	57	0	12	57	0
Yield/Force Off (s)	53	73	8	53	73
Yield/Force Off 170(s)	42	62	8	42	62
Local Start Time (s)	65	45	65	0	45
Local Yield (s)	41	61	73	41	61
Local Yield 170(s)	30	50	73	30	50

Intersection Summary	
Cycle Length	77
Control Type	Actuated-Uncoordinated
Natural Cycle	45

Splits and Phases: 9: Sunkist CC Rd. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑↑↱			↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		0.96			0.93		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1679			1651		1719	3435		1719	3413	
Flt Permitted		0.83			0.92		0.10	1.00		0.11	1.00	
Satd. Flow (perm)		1445			1544		190	3435		204	3413	
Volume (vph)	23	1	11	11	4	17	29	1066	6	4	894	46
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	36	2	17	17	6	26	45	1657	9	6	1390	72
RTOR Reduction (vph)	0	13	0	0	20	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	42	0	0	29	0	45	1666	0	6	1457	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		16.1			16.1		41.9	38.1		36.5	35.4	
Effective Green, g (s)		16.1			16.1		40.9	38.1		35.5	35.4	
Actuated g/C Ratio		0.24			0.24		0.62	0.57		0.54	0.53	
Clearance Time (s)		4.0			4.0		3.0	4.0		3.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		351			375		182	1974		112	1822	
v/s Ratio Prot							c0.01	c0.48		0.00	0.43	
v/s Ratio Perm		c0.03			0.02		0.14			0.03		
v/c Ratio		0.12			0.08		0.25	0.84		0.05	0.80	
Uniform Delay, d1		19.6			19.4		9.0	11.6		11.0	12.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.4		0.7	4.6		0.2	2.6	
Delay (s)		19.7			19.8		9.7	16.3		11.2	15.1	
Level of Service		B			B		A	B		B	B	
Approach Delay (s)		19.7			19.8			16.1			15.1	
Approach LOS		B			B			B			B	

Intersection Summary

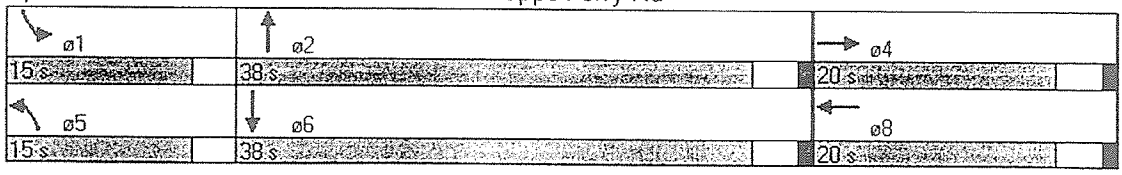
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Phase Number	1	2	4	5	6	8
Movement	SBL	NBTL	EBTL	NBL	SBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	Max	None	None	None	Max
Maximum Split (s)	15	38	20	15	38	20
Maximum Split (%)	20.5%	52.1%	27.4%	20.5%	52.1%	27.4%
Minimum Split (s)	8	20	20	8	20	20
Yellow Time (s)	3	3	3	3	3	3
All-Red Time (s)	0	1	1	0	1	1
Minimum Initial (s)	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		5	5	5	5	5
Flash Dont Walk (s)		11	11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	15	53	0	15	53
End Time (s)	15	53	0	15	53	0
Yield/Force Off (s)	12	49	69	12	49	69
Yield/Force Off 170(s)	12	38	58	1	38	58
Local Start Time (s)	58	0	38	58	0	38
Local Yield (s)	70	34	54	70	34	54
Local Yield 170(s)	70	23	43	59	23	43

Intersection Summary	
Cycle Length	73
Control Type	Actuated-Uncoordinated
Natural Cycle	65

Splits and Phases: 12: Riverview Dr. & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	0.97	1.00		0.97	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3224	3266		1662	3323	1538	3335	1719		3335	1810	1538
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3224	3266		1662	3323	1538	3335	1719		3335	1810	1538
Volume (vph)	310	833	109	31	897	124	267	162	82	239	90	382
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	467	1254	164	47	1350	187	402	244	123	360	135	575
RTOR Reduction (vph)	0	8	0	0	0	22	0	14	0	0	0	213
Lane Group Flow (vph)	467	1410	0	47	1350	165	402	353	0	360	135	362
Turn Type	Prot			Prot		pt+ov	Prot			Prot		Perm
Protected Phases	7	4		3	8	8 1	5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	21.0	65.8		6.8	51.6	73.7	21.0	18.9		18.1	16.0	16.0
Effective Green, g (s)	20.0	65.8		5.8	51.6	73.7	21.0	18.9		18.1	16.0	16.0
Actuated g/C Ratio	0.16	0.53		0.05	0.41	0.59	0.17	0.15		0.15	0.13	0.13
Clearance Time (s)	3.0	4.0		3.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	517	1725		77	1376	910	562	261		484	232	197
v/s Ratio Prot	c0.14	0.43		0.03	c0.41	0.11	c0.12	c0.21		0.11	0.07	
v/s Ratio Perm												c0.24
v/c Ratio	0.90	0.82		0.61	0.98	0.18	0.72	1.35		0.74	0.58	1.84
Uniform Delay, d1	51.4	24.4		58.3	36.0	11.6	49.0	52.8		51.0	51.1	54.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	19.0	3.1		13.5	19.8	0.1	7.6	181.1		6.1	3.7	396.7
Delay (s)	70.4	27.5		71.8	55.8	11.7	56.6	233.9		57.1	54.8	451.0
Level of Service	E	C		E	E	B	E	F		E	D	F
Approach Delay (s)		38.2			51.1			141.2			268.5	
Approach LOS		D			D			F			F	

Intersection Summary

HCM Average Control Delay	103.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	124.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	90.5%	ICU Level of Service	E
Analysis Period (min)	15		

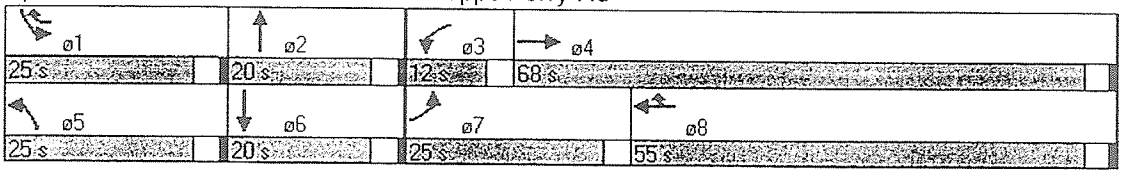
c Critical Lane Group

Phase Number	1	2	3	4	5	6	7	8
Movement	SBL	NBT	WBL	EBT	NBL	SBT	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	Max	None	None	Max	None	None	None
Maximum Split (s)	25	20	12	68	25	20	25	55
Maximum Split (%)	20.0%	16.0%	9.6%	54.4%	20.0%	16.0%	20.0%	44.0%
Minimum Split (s)	20	15	8	20	15	15	8	20
Yellow Time (s)	3	3	3	3	3	3	3	3
All-Red Time (s)	1	1	0	1	1	1	0	1
Minimum Initial (s)	4	4	4	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)	5	5		5	5	5		5
Flash Dont Walk (s)	11	11		11	11	11		11
Dual Entry	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	25	45	57	0	25	45	70
End Time (s)	25	45	57	0	25	45	70	0
Yield/Force Off (s)	21	41	54	121	21	41	67	121
Yield/Force Off 170(s)	10	30	54	110	10	30	67	110
Local Start Time (s)	100	0	20	32	100	0	20	45
Local Yield (s)	121	16	29	96	121	16	42	96
Local Yield 170(s)	110	5	29	85	110	5	42	85

Intersection Summary

Cycle Length	125
Control Type	Actuated-Uncoordinated
Natural Cycle	110

Splits and Phases: 21: Pass Rd & Popps Ferry Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	12	12	12	12	12	11	11	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frt		1.00			1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected		0.96			0.98	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1674			1768	1538	1719	3402		1662	3263	
Flt Permitted		0.51			0.78	1.00	0.34	1.00		0.10	1.00	
Satd. Flow (perm)		886			1410	1538	610	3402		175	3263	
Volume (vph)	229	38	6	77	87	455	1	707	53	117	489	67
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor (vph)	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%	143%
Adj. Flow (vph)	345	57	9	116	131	685	2	1064	80	176	736	101
RTOR Reduction (vph)	0	1	0	0	0	19	0	6	0	0	12	0
Lane Group Flow (vph)	0	410	0	0	247	666	2	1138	0	176	825	0
Turn Type	Perm			Perm		pm+ov	Perm			pm+pt		
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		31.0			31.0	40.0	36.0	36.0		47.5	47.5	
Effective Green, g (s)		31.0			31.0	39.0	36.0	36.0		48.0	48.0	
Actuated g/C Ratio		0.36			0.36	0.45	0.41	0.41		0.55	0.55	
Clearance Time (s)		4.0			4.0	3.0	4.0	4.0		3.0	4.5	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		316			502	760	252	1408		233	1800	
v/s Ratio Prot						c0.08		c0.33		0.07	0.25	
v/s Ratio Perm		c0.46			0.18	0.35	0.00			0.35		
v/c Ratio		1.30			0.49	0.88	0.01	0.81		0.76	0.46	
Uniform Delay, d1		28.0			21.9	21.8	15.0	22.5		15.8	11.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		155.7			0.8	11.1	0.1	5.1		13.0	0.8	
Delay (s)		183.7			22.6	32.9	15.1	27.5		28.8	12.5	
Level of Service		F			C	C	B	C		C	B	
Approach Delay (s)		183.7			30.2			27.5			15.4	
Approach LOS		F			C			C			B	

Intersection Summary			
HCM Average Control Delay	43.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.2%	ICU Level of Service	G
Analysis Period (min)	15		

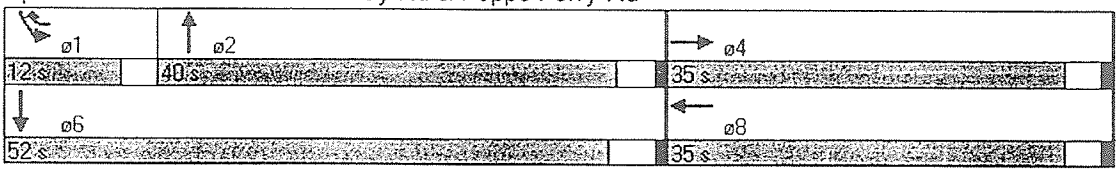
c Critical Lane Group

Phase Number	1	2	4	6	8
Movement	SBL	NBTL	EBTL	SBTL	WBTL
Lead/Lag	Lead	Lag			
Lead-Lag Optimize	Yes	Yes			
Recall Mode	None	Max	None	Max	None
Maximum Split (s)	12	40	35	52	35
Maximum Split (%)	13.8%	46.0%	40.2%	59.8%	40.2%
Minimum Split (s)	8	20	20	20.5	20
Yellow Time (s)	3	3	3	3.5	3
All-Red Time (s)	0	1	1	1	1
Minimum Initial (s)	4	4	4	4	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)		5	5	5	5
Flash Dont Walk (s)		11	11	11	11
Dual Entry	No	Yes	Yes	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	0	12	52	0	52
End Time (s)	12	52	0	52	0
Yield/Force Off (s)	9	48	83	47.5	83
Yield/Force Off 170(s)	9	37	72	36.5	72
Local Start Time (s)	75	0	40	75	40
Local Yield (s)	84	36	71	35.5	71
Local Yield 170(s)	84	25	60	24.5	60

Intersection Summary

Cycle Length		87
Control Type	Actuated-Uncoordinated	
Natural Cycle		65

Splits and Phases: 23: Old Bay Rd & Popps Ferry Rd



Appendix 2

TRAFFIC NOISE INVESTIGATION

TRAFFIC NOISE INVESTIGATION
POPPS FERRY ROAD

PREPARED FOR:

CITY OF BILOXI
BILOXI MISSISSIPPI

PREPARED BY:

PICKERING FIRM, INC
460 BRIARWOOD DRIVE
SUITE 515
JACKSON, MISSISSIPPI 39206

SEPTEMBER 2008
PECI PROJECT NO.: 22231.00

TABLE OF CONTENTS

SECTION	PAGE
PROJECT DESCRIPTION	1
DESCRIPTION OF NOISE DATA	2
METHODOLOGY	3
SUMMARY OF FINDINGS	5
CONCLUSIONS	6
TRAFFIC NOISE ABATEMENT	6
CONSTRUCTION NOISE ABATEMENT	7

APPENDICES	
NOISE DATA COLLECTION LOCATIONS	APPENDIX A
EXTERIOR NOISE LEVEL MEASUREMENTS	APPENDIX B
23 CFR 772	APPENDIX C
SAMPLE LOCATION DIAGRAM	APPENDIX D

LIST OF FIGURES	PAGE
FIGURE 1 – COMMON NOISE LEVELS	3
FIGURE 2 – NOISE ABATEMENT CRITERIA TABLE	4

PROJECT DESCRIPTION

This noise study was conducted in association with a project designed to upgrade and widen a section of Popps Ferry Road between Pass Road and Riverview Drive. Included in this segment of roadway is the causeway and bascule bridge over the Back Bay of Biloxi. This section of road is approximately 2.4 miles in length, of which approximately ¾ miles is the causeway bridge. The entire project is situated within the City of Biloxi, in Harrison County, Mississippi. Currently, the section of Popps Ferry Road is classified as a two-lane urban arterial with curb and gutter. When completed, the project is proposed to be a 5-lane boulevard section with a vegetated median. The majority of the proposed project corridor is densely populated with residential dwellings, with the exception of the Popps Ferry Causeway.

With the causeway and bridge structure located in the middle of the project, the build alternatives have been developed with three alternatives on both the north and south segments of the road. However, because the build alternatives differ by only a few feet, the noise model was run only once.

The purpose of this investigation was to determine the current noise environment and predict future noise impacts as a result of the construction of the above-described roadway. Specifically this project will:

- Identify potential noise receptors along the route of the project
- Determine existing noise levels
- Predict the traffic noise impact associated with the construction of the project
- Identify any feasible noise abatement measures, if necessary

This traffic noise investigation is designed to conform and comply with current regulations established in Title 23 of the United States Code of Federal Regulations, Part 772 (23 CFR 772).

DESCRIPTION OF NOISE DATA

The unit of measure used to describe the sound pressure or intensity (loudness) of sound is called a decibel (dB), while the pitch of a particular sound is determined by its frequency or how rapidly the source object vibrates back and forth. The average human ear can detect a sound pressure of approximately 8dB and sound waves with a frequency range of 20 to 15,000 cycles per second. Additionally, it has been determined that with each 10dBA increase in sound level, humans perceive that increase as a doubling of loudness. For example, a sound level of 50 dBA (quiet urban daytime) is twice as loud as a sound level of 40 dBA (quiet urban nighttime), while a sound level of 60 dBA (commercial area) is twice as loud as the 50 dBA quiet urban daytime and four times louder than the quiet urban night.

Because of the diversity among the human species, each person would detect or hear the same sound at a subjectively different level of loudness. To compensate for this subjectivity, an adjustment or weighting to detectable sounds is made to approximate how the average person would hear that sound. This compensation is called A-weighting and A-weighted decibel measurements are indicated by dBA. Figure 1, found on the following page, is an illustration of some common indoor and outdoor noise levels shown in dBA.

Sounds associated with the use of roadways and highways are usually considered a nuisance or noise. Because the noise level associated with a particular road is never constant, a statistical descriptor is used to describe the varying noise levels. For purposes of this report, the descriptor is a continuous equivalent sound level (Leq), which provides a steady, A-weighted noise level over a stated period of time.

Impacts as a result of traffic noise are defined in 23 CFR 772 and occur when predicted traffic noise levels approach or exceed the Noise Abatement Criteria (NAC) for a specific Activity Category or when noise levels are predicted to substantially increase. The definition of "approach" as used above is determined to be 1 dBA less than the established NAC found in

Figure 2. Also, a "substantial increase" is defined as traffic noise level increase of 15 dBA or more. These guidelines will provide the basis for any conclusions made in this report.

Figure 1
Common Indoor and Outdoor Noise Levels[1]

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
Jet Flyover at 1,000 ft.	110	Rock Band
Gas Lawnmower at 3 ft.	100	
Diesel Truck at 50 ft.	90	Inside Subway Train (New York)
Noisy Urban Daytime	80	Food Blender at 3 ft. Garbage Disposal at 3 ft. Shouting at 3 ft.
Gas Lawn Mower at 100 ft.	70	Vacuum Cleaner at 10 ft. Normal Speech at 3 ft.
Commercial Area Heavy Traffic at 300 ft.	60	Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Small Theater, Large Conference Room (Background) Library
Quiet Suburban Nighttime	30	Bedroom at Night Concert Hall (Background)
Quiet Rural Nighttime	20	Broadcast and Recording Studio
	10	Threshold of Hearing
	0	

[1] *Fundamentals and Abatement of Highway Traffic Noise*, Bolt Beranek and Newman, Inc., June 1973.

METHODOLOGY

The process by which this noise survey was conducted consisted of a four-step approach. The first step included the identification of the proposed alignments and all potential noise receptors located within the project corridor using aerial photography, topographic quadrangles, and street maps. These existing conditions and noise receptors were then field verified and classified according to their functional use and by "Activity Category" as established by the FHWA Noise Abatement Criteria chart shown in Figure 2.

Figure 2
Noise Abatement Criteria (NAC)
Hourly A-Weighted Sound Level in Decibels (dBA)*

Activity Category	$L_{eq}(h)$	$L_{10}(h)$	Description of Activity Category
A	57 (Exterior)	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	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

* Either $L_{eq}(h)$ or $L_{10}(h)$ (but not both) may be used on a project.

Once the various receptors were clearly identified and grouped, existing noise level measurements were collected from strategically selected sites and a current traffic count was observed. A topographic map indicating the data collection locations is attached to this report as Appendix A. Also, passing vehicles were grouped into categories, including automobiles, medium and heavy trucks. The sound level measurements were collected using a Casella sound level meter, model number CEL-490.C1. This instrument was calibrated by the supplier and was field calibrated before and after each use using a Casella CEL-284/2 field calibration unit.

Finally, data obtained during field reconnaissance was applied to and manipulated using the FHWA Transportation Noise Model (TNM), version 2.5. This program is designed to aid in the design of roadways by determining existing noise levels and predicting future traffic noise impacts. This program calculates these predicted noise levels by taking into account many variables such as traffic volume, traffic speed, roadway surface, area topography, physical barriers, tree lines, and ground cover. The TNM is also a valuable tool for developing roadside noise barriers and noise abatement measures, if needed.

Additional data was provided by the Mississippi Department of Transportation (MDOT) that indicates an Average Daily Traffic (ADT) count of 20,000 vehicles per day. Based on this figure, the average daily traffic was estimated at 20,000 vehicles per day in the design year of 2030.

SUMMARY OF FINDINGS

During the field investigation portion of the noise study, a total of 399 potential receptors or groups of receptors were identified along the 2.4 mile corridor. All noise receptors within 400' of centerline of the existing roadway were evaluated. These include 11 residences or residential clusters, 1 library, and 1 church, and 5 commercial facilities. As described earlier, the greater portion of the alignment is through heavily residential areas.

Noise data was collected from 10 locations within the project corridor during peak morning and afternoon traffic volumes. Noise levels were monitored at 10 minute intervals on July 16 and July 17, 2008. Weather conditions were favorable with temperatures ranging from 78-88 degrees Fahrenheit. Traffic counts were also collected during the data collection period and classified by vehicle type (automobiles, medium trucks, heavy trucks, and others). The results of these measurements are listed in Appendix B of this report.

Upon review of the data, it appears that no noise receptors currently approach or exceed the designated NAC, however should the no build alternative be selected, 22 receptors are projected to approach the NAC and 2 are projected to exceed the NAC. Of the receptors projected to approach the NAC, they are primarily situated along Popps Ferry Road and/or are in close proximity to Pass Road, near the southern terminus of the project. The intersection of Popps Ferry Road and Pass Road is heavily traveled and noise levels in this area are relatively high. The 2 receptors that are projected to exceed the NAC are located on Whitney Drive, yet they are still adjacent to and in close proximity to Popps Ferry Road.

Regarding the Build alternatives B, C, and D; 20 receptors are projected to approach the NAC, while only 1 is projected to meet or exceed this threshold level. Similar to the no build alternative, most of these sites are located on or immediately adjacent to Popps Ferry Road.

CONCLUSIONS

Noise levels were collected and predicted along each proposed alternative. Currently none of the noise receptors approach or exceed the noise level criteria. In general, it appears that no single alternative will be significantly more or less impacted with respect to noise level increases.

Regarding the build alternatives, it appears that a slight noise increase will initially be caused by construction activities and eventually by volumetric increases in traffic flow along each of the build alternatives evaluated. However, even though it appears that several receptors will meet or exceed NAC levels will be approached or exceeded regardless of which alternative is selected, the construction of noise barriers as a method of noise abatement does not appear to be a feasible solution.

TRAFFIC NOISE ABATEMENT

The primary and most effective method of noise abatement is the construction of noise barriers. These barriers are usually constructed of concrete or metal, but can also consist of wood, earthen berms or vegetation. While not always feasible, the most practical and effective use of noise barriers is typically along high-speed, limited access facilities, such as interstate highways.

It is the general policy for the Federal Highway Administration to not participate in noise abatement measures for those activities that come into existence after May of 1976. However they may participate in noise abatement measures to protect activities and land use, provided that local authorities have taken measures to exercise land use control over the remaining undeveloped land adjacent to highways. Based on the findings of this investigation, it does not appear that traffic noise abatement measures will be required for this project.

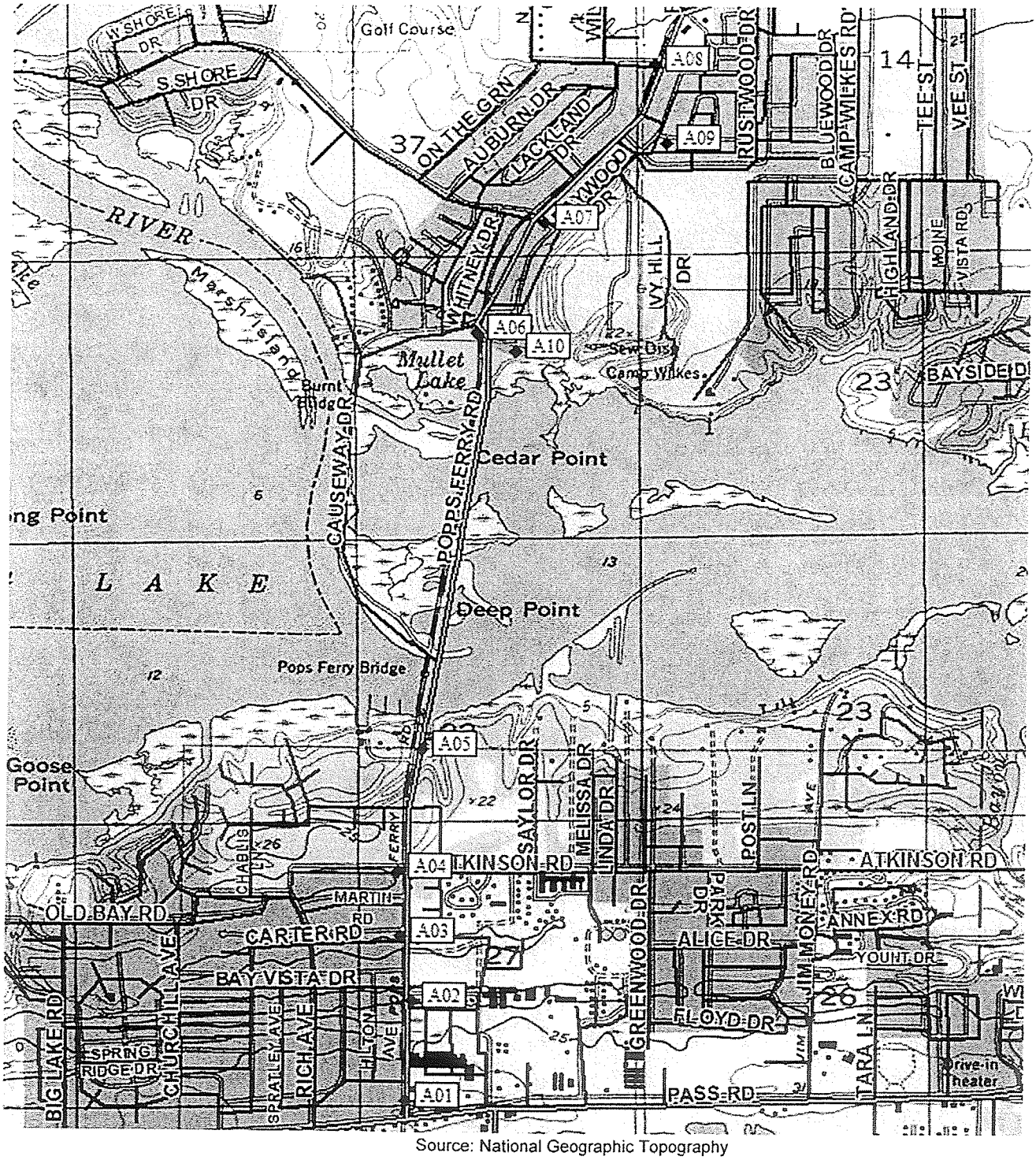
Other noise abatement measures were also considered, including Transportation System Management (TSM), a vegetation barrier, earthen berms, and the development of a restrictive buffer zone. While these alternatives was considered, each was determined to be unfeasible and eliminated from consideration.

CONSTRUCTION NOISE ABATEMENT

Although no noise abatement barriers or other noise abatement measures are required or recommended for this project, noise should be minimized during the construction of the road. The following construction noise controls and abatement measures should be incorporated into the project plans and specifications too minimize adverse construction noise in the project area.

- Each internal combustion engine shall be equipped with the muffler recommended by the equipment manufacturer.
- The contractor shall comply with all other state and local regulations, which are related to noise control and apply to projects of this type.

APPENDIX A
NOISE DATA COLLECTION LOCATIONS



Source: National Geographic Topography

Pickering Environmental Consultants, Inc.

APPENDIX B
EXTERIOR NOISE LEVEL MEASUREMENTS

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		Build Alternatives - North	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
1	Lib.	B	67	Popps Ferry Road	145	59	61	No	63	No
2	Res	B	67	Popps Ferry Road	56	61	62	No	62	No
3	Res	B	67	Popps Ferry Road	56	61	63	No	63	No
4	Res	B	67	Popps Ferry Road	56	61	63	No	63	No
5	Res	B	67	Popps Ferry Road	60	61	63	No	64	No
6	Res	B	67	Popps Ferry Road	60	61	63	No	64	No
7	Res	B	67	Popps Ferry Road	56	63	66	Approach	66	Approach
8	Res	B	67	Baytree Drive	67	64	66	Approach	66	Approach
9	Res	B	67	Popps Ferry Road	55	63	66	Approach	66	Approach
10	Res	B	67	Popps Ferry Road	63	60	62	No	63	No
11	Res	B	67	Popps Ferry Road	69	60	65	No	65	No
12	Res	B	67	Popps Ferry Road	63	60	64	No	65	No
13	Res	B	67	Popps Ferry Road	61	60	62	No	64	No
14	Res	B	67	Popps Ferry Road	59	60	64	No	64	No
15	Res	B	67	Popps Ferry Road	58	60	62	No	62	No
16	Res	B	67	Popps Ferry Road	62	60	64	No	65	No
17	Res	B	67	Popps Ferry Road	67	61	63	No	65	No
18	Res	B	67	Popps Ferry Road	61	62	62	No	64	No
19	Res	B	67	Popps Ferry Road	65	62	63	No	64	No
20	Res	B	67	Popps Ferry Road	68	62	63	No	64	No
21	Res	B	67	Popps Ferry Road	72	62	64	No	65	No
22	Res	B	67	Popps Ferry Road	72	62	64	No	65	No
23	Res	B	67	Popps Ferry Road	66	62	64	No	63	No
24	Res	B	67	Popps Ferry Road	63	62	63	No	65	No
25	Res	B	67	Sunkist C. C. Road	62	63	64	No	65	No
26	Res	B	67	Popps Ferry Road	83	61	64	No	65	No
27	Res	B	67	Popps Ferry Road	74	62	63	No	64	No
28	Res	B	67	Popps Ferry Road	58	62	64	No	65	No
29	Res	B	67	Popps Ferry Road	61	63	64	No	65	No
30	Res	B	67	Popps Ferry Road	69	63	65	No	65	No
31	Res	B	67	Popps Ferry Road	79	63	64	No	65	No
32	Res	B	67	Popps Ferry Road	75	62	64	No	65	No
33	Res	B	67	Popps Ferry Road	70	63	64	No	65	No
34	Res	B	67	Popps Ferry Road	65	62	63	No	64	No
35	Res	B	67	Popps Ferry Road	75	61	62	No	63	No
36	Res	B	67	Popps Ferry Road	59	62	66	Approach	66	Approach
37	Res	B	67	Sabrina Drive	51	63	64	No	64	No
38	Res	B	67	Sabrina Drive	136	63	64	No	63	No
39	Res	B	67	Baywood Drive	126	62	64	No	64	No
40	Res	B	67	Baywood Drive	101	62	63	No	64	No

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-North	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
41	Res	B	67	Popps Ferry Road	104	62	64	No	64	No
42	Res	B	67	North C. C. Lane	61	60	62	No	63	No
43	Res	B	67	Popps Ferry Road	68	61	62	No	63	No
44	Res	B	67	Popps Ferry Road	71	61	63	No	63	No
45	Res	B	67	Popps Ferry Road	71	60	63	No	64	No
46	Res	B	67	Popps Ferry Road	72	61	63	No	63	No
47	Res	B	67	Popps Ferry Road	74	60	63	No	63	No
48	Res	B	67	Popps Ferry Road	78	60	63	No	63	No
49	Res	B	67	Popps Ferry Road	71	60	63	No	63	No
50	Res	B	67	Popps Ferry Road	72	60	62	No	63	No
51	Res	B	67	Popps Ferry Road	70	61	63	No	64	No
52	Res	B	67	Popps Ferry Road	76	61	63	No	64	No
53	Res	B	67	Popps Ferry Road	74	60	63	No	63	No
54	Res	B	67	Popps Ferry Road	70	60	63	No	62	No
55	Res	B	67	Popps Ferry Road	73	62	64	No	64	No
56	Res	B	67	Popps Ferry Road	70	62	63	No	63	No
57	Res	B	67	Popps Ferry Road	74	62	64	No	63	No
58	Res	B	67	Popps Ferry Road	71	61	64	No	64	No
59	Res	B	67	Popps Ferry Road	72	62	64	No	64	No
60	Res	B	67	Popps Ferry Road	66	61	64	No	64	No
61	Res	B	67	Sunkist C. C. Road	62	62	65	No	64	No
62	Res	B	67	Sunkist C. C. Road	62	63	64	No	64	No
63	Res	B	67	Sunkist C. C. Road	97	63	65	No	64	No
64	Res	B	67	Sunkist C. C. Road	175	61	63	No	63	No
65	Res	B	67	Sunkist C. C. Road	259	60	61	No	61	No
66	Res	B	67	Sunkist C. C. Road	367	58	60	No	60	No
67	Res	B	67	Sunkist C. C. Road	455	60	62	No	62	No
68	Res	B	67	Whitney Drive	256	57	58	No	58	No
69	Res	B	67	Whitney Drive	205	58	60	No	59	No
70	Res	B	67	Whitney Drive	170	59	61	No	60	No
71	Res	B	67	Whitney Drive	122	60	63	No	63	No
72	Res	B	67	Whitney Drive	94	64	63	No	62	No
73	Res	B	67	Whitney Drive	79	63	63	No	62	No
74	Res	B	67	Whitney Drive	72	63	67	Yes	67	Yes
75	Res	B	67	Whitney Drive	79	64	67	Yes	66	Approach
76	Res	B	67	Whitney Drive	93	64	66	Approach	66	Approach
77	Res	B	67	Whitney Drive	109	61	63	No	63	No
78	Res	B	67	Whitney Drive	131	61	62	No	63	No
79	Res	B	67	Whitney Drive	156	61	62	No	62	No
80	Res	B	67	Miles Court	183	60	62	No	63	No
81	Res	B	67	Miles Court	106	62	64	No	65	No
82	Res	B	67	Miles Court	65	63	66	Approach	66	Approach
83	Res	B	67	Miles Court	67	64	66	Approach	66	Approach
84	Res	B	67	Miles Court	74	64	66	Approach	66	Approach
85	Res	B	67	Miles Court	141	61	63	No	63	No
86	Res	B	67	Miles Court	225	58	59	No	60	No
87	Res	B	67	Whitney Drive	249	58	59	No	59	No
88	Res	B	67	Whitney Drive	280	57	58	No	58	No
89	Res	B	67	Whitney Drive	330	58	60	No	59	No
90	Res	B	67	Whitney Drive	330	57	58	No	58	No
91	Res	B	67	Whitney Drive	335	57	58	No	58	No
92	Res	B	67	Whitney Drive	308	59	60	No	59	No
93	Res	B	67	Whitney Drive	303	58	60	No	59	No
94	Res	B	67	Waldon Court	251	59	61	No	60	No
95	Res	B	67	Waldon Court	190	59	61	No	61	No
96	Res	B	67	Waldon Court	119	60	62	No	62	No
97	Res	B	67	Waldon Court	87	62	65	No	64	No
98	Res	B	67	Waldon Court	76	62	65	No	65	No
99	Res	B	67	Waldon Court	128	61	63	No	62	No
100	Res	B	67	Waldon Court	198	60	61	No	61	No

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-North	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
101	Res	B	67	Waldon Court	255	59	61	No	61	No
102	Res	B	67	Waldon Court	295	59	61	No	60	No
103	Res	B	67	Causeway Drive	270	60	62	No	61	No
104	Res	B	67	Causeway Drive	221	59	61	No	61	No
105	Res	B	67	Causeway Drive	175	60	62	No	62	No
106	Res	B	67	Causeway Drive	121	61	63	No	63	No
107	Res	B	67	Causeway Drive	410	55	58	No	57	No
108	Res	B	67	North C. C. Lane	172	58	58	No	58	No
109	Res	B	67	North C. C. Lane	270	57	58	No	58	No
110	Res	B	67	Lackland Drive	367	56	57	No	58	No
111	Res	B	67	Lackland Drive	302	57	59	No	59	No
112	Res	B	67	Lackland Drive	287	57	59	No	59	No
113	Res	B	67	Lackland Drive	269	58	59	No	58	No
114	Res	B	67	Lackland Drive	212	57	58	No	58	No
115	Res	B	67	Lackland Drive	217	57	59	No	58	No
116	Res	B	67	Lackland Drive	205	59	60	No	60	No
117	Res	B	67	Lackland Drive	192	58	59	No	59	No
118	Res	B	67	Lackland Drive	186	58	59	No	59	No
119	Res	B	67	Lackland Drive	181	58	60	No	59	No
120	Res	B	67	Lackland Drive	218	58	60	No	59	No
121	Res	B	67	Lackland Drive	193	60	61	No	61	No
122	Res	B	67	Lackland Drive	202	59	61	No	61	No
123	Res	B	67	Ashwood Place	202	59	61	No	60	No
124	Res	B	67	Lackland Drive	184	60	62	No	61	No
125	Res	B	67	Lackland Drive	205	59	61	No	61	No
126	Res	B	67	Lackland Drive	204	60	62	No	62	No
127	Res	B	67	Lackland Drive	187	61	63	No	63	No
128	Res	B	67	Lackland Drive	206	55	58	No	57	No
129	Res	B	67	Lackland Drive	210	58	58	No	58	No
130	Res	B	67	Lackland Drive	264	57	58	No	58	No
131	Res	B	67	Lackland Drive	333	56	57	No	58	No
132	Res	B	67	Lackland Drive	416	57	59	No	59	No
133	Res	B	67	Lackland Drive	371	56	57	No	59	No
134	Res	B	67	Lackland Drive	353	56	57	No	58	No
135	Res	B	67	Lackland Drive	353	56	57	No	58	No
136	Res	B	67	Lackland Drive	359	57	58	No	58	No
137	Res	B	67	Lackland Drive	360	56	57	No	57	No
138	Res	B	67	Lackland Drive	352	57	58	No	58	No
139	Res	B	67	Lackland Drive	357	57	58	No	58	No
140	Res	B	67	Lackland Drive	352	56	57	No	57	No
141	Res	B	67	Lackland Drive	347	56	57	No	57	No
142	Res	B	67	Lackland Drive	349	57	58	No	58	No
143	Res	B	67	Lackland Drive	351	56	57	No	58	No
144	Res	B	67	Lackland Drive	356	56	58	No	59	No
145	Res	B	67	Lackland Drive	350	58	59	No	60	No
146	Res	B	67	Lackland Drive	396	57	59	No	60	No
147	Res	B	67	Auburn Drive	375	58	59	No	59	No
148	Res	B	67	Cambridge Drive	485	55	56	No	56	No
149	Res	B	67	Cambridge Drive	429	56	57	No	56	No
150	Res	B	67	Whitney Drive	415	56	57	No	57	No

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-North	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
151	Res	B	67	Whitney Drive	535	55	57	No	57	No
152	Res	B	67	Whitney Drive	348	56	58	No	57	No
153	Res	B	67	Whitney Drive	282	57	59	No	59	No
154	Res	B	67	Whitney Drive	280	56	57	No	57	No
155	Res	B	67	Whitney Drive	243	56	58	No	58	No
156	Res	B	67	Whitney Drive	261	57	58	No	58	No
157	Res	B	67	Whitney Drive	271	57	58	No	58	No
158	Res	B	67	Whitney Drive	294	56	57	No	57	No
159	Res	B	67	Whitney Drive	308	56	57	No	58	No
160	Res	B	67	Whitney Drive	341	57	58	No	59	No
161	Res	B	67	Whitney Drive	358	57	57	No	57	No
162	Res	B	67	Whitney Drive	394	57	6	No	57	No
163	Res	B	67	Whitney Drive	425	55	56	No	56	No
164	Res	B	67	Cambridge Drive	475	55	56	No	56	No
165	Res	B	67	Cambridge Drive	419	57	57	No	57	No
166	Res	B	67	Cambridge Drive	411	56	58	No	58	No
167	Res	B	67	Baywood Drive	407	56	58	No	57	No
168	Res	B	67	Whitney Drive	346	56	58	No	58	No
169	Res	B	67	Whitney Drive	279	57	59	No	58	No
170	Res	B	67	Whitney Drive	197	59	60	No	60	No
171	Res	B	67	Whitney Drive	177	58	60	No	59	No
172	Res	B	67	Baywood Drive	186	59	60	No	60	No
173	Res	B	67	Baywood Drive	185	59	60	No	60	No
174	Res	B	67	Baywood Drive	202	57	59	No	59	No
175	Res	B	67	Baywood Drive	202	57	59	No	58	No
176	Res	B	67	Baywood Drive	193	58	60	No	60	No
177	Res	B	67	Baytree Drive	198	58	60	No	59	No
178	Res	B	67	Baywood Drive	211	58	60	No	60	No
179	Res	B	67	Baywood Drive	206	58	60	No	60	No
180	Res	B	67	Baywood Drive	188	57	59	No	59	No
181	Res	B	67	Baywood Drive	188	58	60	No	60	No
182	Res	B	67	Baywood Drive	196	59	60	No	59	No
183	Res	B	67	Rustwood Drive	141	59	60	No	60	No
184	Res	B	67	Rustwood Drive	140	59	60	No	60	No
185	Res	B	67	Baywood Drive	186	58	59	No	60	No
186	Res	B	67	Baywood Drive	168	59	60	No	60	No
187	Res	B	67	Baywood Drive	181	58	60	No	60	No
188	Res	B	67	Rustwood Drive	172	58	59	No	59	No
189	Res	B	67	Baywood Drive	170	58	60	No	60	No
190	Res	B	67	Baywood Drive	180	57	59	No	59	No
191	Res	B	67	Baywood Drive	194	57	59	No	59	No
192	Res	B	67	Baywood Drive	182	58	59	No	59	No
193	Res	B	67	Baywood Drive	168	58	59	No	58	No
194	Res	B	67	Baywood Drive	169	58	59	No	59	No
195	Res	B	67	Baywood Drive	192	58	59	No	59	No
196	Res	B	67	Baywood Drive	197	59	59	No	59	No
197	Res	B	67	Sunkist C. C. Road	207	57	59	No	58	No
198	Res	B	67	Baywood Drive	185	57	58	No	58	No
199	Res	B	67	Baywood Drive	201	57	58	No	57	No
200	Res	B	67	Baywood Drive	285	56	58	No	58	No

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-North	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
201	Res	B	67	Baywood Drive	233	55	57	No	56	No
202	Res	B	67	Baywood Drive	246	56	58	No	58	No
203	Res	B	67	Baywood Drive	246	56	57	No	57	No
204	Res	B	67	Baywood Drive	244	56	58	No	57	No
205	Res	B	67	Baywood Drive	258	57	58	No	58	No
206	Res	B	67	Sabrina Drive	219	56	57	No	57	No
207	Res	B	67	Baywood Drive	230	56	58	No	57	No
208	Res	B	67	Baywood Drive	225	56	57	No	57	No
209	Res	B	67	Baywood Drive	259	57	58	No	58	No
210	Res	B	67	Baywood Drive	226	57	58	No	58	No
211	Res	B	67	Baywood Drive	330	56	58	No	57	No
212	Res	B	67	Baywood Drive	356	55	56	No	56	No
213	Res	B	67	Baywood Drive	356	55	56	No	56	No
214	Res	B	67	Baywood Drive	358	55	56	No	56	No
215	Res	B	67	Baywood Drive	362	55	56	No	56	No
216	Res	B	67	Baywood Drive	377	55	57	No	56	No
217	Res	B	67	Baywood Drive	345	56	57	No	57	No
218	Res	B	67	Baywood Drive	385	57	58	No	58	No
219	Res	B	67	Baywood Drive	390	55	57	No	56	No
220	Res	B	67	Baywood Drive	340	56	57	No	57	No
221	Res	B	67	Rustwood Drive	323	56	57	No	57	No
222	Res	B	67	Rustwood Drive	318	57	58	No	58	No
223	Res	B	67	Baywood Drive	324	57	58	No	57	No
224	Res	B	67	Ivy Hill Drive	322	58	58	No	58	No
225	Res	B	67	Baywood Drive	326	57	58	No	58	No
226	Res	B	67	Baywood Drive	326	57	58	No	58	No
227	Res	B	67	Rustwood Drive	331	57	58	No	58	No
228	Res	B	67	Rustwood Drive	330	56	58	No	58	No
229	Res	B	67	Baywood Drive	330	56	58	No	58	No
230	Res	B	67	Baywood Drive	331	57	58	No	57	No
231	Res	B	67	Baywood Drive	335	57	57	No	57	No
232	Res	B	67	Baywood Drive	338	56	56	No	56	No
233	Res	B	67	Baywood Drive	353	56	56	No	56	No
234	Res	B	67	Baywood Drive	346	56	57	No	57	No
235	Res	B	67	Baywood Drive	361	56	57	No	57	No
236	Res	B	67	Baywood Drive	358	55	57	No	57	No
237	Res	B	67	Baywood Drive	382	55	56	No	56	No
238	Res	B	67	Baywood Drive	408	55	57	No	56	No
239	Res	B	67	Baywood Drive	417	56	57	No	57	No
240	Res	B	67	Baywood Drive	417	56	58	No	58	No
241	Res	B	67	Baywood Drive	418	55	58	No	59	No
242	Res	B	67	Baywood Drive	395	57	59	No	59	No
243	Res	B	67	Baywood Drive	407	56	60	No	59	No
244	Res	B	67	Baywood Drive	394	56	59	No	59	No
245	Res	B	67	Baywood Drive	403	55	59	No	59	No

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-South	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
246	Res	B	67	Anatole Bay Condo	110	60	61	No	64	No
247	Res	B	67	Anatole Bay Condo	335	57	58	No	62	No
248	Res	B	67	Anatole Bay Condo	260	58	58	No	62	No
249	Res	B	67	Anatole Bay Condo	106	59	61	No	63	No
250	Res	B	67	Anatole Bay Condo	106	59	60	No	62	No
251	Res	B	67	Anatole Bay Condo	257	55	57	No	59	No
252	Res	B	67	Anatole Bay Condo	366	56	59	No	61	No
253	Res	B	67	Anatole Bay Condo	406	56	58	No	63	No
254	Res	B	67	Sanlenay Court	359	57	57	No	59	No
255	Res	B	67	Sanlenay Court	280	59	60	No	61	No
256	Res	B	67	Sanlenay Court	398	58	59	No	60	No
257	Res	B	67	Bonne Terre Blvd	318	59	61	No	61	No
258	Res	B	67	Bonne Terre Blvd	231	58	62	No	63	No
259	Res	B	67	Bonne Terre Blvd	158	59	60	No	62	No
260	Res	B	67	Bonne Terre Blvd	86	61	63	No	65	No
261	Res	B	67	Barneaux Place	82	63	64	No	65	No
262	Res	B	67	Barneaux Place	84	62	64	No	65	No
263	Res	B	67	Barneaux Place	57	64	66	Approach	66	Approach
264	Res	B	67	Barneaux Place	55	63	66	Approach	66	Approach
265	Res	B	67	Barneaux Place	178	62	63	No	64	No
266	Res	B	67	Barneaux Place	258	61	62	No	63	No
267	Res	B	67	Barneaux Place	271	59	59	No	60	No
268	Res	B	67	Barneaux Place	249	58	59	No	60	No
269	Res	B	67	Bonne Terre Blvd	253	59	61	No	63	No
274	Res	B	67	Old Bay Road	119	61	63	No	64	No
275	Res	B	67	Old Bay Road	206	59	62	No	63	No
276	Res	B	67	Old Bay Road	289	56	59	No	60	No
277	Res	B	67	Old Bay Road	410	56	57	No	61	No
278	Res	B	67	Old Bay Road	411	57	58	No	60	No
279	Res	B	67	Old Bay Road	306	58	60	No	62	No
280	Res	B	67	Old Bay Road	208	60	61	No	61	No
281	Res	B	67	Popps Ferry	93	60	63	No	64	No
282	Res	B	67	Martin Road	90	60	63	No	63	No
283	Res	B	67	Martin Road	205	58	60	No	61	No
284	Res	B	67	Martin Road	309	58	59	No	60	No
285	Res	B	67	Martin Road	408	56	58	No	59	No
286	Res	B	67	Martin Road	91	61	62	No	64	No
287	Res	B	67	Martin Road	212	59	61	No	64	No
288	Res	B	67	Martin Road	306	57	59	No	60	No
289	Res	B	67	Martin Road	410	56	58	No	59	No
290	Res	B	67	Carter Road	75	61	63	No	64	No
291	Res	B	67	Carter Road	190	58	60	No	61	No
292	Res	B	67	Carter Road	292	57	60	No	61	No
293	Res	B	67	Carter Road	389	56	59	No	59	No
294	Res	B	67	Carter Road	387	56	63	No	61	No
295	Res	B	67	Carter Road	283	56	62	No	63	No
296	Res	B	67	Carter Road	170	59	62	No	62	No
297	Res	B	67	Popps Ferry	79	61	63	No	63	No
298	Res	B	67	Bay Vista Drive	372	56	59	No	58	No
299	Res	B	67	Bay Vista Drive	260	56	61	No	62	No
300	Res	B	67	Bay Vista Drive	171	58	63	No	61	No

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-South	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
301	Res	B	67	Bay Vista Drive	70	60	64	No	61	No
302	Res	B	67	Bay Vista Drive	61	60	62	No	62	No
303	Res	B	67	Bay Vista Drive	157	58	61	No	65	No
306	Res	B	67	Popps Ferry	100	61	63	No	64	No
307	Res	B	67	Popps Ferry	97	62	64	No	63	No
308	Res	B	67	Popps Ferry	94	62	64	No	64	No
309	Res	B	67	Popps Ferry	98	61	64	No	63	No
310	Res	B	67	Popps Ferry	88	63	63	No	66	No
311	Res	B	67	Popps Ferry	88	64	62	No	63	No
312	Res	B	67	Popps Ferry	90	60	64	No	64	No
313	Res	B	67	Popps Ferry	89	64	63	No	64	No
314	Comm	C	72	Pass Road	82	61	64	No	65	No
315	Comm	C	72	Pass Road	86	66	71	Approach	71	Yes
316	Res	B	67	Hinman Drive	172	62	64	No	65	No
317	Res	B	67	Hinman Drive	267	61	63	No	64	No
318	Res	B	67	Hinman Drive	386	60	63	No	64	No
319	Res	B	67	Hilton Avenue	265	59	62	No	63	No
320	Res	B	67	Hilton Avenue	268	59	61	No	62	No
321	Res	B	67	Hilton Avenue	265	61	63	No	63	No
322	Res	B	72	Hilton Avenue	269	62	62	No	63	No
323	Res	B	72	Hilton Avenue	254	60	61	No	62	No
324	Res	B	72	Hilton Avenue	274	59	63	No	63	No
325	Res	B	67	Hilton Avenue	249	58	62	No	61	No
326	Res	B	67	Hilton Avenue	254	59	62	No	62	No
327	Res	B	67	Hilton Avenue	266	57	61	No	62	No
334	Comm	C	72	Pass Road	65	65	69	No	68	No
335	Comm	C	72	Pass Road	78	67	71	Approach	73	Yes
336	Comm	C	72	Pass Road	78	67	71	Approach	72	Yes
337	Comm	C	72	Pass Road	103	61	64	No	65	No
338	Res	B	67	Bertucci Boulevard	362	61	63	No	63	No
339	Res	B	67	Merlin Cove	198	62	64	No	64	No
340	Res	B	67	Merlin Cove	144	61	63	No	63	No
341	Res	B	67	Merlin Cove	71	63	66	Approach	66	Approach
342	Res	B	67	Merlin Cove	78	63	66	Approach	66	Approach
343	Res	B	67	Merlin Cove	81	64	66	Approach	66	Approach
344	Res	B	67	Merlin Cove	142	63	64	No	64	No
345	Res	B	67	Merlin Cove	180	62	64	No	64	No
346	Res	B	67	Merlin Cove	217	60	64	No	63	No
347	Res	B	67	Bertucci Boulevard	337	56	58	No	59	No
348	Res	B	67	Bertucci Boulevard	337	57	59	No	59	No
349	Res	B	67	Bertucci Boulevard	337	57	59	No	59	No
350	Res	B	67	Bertucci Boulevard	337	56	59	No	58	No

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-South	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2025	NOISE IMPACT
351	Res	B	67	Bertucci Boulevard	337	56	58	No	59	No
352	Res	B	67	Bertucci Boulevard	337	57	59	No	59	No
353	Res	B	67	Bertucci Boulevard	340	58	59	No	60	No
354	Res	B	67	Bertucci Boulevard	340	58	59	No	60	No
355	Res	B	67	Bertucci Boulevard	340	58	59	No	61	No
356	Res	B	67	Bertucci Boulevard	346	57	59	No	61	No
357	Res	B	67	Bertucci Boulevard	338	56	58	No	60	No
358	Res	B	67	Skylark Cove	217	59	60	No	61	No
359	Res	B	67	Skylark Cove	217	58	60	No	61	No
360	Res	B	67	Skylark Cove	82	64	66	Approach	66	Approach
361	Res	B	67	Skylark Cove	82	63	66	Approach	66	Approach
362	Res	B	67	Skylark Cove	108	61	63	No	64	No
363	Res	B	67	Skylark Cove	177	60	62	No	62	No
364	Res	B	67	Skylark Cove	216	60	63	No	62	No
365	Res	B	67	Carter Avenue	117	63	65	No	65	No
366	Res	B	67	Carter Avenue	78	64	66	Approach	66	Approach
367	Res	B	67	Carter Avenue	412	59	60	No	61	No
368	Res	B	67	Carter Avenue	384	59	62	No	62	No
369	Res	B	67	Carter Avenue	332	59	61	No	62	No
370	Res	B	67	Carter Avenue	291	60	61	No	62	No
371	Res	B	67	Carter Avenue	250	60	63	No	63	No
372	Res	B	67	Carter Avenue	209	61	64	No	62	No
373	Res	B	67	Carter Avenue	169	61	64	No	63	No
374	Res	B	67	Carter Avenue	90	62	65	No	64	No
375	Res	B	67	Trafalgar Drive	422	56	58	No	59	No
376	Res	B	67	Trafalgar Drive	422	56	59	No	60	No
377	Res	B	67	Trafalgar Drive	422	57	58	No	61	No
378	Res	B	67	Trafalgar Drive	380	57	60	No	61	No
379	Res	B	67	Trafalgar Drive	342	58	59	No	61	No
380	Res	B	67	Trafalgar Drive	301	57	59	No	61	No
381	Res	B	67	Trafalgar Drive	260	58	60	No	62	No
382	Res	B	67	Trafalgar Drive	221	56	59	No	63	No
383	Res	B	67	Trafalgar Drive	180	59	60	No	62	No
384	Res	B	67	Trafalgar Drive	144	59	61	No	62	No
385	Res	B	67	Trafalgar Drive	98	62	62	No	63	No
386	Res	B	67	Trafalgar Drive	88	60	62	No	63	No
387	Res	B	67	Trafalgar Drive	127	58	60	No	62	No
388	Res	B	67	Trafalgar Drive	170	58	59	No	62	No
389	Res	B	67	Trafalgar Drive	281	58	61	No	61	No
390	Res	B	67	Trafalgar Drive	324	59	60	No	61	No
391	Res	B	67	Trafalgar Drive	361	55	60	No	60	No
392	Res	B	67	Trafalgar Drive	401	56	60	No	61	No
393	Res	B	67	Trafalgar Drive	443	56	59	No	60	No
400	Res	B	67	Grants Ferry						

EXTERIOR NOISE LEVEL MEASUREMENTS
POPPS FERRY ROAD AND BRIDGE

NOISE REC. NO.	TYPE	NAC CAT.	NAC SOUND LEVEL	DESCRIPTION	Distance from Center Line	EXISTING Leq dBA (current)	NO BUILD		ALT. B-South	
							ESTIMATED Leq dBA	NOISE IMPACT	ESTIMATED Leq dBA 2030	NOISE IMPACT
401	Res	B	67	Grants Ferry	286	64	65	No	64	No
402	Res	B	67	Grants Ferry	285	63	64	No	64	No
403	Res	B	67	Grants Ferry	285	62	64	No	64	No
404	Res	B	67	Grants Ferry	133	64	66	Approach	64	No
405	Res	B	67	Grants Ferry	133	63	63	No	64	No
406	Res	B	67	Grants Ferry	122	62	63	No	65	No
407	Res	B	67	Grants Ferry	127	61	62	No	64	No
408	Res	B	67	Grants Ferry	127	61	66	Approach	66	Approach
409	Res	B	67	Grants Ferry	136	62	66	Approach	66	Approach
410	Res	B	67	Grants Ferry	152	61	65	No	64	No
411	Res	B	67	Grants Ferry	156	64	65	No	63	No
412	Res	B	67	Grants Ferry	228	62	63	No	63	No
413	Res	B	67	Grants Ferry	287	62	63	No	63	No
414	Res	B	67	Grants Ferry	324	62	63	No	63	No
415	Res	B	67	Grants Ferry	367	61	63	No	64	No
416	Res	B	67	Grants Ferry	407	61	64	No	64	No
417	Res	B	67	Grants Ferry	449	62	64	No	62	No

APPENDIX C

23 CFR 772

APPENDIX

23 CFR PART 772 - PROCEDURES FOR ABATEMENT OF HIGHWAY TRAFFIC NOISE AND CONSTRUCTION NOISE

Sec.
772.1 Purpose.
772.3 Noise Standards.
772.5 Definitions.
772.7 Applicability.
772.9 Analysis of Traffic Noise Impacts and Abatement Measures.
772.11 Noise Abatement.
772.13 Federal Participation.
772.15 Information for Local Officials.
772.17 Traffic Noise Prediction.
772.19 Construction Noise.
Table 1 - Noise Abatement Criteria
Appendix A - National Reference Energy Mean Emission Levels as a Function of Speed

AUTHORITY: 23 U.S.C. 109(h), 109(i); 42 U.S.C. 4331, 4332; sec. 339(b), Pub. L. 104-59, 109 Stat. 568, 605; 49 CFR 1.48(b).
(Source: 47 FR 29654, July 8, 1982; 47 FR 33956, Aug. 5, 1982, and 62 FR 42903, August 11, 1997)

Sec. 772.1 Purpose.

To provide procedures for noise studies and noise abatement measures to help protect the public health and welfare, to supply noise abatement criteria, and to establish requirements for information to be given to local officials for use in the planning and design of highways approved pursuant to Title 23, United States Code (U.S.C.).

Sec. 772.3 Noise Standards.

The highway traffic noise prediction requirements, noise analyses, noise abatement criteria, and requirements for informing local officials in this regulation constitute the noise standards mandated by 23 U.S.C. 109(i). All highway projects which are developed in conformance with this regulation shall be deemed to be in conformance with the Federal Highway Administration (FHWA) noise standards.

Sec. 772.5 Definitions.

(a) Design year. The future year used to estimate the probable traffic volume for which a highway is designed. A time, 10 to 20 years, from the start of construction is usually used.

(b) Existing noise levels. The noise, resulting from the natural and mechanical sources and human activity, considered to be usually present in a particular area.

(c) L_{10}. The sound level that is exceeded 10 percent of the time (the 90th percentile) for the period under consideration.

(d) $L_{10}(h)$. The hourly value of L10.

(e) L_{eq}. The equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period.

(f) $L_{eq}(h)$. The hourly value of Leq.

(g) Traffic noise impacts. Impacts which occur when the predicted traffic noise levels approach or exceed the noise abatement criteria (Table 1), or when the predicted traffic noise levels substantially exceed the existing noise levels.

(h) Type I projects. A proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizonal or vertical alignment or increases the number of through-traffic lanes.

(i) Type II projects. A proposed Federal or Federal-aid highway project for noise abatement on an existing highway.

Sec. 772.7 Applicability.

(a) Type I projects. This regulation applies to all Type I projects unless it is specifically indicated that a section applies only to Type II projects.

(b) Type II projects. The development and implementation of Type II projects are not mandatory requirements of 23 U.S.C. 109(i) and are, therefore, not required by this regulation. When Type II projects are proposed for Federal-aid highway participation at the option of the highway agency, the provisions of Subsec. 772.9(c), 772.13, and 772.19 of this regulation shall apply.

Sec. 772.9 Analysis of Traffic Noise Impacts and Abatement Measures.

(a) The highway agency shall determine and analyze expected traffic noise impacts and alternative noise abatement measures to mitigate these impacts, giving weight to the benefits and cost of abatement, and to the overall social, economic and environmental effects.

(b) The traffic noise analysis shall include the following for each alternative under detailed study:

(1) Identification of existing activities, developed lands, and undeveloped lands for which development is planned, designed and programmed, which may be affected by noise from the highway;

(2) Prediction of traffic noise levels;

(3) Determination of existing noise levels;

(4) Determination of traffic noise impacts; and

(5) Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.

(c) Highway agencies proposing to use Federal-aid highway funds for Type II projects shall perform a noise analysis of sufficient scope to provide information needed to make the determination required by Sec. 772.13(a) of this chapter.

Sec. 772.11 Noise Abatement.

(a) In determining and abating traffic noise impacts, primary consideration is to be given to exterior areas. Abatement will usually be necessary only where frequent human use occurs and a lowered noise level would be of benefit.

(b) In those situations where there are no exterior activities to be affected by the traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities, the interior criterion shall be used as the basis of determining noise impacts.

(c) If a noise impact is identified, the abatement measures listed in Sec. 772.13(c) of this chapter must be considered.

(d) When noise abatement measures are being considered, every reasonable effort shall be made to obtain substantial noise reductions.

(e) Before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify:

(1) Noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project, and

(2) Noise impacts for which no apparent solution is available.

(f) The views of the impacted residents will be a major consideration in reaching a decision on the reasonableness of abatement measures to be provided.

(g) The plans and specifications will not be approved by FHWA unless those noise abatement measures which are reasonable and feasible are incorporated into the plans and specifications to reduce or eliminate the noise impact on existing activities, developed lands, or undeveloped lands for which development is planned, designed, and programmed.

Sec. 772.13 Federal Participation.

(a) Federal funds may be used for noise abatement measures where:

(1) A traffic noise impact has been identified,

(2) The noise abatement measures will reduce the traffic noise impact, and

(3) The overall noise abatement benefits are determined to outweigh the overall adverse social, economic, and environmental effects and the costs of the noise abatement measures.

(b) For Type II projects, noise abatement measures will only be approved for projects that were approved before November 28, 1995, or are proposed along lands 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. Noise abatement measures will not be approved at locations where such measures were previously determined not to be reasonable and feasible for a Type I project.

(c) The noise abatement measures listed below may be incorporated in Type I and Type II

projects to reduce traffic noise impacts. The costs of such measures may be included in Federal-aid participating project costs with the Federal share being the same as that for the system on which the project is located, except that Interstate construction funds may only participate in Type I projects.

(1) Traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive land designations).

(2) Alteration of horizontal and vertical alignments.

(3) Acquisition of property rights (either in fee or lesser interest) for construction of noise barriers.

(4) Construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway right-of-way. Interstate construction funds may not participate in landscaping.

(5) Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. This measure may be included in Type I projects only.

(6) Noise insulation of public use or nonprofit institutional structures.

(d) There may be situations where (1) severe traffic noise impacts exist or are expected, and (2) the abatement measures listed above are physically infeasible or economically unreasonable. In these instances, noise abatement measures other than those listed in Sec. 772.13(c) of this chapter may be proposed for Types I and II projects by the highway agency and approved by the Regional Federal Highway Administrator on a case-by-case basis when the conditions of Sec. 772.13(a) of this chapter have been met.

Sec. 772.15 Information for Local Officials.

In an effort to prevent future traffic noise impacts on currently undeveloped lands, highway agencies shall inform local officials within whose jurisdiction the highway project is located of the following:

(a) The best estimation of future noise levels (for various distances from the highway improvement) for both developed and undeveloped lands or properties in the immediate vicinity of the project,

(b) Information that may be useful to local communities to protect future land development from becoming incompatible with anticipated highway noise levels, and

(c) Eligibility for Federal-aid participation for Type II projects as described in Sec. 772.13(b) of this chapter.

Sec. 772.17 Traffic Noise Prediction.

(a) Any traffic noise prediction method is approved for use in any noise analysis required by this regulation if it generally meets the following two conditions:

(1) The methodology is consistent with the methodology in the FHWA Highway

Traffic Noise Prediction Model (Report No.FHWA-RD-77-108)*

* These documents are available for inspection and copying as prescribed in 49 CFR Part 7, Appendix D.

(2) The prediction method uses noise emission levels obtained from one of the following:

(i) National Reference Energy Mean Emission Levels as a Function of Speed (Appendix A).

(ii) Determination of reference energy mean emission levels in Sound Procedures for Measuring Highway Noise: Final Report, DP-45-1R. *

(b) 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.

Sec. 772.19 Construction Noise.

The following general steps are to be performed for all Types I and II projects:

(a) Identify land uses or activities which may be affected by noise from construction of the project. The identification is to be performed during the project development studies.

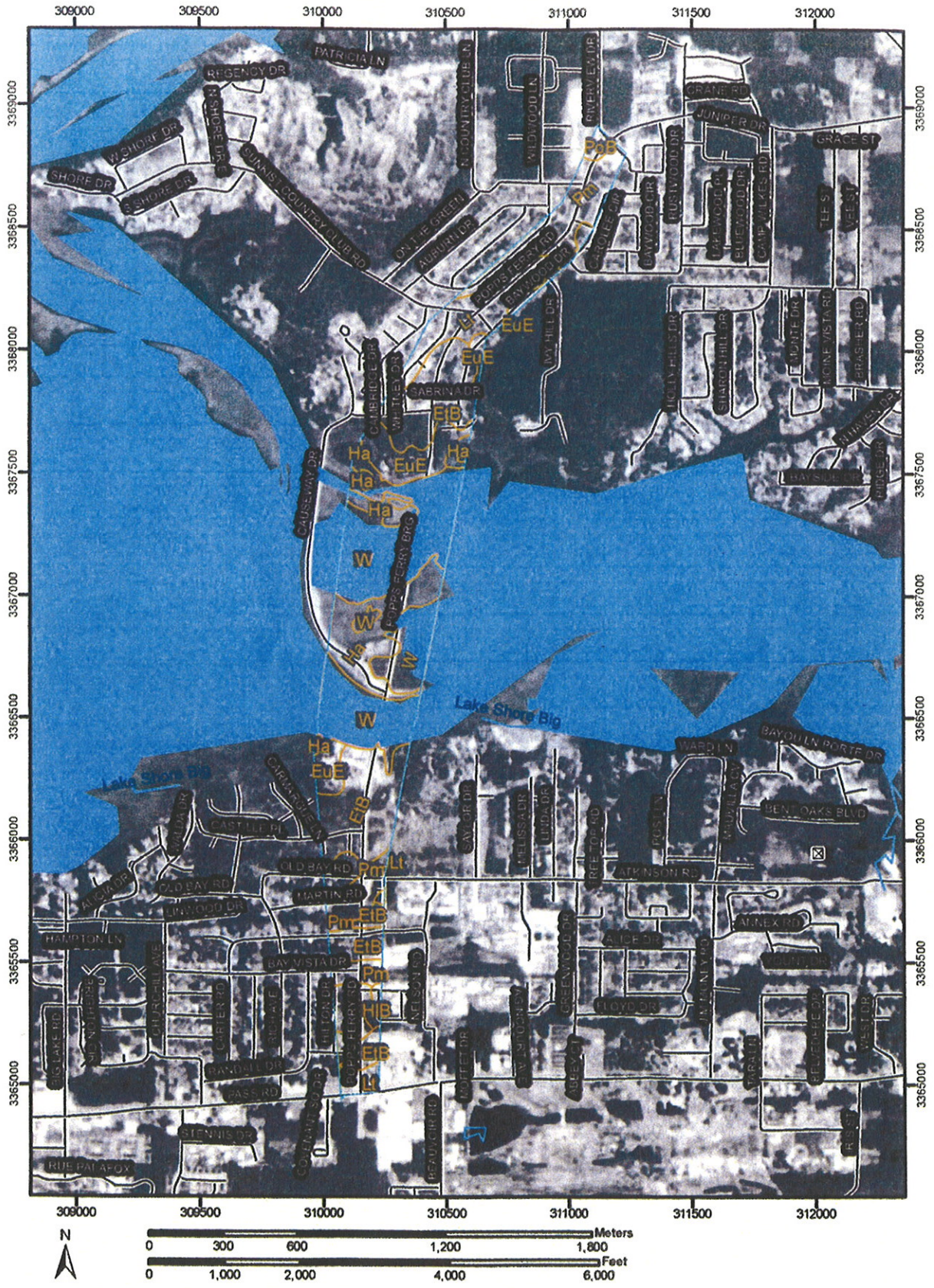
(b) Determine the measures which are needed in the plans and specifications to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighing of the benefits achieved and the overall adverse social, economic and environmental effects and the costs of the abatement measures.

(c) Incorporate the needed abatement measures in the plans and specifications.

APPENDIX D
SAMPLE LOCATION DIAGRAM

Appendix 3

SOIL MAP
AND
DESCRIPTIONS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309500
310000
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3369000
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3366500
3366000
3365500
3365000
PATRICIA LN
REGENCY DR
W SHORE DR
SHORE DR
E SHORE DR
UNIVERSITY CLUB RD
ON THE GREEN
AUBURN DR
POPPS FERRY RD
BAYWOOD DR
RIVERVIEW DR
WILDWOOD LN
GRANE RD
JUNIPER DR
GRACE ST
PoB
Pm
EuE
Ha
EtB
W
Lt
HlB
CAMBRIDGE DR
WHITNEY DR
SABRINA DR
IVY HILL DR
CAUSEWAY DR
Lake Shore Blg
CARMARGUE LN
CASTILLE PL
OLD BAY RD
MARTIN RD
LINWOOD DR
HAMPTON LN
BAY VISTA DR
NELSON RD
RANDALL DR
PASS RD
STENNIS DR
RUE PATAFOX
WARD LN
BAYOU LN
PORTE DR
BEN OAKS BLVD
ATKINSON RD
ANNEX RD
ALICE DR
FLOYD DR
WEST DR
0
300
600
1,200
1,800
Meters
0
1,000
2,000
4,000
6,000
Feet
N

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Harrison County, Mississippi
Survey Area Data: Version 7, Mar 14, 2007

Date(s) aerial images were photographed: 2/19/1992

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Harrison County, Mississippi (MS047)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EtB	Eustis loamy sand, 0 to 5 percent slopes	78.7	25.9%
EuE	Eustis and Poarch soils, 8 to 17 percent slopes	24.4	8.0%
Ha	Handsboro association	35.3	11.6%
HlA	Harleston fine sandy loam, 0 to 2 percent slopes	1.2	0.4%
HlB	Harleston fine sandy loam, 2 to 5 percent slopes	7.6	2.5%
Lr	Lakeland fine sand	1.8	0.6%
Lt	Latonia loamy sand	29.0	9.6%
Pm	Plummer loamy sand	37.6	12.4%
PoB	Poarch fine sandy loam, 2 to 5 percent slopes	2.4	0.8%
W	Water	85.7	28.2%
Totals for Area of Interest (AOI)		303.6	100.0%

LOCATION EUSTIS FL+AL GA LA MO MS NC SC TN TX

Established Series
Rev. HFH
05/2001

EUSTIS SERIES

The Eustis series consists of deep, somewhat excessively drained soils that formed in coarse-textured marine or fluvial sediments on smooth to strongly dissected parts of the Coastal Plain.

TAXONOMIC CLASS: Siliceous, thermic Psammentic Paleudults

TYPICAL PEDON: Eustis fine sand--forested.
(Colors are for moist soil.)

Ap--0 to 6 inches; very dark grayish brown (10YR 3/2) fine sand; weak fine granular structure; very friable; many fine and medium roots; very strongly acid; clear wavy boundary. (5 to 7 inches thick)

A21--6 to 9 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; many fine and medium roots; some grayish, brown (10YR 5/2) fine sand like that of the Ap horizon; very strongly acid; gradual smooth boundary.

A22--9 to 24 inches; dark yellowish brown (10YR 4/4) fine sand; single grained; loose; few fine and medium roots; few sand grains are clean; very strongly acid; gradual smooth boundary. (Combined thickness of the A2 horizon is 9 to 34 inches)

B21t--24 to 36 inches; yellowish red (5YR 5/6) loamy fine sand; weak medium granular structure; friable; few fine to coarse roots; many sand grains are coated with oxides and clay; strongly acid; gradual wavy boundary.

B22t--36 to 60 inches; yellowish red (5YR 5/6) loamy fine sand; moderate medium granular structure; friable; few medium to coarse roots; sand grains are coated with oxides and clay; clay bridges between sand grains; strongly acid; gradual wavy boundary.

B23t--60 to 76 inches; strong brown (7.5YR 5/6) loamy fine sand; moderate medium granular structure; friable; sand grains are coated with oxides and clay; few clay bridges between sand grains; strongly acid; gradual wavy boundary. (Combined thickness of the Bt horizon is 46 to 66 inches)

C--76 to 98 inches; reddish yellow (7.5YR 6/6) fine sand, common medium distinct very pale brown (10YR 7/4) mottles; single grained; loose; strongly acid.

TYPE LOCATION: Madison County, Florida; 3.5 miles east of Madison, 75 feet south of U. S. Highway 90, NE1/4SE1/4, sec. 30, T. 1 N., R. 10 W.

RANGE IN CHARACTERISTICS: Thickness of the solum is 60 inches or more. Soil reaction is strongly acid or very strongly acid
throughout. The soil is dry for periods of less than 60 days in most years.

The A1 or Ap horizon has hue 10YR or 7.5YR, value 3 to 5, and chroma 3 or less. Where value is 3 thickness is less than 8 inches.

The A21 horizon has hue 10YR, value 4 or 5, and chroma 2 to 4. The A22 horizon has hue 10YR to 5YR, value 3 to 5, and chroma 3 or more. Texture of the A horizon ranges from sand to loamy fine sand.

The Bt horizon color is centered on hue 5YR, value 3 to 6, chroma 3 to 8 but hues range from 2.5YR to 10YR. Texture is loamy sand or loamy fine sand and contains at least 3 percent more clay than the A2 horizon. In some pedons, the Bt horizon occurs as bands or lamellae of loamy sand that total more than 6 inches thick within depths of 14 to 80 inches. Silt and very fine sand plus clay range from 10 to 30 percent. Clay content is at least 10 percent and typically ranges from 10 to 15 percent.

The C horizon has hue 5YR or 7.5YR, value 5 to 7, and chroma 6 or 8; or hue 10YR, value 5 and chroma 3 to 8, or value 7 or 8 and chroma 1 to 4. Colors with value 7 or 8 and chroma 2 or less are due to uncoated sand grains and are not indicative of wetness. In some pedons the C horizon is strongly mottled with yellow, brown, red, and white. White mottles indicative of wetness are below depths of 72 inches.

COMPETING SERIES: These are the Betis and Valdosta series in the same family and the Flomaton series in a closely similar family. Betis soils are dry in the moisture control section for more than 75 days. Valdosta soils have less than 10 percent clay in the upper 20 inches of the argillic horizon. Floamton soils have more than 35 percent pebbles and cobbles in the argillic horizon.

GEOGRAPHIC SETTING: Eustis soils are on smooth to strongly dissected parts of the Coastal Plain. Slopes are mainly 0 to 12 percent, but they are as much as 30 percent in highly dissected areas. The regolith is thick coarse-textured marine or fluvial sediments. Average annual precipitation is about 52 inches and average annual temperature is about 69 degrees F. near the type location.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Alaga, Albany, Chipley, Dothan, Kenansville, Kershaw, Lakeland, Lucy, Orangeburg, Troup, and Wagram series. Alaga soils have 10 to 25 percent silt plus clay in the 10 to 40 inch control section and lack Bt horizons. Dothan and Orangeburg soils have loamy Bt horizons within depths of 20 inches, Kenansville, Lucy, and Troup soils between depths of 20 to 40 inches, and Albany and Troup soils between depths of 40 to 80 inches. In addition, Albany soils are somewhat poorly drained. Chipley, Kershaw, and Lakeland soils all lack Bt horizons. In addition, Chipley soils are somewhat poorly drained, Kershaw soils are in an uncoated family, and Lakeland
soils have 5 to 10 percent silt plus clay in the 10 to 40 inch control section.

DRAINAGE AND PERMEABILITY: Somewhat excessively drained. Runoff is slow. Permeability of the Bt horizon is moderately rapid to rapid. Water holding capacity is low.

USE AND VEGETATION: Most of the soil is cleared and is used for growing corn, peanuts, melons, tung, peaches, and tobacco. Natural vegetation is longleaf, shortleaf, loblolly, and slash pines, blackjack, bluejack, post and turkey oaks, and an undergrowth of pineland threeawn, bluestem, and briars.

DISTRIBUTION AND EXTENT: The Atlantic and Gulf Coast Plain from Texas to Virginia. The series is extensive.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama

SERIES ESTABLISHED: Lake County, Florida; 1923.

REMARKS: The Eustis series was formerly classified in the Regosol great soil group. This description limits Eustis soils to sandy soils that have a weakly expressed loamy sand or loamy fine sand Bt horizon having base saturation of less than 35 percent.

National Cooperative Soil Survey
U. S. A.

LOCATION LAKELAND FL+AL GA LA MD MS NC NJ SC VA

Established Series
Rev. AGH; GRB
04/2007

LAKELAND SERIES

The Lakeland series consists of very deep, excessively drained, rapid to very rapidly permeable soils on uplands. They formed in thick beds of eolian or marine sands. Near the type location, the mean annual temperature is about 67 degrees F., and the mean annual precipitation is about 52 inches. Slopes are dominantly from 0 to 12 percent but can range to 85 percent in dissected areas.

TAXONOMIC CLASS: Thermic, coated Typic Quartzipsamments

TYPICAL PEDON: Lakeland sand--forested. (Colors are for moist soil.)

A--0 to 3 inches; very dark grayish brown (10YR 3/2) crushed and rubbed sand; single grained; loose; common uncoated sand grains; common fine and medium roots; strongly acid, clear wavy boundary. (2 to 9 inches thick)

C1--3 to 10 inches; yellowish brown (10YR 5/4) sand; common medium faint yellowish brown (10YR 5/6) splotches; single grained; loose; common fine and medium roots; few uncoated sand grains; strongly acid; gradual wavy boundary.

C2--10 to 43 inches; yellowish brown (10YR 5/8) sand; single grained; loose; few fine roots; few uncoated sand grains; strongly acid; gradual wavy boundary.

C3--43 to 64 inches; yellowish brown (10YR 5/8) sand; few medium faint very pale brown (10YR 7/3) splotches and streaks; single grained; loose; many uncoated sand grains; strongly acid; gradual wavy boundary.

C4--64 to 80 inches; very pale brown (10YR 7/4) sand; single grained; loose; many uncoated sand grains; few medium distinct yellowish red (5YR 5/8) masses of iron accumulation; strongly acid. (Combined thickness of the C horizons ranges from 71 to more than 98 inches)

TYPE LOCATION: Calhoun County, Florida; approximately 6.0 miles west of Chason on Florida State Highway 274; NE1/4, NE1/4, Sec. 31, T. 2 N., R. 10 W.

RANGE IN CHARACTERISTICS: Thickness of the sand exceeds 80 inches. Silt plus clay in the 10 to 40-inch control section ranges from 5 to 10 percent. Reaction ranges from very strongly acid to moderately acid throughout except where the surface has been limed.

The A or Ap horizon has hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4. Texture is sand or fine sand.

The C horizon has hue of 5YR to 2.5Y, value of 4 to 8, and chroma of 2 to 8. Horizons with chroma of 2 are not indicative of wetness. Small pockets of sand grains in shades of gray not related to wetness or

masses of iron accumulation in shades of yellow or brown may occur in some pedons below depths of 40 inches. Some pedons have an A/C horizon that is a mixture in shades of gray, yellow, and brown. Texture is sand or fine sand.

COMPETING SERIES: These include the Alaga, Bigbee, Cainhoy, Darden, Foxworth, McNeely, Tonkawa, Turkey, and Wando series. Alaga and Darden soils have 10 to 25 percent silt plus clay in the 10 to 40 inch control section. Bigbee soils are on lower adjacent positions, have a water table 20 to 40 inches below the surface for short periods, and are subject to flooding. Cainhoy soils have a Bh horizon below 80 inches. Foxworth soils have a water table at 48 to 72 inches below the surface. McNeely soils have weakly developed Bw horizons. Tonkawa soils have a moisture control section that is dry for 125-150 cumulative days for most years. The somewhat excessively drained Turkey soils have 10 to 18 percent silt plus clay in the 10 to 40 inch control section. The well drained Wando soils have 5 to 20 percent silt plus clay in the 10 to 40 inch control section.

GEOGRAPHIC SETTING: Lakeland soils are on broad uplands in the Lower Coastal Plain. They formed in eolian or marine sands. Slopes are dominantly 0 to 12 percent but may range up to 85 percent in highly dissected areas. The climate is humid subtropical. The average annual air temperature ranges from 62 to 71 degrees F., and the average annual precipitation ranges from 45 to 60 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These include the competing Foxworth soils and the Chipley, Kershaw, Kureb, Osier, Plummer, Troup, and Wakulla soils. Chipley soils occur closer to streams or in hillside seep areas. They have chroma of 2 or less between 20 and 40 inches and are seasonally wet. Kershaw soils have less than 5 percent silt plus clay in the 10 to 40 inch control section. Kureb soils have less than 5 percent silt plus clay in the 10- to 40- inch control section, and have weakly developed spodic horizons. Osier and Plummer soils are poorly drained and are on lower adjacent drainageways. In addition, Plummer soils have an argillic horizon 40 to 80 inches below the surface. Troup soils occur in the same landscape with Lakeland and they have Bt horizons within 40 to 80 inches of the surface. The somewhat excessively drained Wakulla soils have argillic horizons with 10 to 10 percent silt plus clay.

DRAINAGE AND PERMEABILITY: Excessively drained; rapid permeability; slow runoff.

USE AND VEGETATION: Many areas are cleared and used for peanuts, watermelons, peaches, corn, tobacco, and improved pasture. The natural vegetation consists of blackjack oak, turkey oak, post oak; scattered long leaf pine; and an understory of creeping bluestem, sandy bluestem, lopsided indiangrass, hairy panicum, fringeleaf paspalum, and native annual forbs.

DISTRIBUTION AND EXTENT: Atlantic and Gulf Coastal Plain and sand hills of the thermic belt from Texas to Virginia. The series is extensive.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama.

SERIES ESTABLISHED: Alachua County, Florida; 1947.

REMARKS: Diagnostic horizons and features recognized in this pedon:

Ochric epipedon - 0 to 3 inches (A horizon).

Coated feature - The fine-earth fraction contains 5 to 10 percent by weight silt plus clay.

Depth to seasonal water table is more than 80 inches.

National Cooperative Soil Survey
U.S.A.

LOCATION PLUMMER GA+AL FL MS NC SC TX VA

Established Series
KSL/Rev. JAK
10/2007

PLUMMER SERIES

MLRA(s): 133A-Southern Coastal Plain, 133B-Western Coastal Plain, 153A-Atlantic Coast Flatwoods, and 153B-Tidewater Area
Depth Class: Very deep
Drainage Class (Agricultural): Poorly or very poorly drained
Internal Free Water Occurrence: Very shallow, persistent
Flooding Frequency and Duration: None
Ponding Frequency and Duration: None to frequent; long or very long periods
Index Surface Runoff: Negligible to low
Saturated Hydraulic Conductivity: Moderately high
Shrink-swell Potential: Low
Landscape: Upper, middle, and lower coastal plains
Landform: Flats, depressions
Geomorphic Component: Talfs, dips
Hillslope Profile Position: Not assigned
Parent Material: Marine or fluviomarine deposits
Slope: 0 to 5 percent, dominantly less than 1 percent
Elevation (type location): Unknown
Frost Free Period (type location): 240 days
Mean Annual Air Temperature (type location): 19.2 degrees C (66.5 degrees F.)
Mean Annual Precipitation (type location): 1240 millimeters (49 inches)

TAXONOMIC CLASS: Loamy, siliceous, subactive, thermic Grossarenic Paleaquults

TYPICAL PEDON: Plummer sand on a 1 percent slope, in woodland. (Colors are for moist soil unless otherwise stated.)

A--0 to 23 centimeters (about 0 to 9 inches); dark gray (N 4/) sand; weak fine granular structure; very friable; many medium and fine roots; many clean sand grains in lower part; very strongly acid; clear wavy boundary. (10 to 30 centimeters thick)

Eg1--23 to 71 centimeters (about 9 to 28 inches); gray (5Y 6/1) sand; single grain; loose; few roots in upper part; common root holes with brown stains; very strongly acid; gradual wavy boundary.

Eg2--71 to 127 centimeters (about 28 to 50 inches); light gray (5Y 7/1) sand; single grain; loose; very strongly acid; gradual irregular boundary. (Combined thickness of the E horizon is 90 to 170 centimeters)

Btg--127 to 200 centimeters (about 50 to 80 inches); light gray (5Y 7/1) sandy loam with bodies of sandy clay loam; common medium and fine prominent yellowish brown (10YR 5/6) masses of oxidized iron; weak medium granular and subangular blocky structure; friable; sand grains bridged with clay;

very strongly acid.

TYPE LOCATION: Wayne County, Georgia; about 2.6 miles east of Gardi along U.S. Highway 341 and south on county road 4.2 miles to crossroads; 0.2 mile east.

RANGE IN CHARACTERISTICS:
Depth to top of argillic horizon: 100 to 195 centimeters (about 40 to 75 inches), commonly 125 to 180 centimeters (about 50 to 70 inches)
Depth to base of argillic horizon: 150 to 200 centimeters or more (about 60 to 80 inches), commonly more than 2500 centimeters (about 100 inches)
Depth to bedrock: Greater than 200 centimeters (about 80 inches)
Depth to seasonal high water table: 0 to 25 centimeters (about 0 to 10 inches) December to July
Thickness of the sandy surface and subsurface layers: Greater than 100 centimeters (about 40 inches)
Content and size of rock fragments: 0 to 10 percent, by volume throughout, mostly fine quartz gravel or ironstone nodules or concretions
Effective Cation Exchange Capacity: 3 to 10 milliequivalents per 100 grams of soil in the A horizon; 1 to 3 in E horizons; and 3 to 5 in the B horizon
Soil Reaction: Extremely acid to strongly acid, except where limed

RANGE OF INDIVIDUAL HORIZONS:
Oa horizon (where present):
Color--hue of 10YR, 2.5Y or 5Y; value of 2 to 4, chroma of 1 or 2; or is neutral with value of 2 to 4
Texture--muck, 2 to 20 centimeters thick

A horizon:
Color--hue of 10YR to 5Y; value of 2 to 4, chroma of 1 or 2; or is neutral with value of 2 to 4. Where moist value and chroma are 3 or less, thickness of the A horizon is less than 25 centimeters (about 10 inches).
Texture--sand, fine sand, loamy fine sand or, loamy sand
Clay content: 1 to 10 percent

Eg horizon:
Color--hue of 10YR to 5Y, value of 5 to 8, chroma of 1 or 2; or is neutral with value of 5 to 8
Texture--sand, fine sand, loamy fine sand, or loamy sand
Clay content: 1 to 10 percent
Redoximorphic features--iron depletions in shades of brown, yellow, or gray and masses of oxidized iron in shades of red, yellow, or brown. Iron depletions may be zones of uncoated sand grains.

BEg horizon (where present):
Color--hue of 10YR to 5Y, value of 5 to 7, chroma of 1 or 2; or is neutral with value of 5 to 7
Texture--loamy sand or loamy fine sand
Clay content: 1 to 12 percent
Redoximorphic features--iron depletions in shades of brown, yellow, or gray and masses of oxidized iron in shades of red, yellow, or brown. Iron depletions may be zones of uncoated sand grains.

Btg horizon:
Color--hue of 10YR to 5Y, value of 5 to 7, chroma of 1 or 2; or is neutral with value of 5 to 7
Texture--sandy loam, fine sandy loam or sandy clay loam and may have pockets of loamy sand or sandy clay
Clay content: 12 to 35 percent

Redoximorphic features--iron depletions in shades of brown, yellow, or gray and masses of oxidized iron in shades of red, yellow, or brown

COMPETING SERIES:
Starke soils--have an umbric epipedon

GEOGRAPHIC SETTING:
Landscape: Upper, middle, and lower coastal plains
Landform: Flats, depressions
Geomorphic Component: Talfs, dips
Hillslope Profile Position: Not assigned
Parent Material: Marine or fluviomarine deposits
Slope: 0 to 5 percent, dominantly less than 1 percent
Elevation: 5 to 135 meters (about 15 to 450 feet)
Mean Annual Air Temperature: 14 to 21 degrees C. (about 59 to 70 degrees F.)
Mean Annual Precipitation: 965 to 1320 millimeters (about 38 to 52 inches)
Frost Free Period: 190 to 275 days

GEOGRAPHICALLY ASSOCIATED SOILS:
Alapaha soils--have an arenic epipedon and have plinthite in the Bt horizons
Atmore soils--have 6 to 18 percent clay in upper 50 centimeters of the Bt horizon and plinthite in the lower Bt horizon
Ellabelle soils--have an umbric epipedon
Johnston soils--have a thick umbric epipedon
Leefield soils--have combined A and E horizons of less than 100 centimeters thick
Leon soils--have a spodic horizon
Lynn Haven soils--have a spodic horizon
Mascotte soils--have a spodic horizon
Ocilla soils--have combined A and E horizons of less than 100 centimeters thick
Olustee soils--have a spodic horizon
Osier soils--do not have an argillic horizon
Pelham soils--have an arenic epipedon
Rains soils--have combined A and E horizons of less than 100 centimeters thick
Rutlege soils--have an umbric epipedon
Surrency soils--have an umbric epipedon
Torhunta soils--have a thick umbric epipedon

DRAINAGE AND PERMEABILITY:
Drainage Class (Agricultural): Poorly or very poorly drained
Internal Free Water Occurrence: Very shallow, persistent
Flooding Frequency and Duration: None
Ponding Frequency and Duration: Depressional areas are occasionally or frequently ponded for long or very long periods
Index Surface Runoff: Negligible to low
Saturated Hydraulic Conductivity: Moderately high (4.2 to 14.1 micrometers per second)
Shrink-swell Potential: Low

USE AND VEGETATION:
Major Uses: Woodland
Dominant Vegetation: Where wooded--mixed stands of slash, loblolly, and longleaf pine with swamp tupelo and bald cypress and an understory of gallberry, waxmyrtle, southern bayberry, wiregrass, pitcher

plants, and bracken fern. Where cleared--pasture.

DISTRIBUTION AND EXTENT:
Distribution: Georgia, Alabama, Delaware, Florida, Maryland, Mississippi, North Carolina, South Carolina, and Virginia
Extent: Large

MLRA OFFICE RESPONSIBLE: Raleigh, North Carolina

SERIES ESTABLISHED: Duval County, Florida; 1910.

REMARKS: Diagnostic horizons and soil characteristics recognized in this pedon are:
Ochric epipedon--the zone from the surface of the soil to a depth of about 127 centimeters (A, Eg1, and Eg2 horizons)
Grossarenic feature--sandy materials from the surface of the soil to a depth of approximately 127 centimeters (A, Eg1, and Eg2 horizons)
Argillic horizon--the zone from approximately 127 to 200 centimeters (Btg horizon)
Aquic conditions--periodic saturation and reduction in a zone from the soil surface to 200 centimeters at some time during the year (endosaturation).
Redox concentrations--the zone from 127 to 200 centimeters (Btg horizon)
Redox depletions with chroma of 2 or less--the zone from the soil surface to 200 centimeters (A, Eg, and Btg horizons)
Series control section--the zone from 0 to 200 centimeters

ADDITIONAL DATA:
Laboratory Data: Characterization data are not available from NRCS-Soil Survey Laboratory, Lincoln, NE.
Database Information:
Data Mapunit ID--To be developed
Typical Pedon User Pedon ID--To be developed

National Cooperative Soil Survey
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The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3, or it has hue of 2.5Y, value of 4 or 5, and chroma of 2. Where the value is less than 3.5, the horizon is less than 6 inches thick. It is fine sandy loam, sandy loam, loamy sand, or loamy fine sand.

The E horizon, where present, has hue of 10YR, value of 4 to 6, and chroma of 2 to 6, or it has hue of 2.5Y, value of 6, and chroma of 4. It is sandy loam or fine sandy loam.

The BA and BE horizons, where present, has hue of 10YR, value of 4 or 5, and chroma of 3 to 8, or it has hue of 2.5Y, value 5, and chroma of 4 or 6. It is sandy loam or fine sandy loam.

The Bt horizon has hue of 7.5YR, value of 4 or 5, and chroma of 4 to 6, or it has hue of 10YR, value of 4 to 6, and chroma of 4 to 8, or it has hue of 2.5Y, value of 5 and chroma of 6. It is sandy loam, fine sandy loam, or loam. The Bt horizon has 10 to 16 percent clay and 20 to 35 percent silt.

The C horizon is variable in color and ranges from white to yellowish brown. It is loamy sand or sand. COMPETING SERIES: These include the Bassfield and Rumford series and the closely related Benndale, Brogdon, Cahaba, Johns, Kalmia, Kenansville, and McLaurin series. Bassfield soils have a Bt horizon in hue of 5YR to 2.5YR. Rumford soils typically have hue of 5YR or redder and have less silt in the Bt horizon. Benndale, Brogdon, and McLaurin soils have a solum thicker than 60 inches. Cahaba and Kalmia soils have a fine loamy particle size class. Johns soils have mottles with chroma of 2 or less within 20 inches of the surface. Kenansville soils have an arenic epipedon.

GEOGRAPHIC SETTING: Latonia soils are on nearly level to sloping marine or streams terraces of the Southern Coastal Plain and Eastern Gulf Coast Flatwoods. They formed in marine or alluvial sediments that are loamy in the upper part and sandy in the lower part. Slopes range from 0 to 5 percent. The climate is warm and humid. Near the type location the average annual temperature is about 62 degrees F. Average annual precipitation is about 48 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Bassfield, Benndale, Cahaba, and McLaurin series and the Atmore, Basin, Prentiss, and Ruston series. Well drained Bassfield and Cahaba soils are in similar portions as the Latonia soils. Well drained Benndale and McLaurin soils are in adjacent uplands. Poorly drained Atmore soils and somewhat poorly drained Basin soils, which are in depressions and on broad flats, have plinthite in the B horizon. Moderately well drained Prentiss soils which are in slightly higher positions on terraces, have a fragipan. Well drained Ruston soils, which are at higher elevations in the uplands, have a solum more than 60 inches thick.

DRAINAGE AND PERMEABILITY: Well drained; slow runoff; moderately rapid permeability. Some areas on lower terraces are subject to occasional flooding for very brief periods late in winter and early in spring.

USE AND VEGETATION: Most areas of the Latonia soils are used for woodland. Principal vegetation is slash, loblolly, and longleaf pine. Cleared areas are used for growing corn, soybeans, small grains, and pasture.

DISTRIBUTION AND EXTENT: Alabama, Arkansas, Louisiana, and Mississippi. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama

SERIES ESTABLISHED: Lamar County, Mississippi; 1969.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from surface to 4 inches (A horizon).

Argillic horizon - the zone from approximately 8 to 32 inches (Bt1 and Bt2).

National Cooperative Soil Survey
U. S. A.

LOCATION HARLESTON MS+AL AR LA

Established Series
Rev: WMK:RBH
03/97

HARLESTON SERIES

The Harleston series consists of deep, moderately well drained, moderately permeable soils. They formed in marine or stream
deposits consisting of thick beds of sandy loam. They are on terraces and uplands of the Southern Coastal Plain. Slopes range from 0 to 12 percent.

TAXONOMIC CLASS: Coarse-loamy, siliceous, semiactive, thermic Aquic Paleudults

TYPICAL PEDON: Harleston loam--pasture.
(Colors are for moist soil unless otherwise
stated.)

Ap--0 to 5 inches; very dark gray ?(10YR 3/1) loam; weak
medium granular structure; very friable; many fine roots; very strongly acid; abrupt smooth boundary. (2 to 5 inches thick)

E--5 to 9 inches; light olive brown (2.5Y 5/4) loam; weak
fine and medium granular structure; very friable; many wormcasts containing very dark gray material; very strongly acid; clear
smooth boundary. (3 to 10 inches thick)

Bt1--9 to 20 inches; yellowish brown (10YR 5/6) loam; weak
fine and medium subangular blocky structure; friable; sand grains coated and bridged with clay; patchy clay films; few soft brown bodies; very strongly acid; clear wavy boundary. (10 to 15
inches thick)

Bt2--20 to 26 inches; yellowish brown (10YR 5/6) loam; many
medium and coarse distinct yellowish red (5YR 5/8), and common
medium distinct light brownish gray (10YR 6/2) mottles; weak
medium subangular blocky structure; friable; sand grains coated
and bridged with clay; patchy clay films; few pockets of uncoated sand grains; few medium to coarse red bodies; very strongly acid; gradual smooth boundary. (4 to 10 inches thick)

Bt3--26 to 33 inches; brownish yellow (10YR 6/6) loam; common medium distinct light brownish gray (10YR 6/2), pale brown (10YR 6/3), and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; sand grains coated and
bridged with clay; few pockets of sandy loam; very strongly acid; clear wavy boundary.

Bt4--33 to 60 inches; yellowish brown (10YR 5/6) loam; many
medium and coarse distinct strong brown (7.5YR 5/6), and light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; slightly brittle; few soft strong brown to yellowish red

bodies; sand grains coated and bridged with clay; patchy clay films; few polygonal cracks filled with light
brownish gray sandy loam extending downward; very strongly acid; gradual irregular boundary.

Bt5--60 to 72 inches; coarsely mottled red (2.5YR 4/6), gray (10YR 6/1), yellowish brown (10YR 5/6), and strong brown (7.5YR 5/6) sandy clay loam; moderate medium subangular blocky structure; friable; slightly brittle; patchy clay films; sand grains coated and bridged with clay; very strongly acid. (Combined thickness of the lower part of the Bt subhorizons is 45 to 60 inches or more.)

TYPE LOCATION: Jackson County, Mississippi; 2.0 miles southeast of Hurley and 200 yards east of blacktop road into pasture. NW1/4NW1/4 sec. 10, T. 5 S., R. 5. W.

RANGE IN CHARACTERISTICS: Solum thickness exceeds 60 inches. Reaction ranges from extremely acid to strongly acid, except those surface layers that have been limed. Content of gravel ranges from none to as much as 10 percent of the volume in all horizons.

The A or Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 3. It is loam, sandy loam, fine sandy loam, or loamy fine sand.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4, or it has hue or 2.5Y, value of 4 to 6, and chroma of 2 to 4. It is loam, sandy loam, fine sandy loam, or loamy fine sand.

The BE horizon, where present, has hue of 10YR or 2.5Y, value of 5, and chroma of 4 to 6. It is fine sandy loam or loam.

The Bt1 and Bt2 horizons have hue of 7.5YR to 2.5Y, value of 5 or 6, and chroma of 4 to 8. Mottles with chroma of 2 or less range from few to many in the Bt2 horizon. Texture is sandy loam or loam. The upper 20 inches of the Bt horizon has from 8 to 18 percent clay and from 20 to 50 percent silt.

The lower part of the Bt horizon has matrix colors similar to Bt1 and Bt2 horizons, except with few to many mottles having chroma of 2 or less throughout, or it is mottled in shades of gray, brown, or red. It is sandy loam, loam, or sandy clay loam. Some pedons have 1 to 5 percent plinthite. Some pedons have few to many fine to medium iron concretions.

COMPETING SERIES: These are Dallardsville and Foreston series in the same family and the closely related Basin, Benndale, Escambia, Goldsboro, McLaurin, Poarch, Quitman and Stough series. Dallardsville soils have tongues of albic material in the B horizon. Foreston soils have a Bt horizon with less than 20 percent silt and a Bt horizon that commonly decreases in clay in

the lower part and has skeletons. Basin and Stough soils are brittle and compact in about 40 percent of the volume of the lower part of the Bt horizon. Benndale, McLaurin, and Poarch soils are similar to Harleston soils in texture of the B horizons, but do not have mottles of chroma 2 or less within 30 inches of the soil surface. In addition, Poarch soils have more than 5 percent plinthite. Escambia soils have more than 5 percent plinthite between a depth of 20 and 42 inches of the surface. Goldsboro and Quitman soils have a fine loamy particle-size class.

GEOGRAPHIC SETTING: Harleston soils are on nearly level to strongly sloping terraces and uplands of the Southern Coastal Plain upland. Slope gradients range from 0 to 12 percent. The soil formed in marine or stream deposits, consisting of thick beds of sandy loams. At the type location the climate is warm and humid. The mean annual temperature is 65 degrees F., and mean annual rainfall is 62 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Basin, Benndale, Escambia, McLaurin, and Poarch series and Eustis, Saucier, Smithton, and Susquehanna series. Somewhat poorly drained Basin and Escambia soils mainly are on positions that are slightly lower. Well drained Benndale and McLaurin soils mainly are on positions that are slightly higher and on upper slopes. Moderately well drained Poarch soils are in similar positions as the Harleston soils. Somewhat excessively drained Eustis soils, which are on nearby upper slopes of ridges, are sandy throughout. Moderately well drained Saucier soils, which are in similar positions as the Harleston soils, have 20 to 35 percent clay in the upper 20 inches of the Bt horizon and have 5 to 25 percent plinthite at a depth between 20 and 45 inches. Poorly drained Smithton soils, which are on flood plains and in depressions in uplands, have a predominantly gray color throughout. Somewhat poorly drained Susquehanna soils, which are on adjacent side slopes, have 35 to 60 percent clay in the upper 20 inches of the Bt horizon.

DRAINAGE AND PERMEABILITY: Moderately well drained; slow to medium runoff and moderate permeability. Some of the low terrace areas overflow occasionally for very brief duration during periods of high rainfall.

USE AND VEGETATION: Most of the acreage is in forest of loblolly, shortleaf, and slash pines. The understory is gallberry, wax myrtle, and native grass species plants, including pinehill bluestem, common carpetgrass, and longleaf uniola.
Cleared areas are used for pasture, hay, corn, and soybeans.

DISTRIBUTION AND EXTENT: The Southern Coastal Plain in Mississippi, Alabama, and Arkansas. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama

SERIES ESTABLISHED: George County, Mississippi; 1970.

REMARKS: Harleston soils were formerly included in the Goldsboro series.

National Cooperative Soil Survey
U. S. A.

LOCATION HANDSBORO MS+FL SC

Established Series
Rev. WIS:WMK: RBH
02/97

HANDSBORO SERIES

The Handsboro series consists of deep, very poorly drained, moderately permeable soils that formed in thick accumulations of highly decomposed herbaceous plant remains that have thin strata of mineral soil sediments. These soils are in regularly flooded salt marshes in estuaries of the Eastern Gulf Coast Flatwoods and Atlantic Coast Flatwoods Major Land Resource Areas. Slopes are less than 1 percent.
TAXONOMIC CLASS: Euic, thermic Typic Sulfihemists

TYPICAL PEDON: Handsboro mucky silt loam--tidal marsh.
(Colors are for moist soil unless otherwise stated.)

A--0 to 2 inches; very dark gray (10YR 3/1) mucky silt loam; common coarse faint black (10YR 2/1) mottles; massive; slightly sticky; very fluid; many fine roots, conductivity 13 mmho/cm; moderately alkaline in water; abrupt smooth boundary. (0 to 4 inches thick)

Oa1--2 to 10 inches; very dark grayish brown (10YR 3/2) broken face, pressed or rubbed sapric material; about 65 percent fiber, about 12 percent rubbed; massive; nonsticky; very fluid; many fine roots; about 35 percent mineral; conductivity 17 mmho/cm; moderately alkaline in water; gradual smooth boundary.

Oa2--10 to 28 inches; very dark grayish brown (10YR 3/2) broken face, pressed or rubbed sapric material; about 30 percent fiber, 12 percent rubbed; massive; nonsticky; very fluid; many fine roots; about 30 percent mineral; conductivity 34 mmho/cm; moderately alkaline in water; gradual smooth boundary.

Oa3--28 to 37 inches; very dark gray (10YR 3/1) broken face, sapric material, very dark grayish brown (10YR 3/2) pressed or rubbed; about 25 percent fiber; 8 percent rubbed; massive; nonsticky; very fluid; common fine roots; about 35 percent mineral content; mildly alkaline in water; clear smooth boundary. (Thickness of the upper part of the Oa horizon is 10 to 24 inches)

C--37 to 39 inches; dark grayish brown (10YR 4/2) loam; structureless; slightly sticky; slightly fluid; common fine roots; moderately alkaline in water; clear smooth boundary. (2 to 6 inches thick)

Oa4--39 to 43 inches; very dark gray (10YR 3/1) broken face, sapric material, very dark grayish brown (10YR 3/2) pressed or rubbed; about 10 percent fiber; one percent rubbed; massive; nonsticky; very fluid; common fine roots; about 30 percent mineral content; mildly alkaline in water; clear smooth boundary.

C'--43 to 45 inches; dark grayish brown (10YR 4/2) loam, structureless; slightly sticky; slightly fluid; common fine roots; moderately alkaline in water; clear smooth boundary. (2 to 6 inches thick)

Oa5--45 to 50 inches; very dark gray (10YR 3/1) broken face; sapric material; very dark grayish brown

(10YR 3/2) pressed or rubbed; about 8 percent fiber; one percent rubbed; massive; nonsticky; very fluid; common fine roots; about 35 percent mineral content; mildly alkaline in water; clear smooth boundary. (2 to 8 inches thick)

C"--50 to 54 inches; dark grayish brown (10YR 4/2) loam; massive; slightly sticky; slightly fluid; common fine roots; moderately alkaline in water; clear smooth boundary. (2 to 6 inches thick)

Oa6--54 to 60 inches; very dark gray (10YR 3/1) broken face; sapric material; very dark grayish brown (10YR 3/2) pressed or rubbed; about 6 percent fiber; one percent rubbed; massive; nonsticky; slightly fluid; common fine roots; about 40 percent mineral content; mildly alkaline in water.

TYPE LOCATION: Harrison County, Mississippi; 0.4 mile north of the south end of Popps Ferry Bridge along Popps Ferry Road, and 250 feet east of road. NE1/4SW1/4 sec. 22, T. 7 S., R. 10 W.

RANGE IN CHARACTERISTICS: Sulfur content ranges from 0.75 to about 4.5 percent in the subhorizons within 12 to 40 inches of the surface. The organic layers in all tiers are dominantly sapric materials, but some pedons have layers of hemic materials. Thin mineral strata are within a depth of 12 to 51 inches. Thickness of the individual mineral layers commonly ranges from 2 to 6 inches, and the combined thickness is less than 16 inches within 32 inches of the surface. Below 37 inches, thickness and arrangement of the strata are variable. Reaction ranges from neutral to moderately alkaline in water throughout the soil in the natural state; after air drying the pH value in .01M calcium chloride is less than 3.5. Conductivity of the saturation extract of layers at depths below about 6 inches ranges from about 16 to 35 mmho/cm.

The A horizon has hue of 10YR, 2.5Y, or 5Y value of 2 to 4, and chroma of 1 or 2. It is mucky loam, mucky silt loam, or mucky silty clay loam. The hemic or sapric materials within all tiers have hue of 10YR, 2.5Y, or 5Y, value of 2 to 4, and chroma or 1 or 2. The rubbed fiber content ranges from 1 to 16 percent, and the mineral content ranges from 30 to 40 percent. The mineral strata of the C horizon have hue of 10YR, 2.5Y, or 5Y value of 3 to 5 and chroma of 1 or 2. The mineral strata in the 12 to 37 inch depth are loam or silt loam. Below 37 inches, the mineral strata are loam, sandy loam, silty clay, or clay.

COMPETING SERIES: Pocaty is the only competing series. Closely related series include the Allemands, Belhaven, Capers, Dare, Dorovan, Kenner, Lafitte, Mattamuskett, Maurepas, Okeechobee, Pamlico, Pawcatuck, Ponzer, Pungo, Tomoko, and Westbrook series. Pocaty series do not have strata of mineral material within the control section. Allemands, Belhaven, Mattamuskett, Ponzer, and Tomoko soils have thick layers of mineral materials above 51 inches. Also, Tomoko soils have a hyperthermic temperature class; Belhaven, Dare, Dorovan, Mattamuskett, Pamlico, Ponzer, and Pungo soils are extremely acid to strongly acid in undrained pedons in all parts of the control section. Capers soils do not have organic material in more than half of the upper 32 inches. Lafitte, Maurepas, Okeechobee, and all the other competing series except Capers do not have sulfidic materials within 40 inches of the surface. Pawcatuck and Westbrook soils have a mesic temperature class, have fibric material, and are underlain by mineral layers at a depth of less than 51 inches.

GEOGRAPHIC SETTING: Handsboro soils are in large tidal marsh areas of the Eastern Gulf Coast Flatwoods and Atlantic Coast Flatwood Major Land Resource Areas. Elevations are approximately sea level or below. The soil formed in herbaceous plant remains and stratified loamy alluvium deposited in areas that are subject to daily or frequent inundation with brackish water. The climate is warm and humid. Near the type location, the mean annual precipitation is about 58 inches and the mean annual temperature is about 68 degrees Fahrenheit.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Bohicket, Ocilla, Plummer, and Smithton series. Very poorly drained Bohicket soils are in similar areas. Ocilla soils are somewhat poorly drained, and Plummer and Smithton soils are poorly drained mineral soils, on adjoining slightly higher elevations, above daily tidal flooding.

DRAINAGE AND PERMEABILITY: Very poorly drained. Permeability is moderate. These soils are subject to inundation with brackish water at high tide every day. Water table is always near or above the soil surface.

USE AND VEGETATION: Handsboro soils are used mainly as nursery areas for various marine species and by waterfowl and shore birds. Native vegetation is dominantly black needlerush, smooth cord grass, sea lavender, and marsh aster.

DISTRIBUTION AND EXTENT: Florida, Mississippi, and South Carolina. The series is of moderate extent.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama

SERIES ESTABLISHED: Harrison County, Mississippi; 1971.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Histic epipedon - the zone from the surface to a depth of about 37 inches (A, Oa1, Oa2, Oa3 horizons).

Sulfidic materials - indication of sulfidic materials (reaction ranges from neutral or moderately alkaline in water throughout profile in natural state; after air drying, pH value in .01M calcium chloride is less than 3.5). Provisionally, all Sulfihemists are considered to be Typic Sulfihemists.

National Cooperative Soil Survey
U.S.A.

LOCATION POARCH AL+FL MS

Established Series
Rev. LFR:GWH
03/97

POARCH SERIES

The Poarch series consists of deep, well and moderately well drained, moderately permeable soils on uplands that formed in unconsolidated sandy and loamy marine sediments. They are saturated in the lower part in late winter and early spring. Slopes range from 0 to 8 percent.

TAXONOMIC CLASS: Coarse-loamy, siliceous, semiactive, thermic Plinthic Paleudults

TYPICAL PEDON: Poarch fine sandy loam, on a smooth 0.5 percent slope in a cultivated field. (Colors are for moist soil.)

Ap--0 to 7 inches; dark gray (10YR 4/1) fine sandy loam; weak fine granular structure; friable; common fine roots; very strongly acid; clear smooth boundary. (4 to 8 inches thick)

E--7 to 12 inches; light yellowish brown (2.5Y 6/4) loam; weak fine granular structure; friable; few fine roots; common fine pores; very strongly acid; gradual wavy boundary. (0 to 9 inches thick)

Bt1--12 to 24 inches; yellow (2.5Y 7/6) loam; weak medium subangular blocky structure; friable; few fine roots and pores; sand grains coated and bridged with clay; very strongly acid; gradual wavy boundary. (7 to 18 inches thick)

Bt2--24 to 32 inches; yellow (2.5Y 7/6) loam; few fine faint brownish yellow mottles; weak medium subangular blocky structure; friable; few fine roots and pores; most sand grains coated and bridged with clay; common medium light gray (2.5Y 7/2) areas of uncoated sand grains; very strongly acid; clear wavy boundary. (6 to 19 inches thick)

Btv1--32 to 38 inches; mottled yellow (2.5Y 7/6), light gray (2.5Y 7/2), strong brown (7.5YR 5/6), and red (2.5YR 5/6) loam; moderate medium subangular blocky structure; friable; few fine roots and pores; sand grains coated and bridged with clay; about 6 percent plinthite nodules; thin patchy clay films on plinthite nodules; very strongly acid; gradual wavy boundary. (5 to 12 inches thick)

Btv2--38 to 50 inches; mottled olive yellow (2.5Y 6/6), light gray (2.5Y 7/2), strong brown (7.5YR 5/6), and red (2.5YR

5/8) loam; weak medium subangular blocky structure; friable; few fine pores; sand grains coated and bridged with clay; about 12 percent plinthite nodules; thin patchy clay films on plinthite nodules; few iron oxide concretions; very strongly acid; gradual wavy boundary. (10 to 21 inches thick)

Bv3t--50 to 66 inches; mottled brownish yellow (10YR 6/6), light gray (10YR 7/1), strong brown (7.5YR 5/8) loam; weak medium subangular blocky structure; friable; most sand grains coated and bridged with clay; 3 percent plinthite nodules; few iron oxide concretions; very strongly acid.

TYPE LOCATION: Escambia County, Alabama; 2.6 miles southeast of radio station in Atmore, 60 feet north of Florida line road in SW1/4SW1/4SE1/4 sec. 34, T. 1 N., R. 6 E.

RANGE IN CHARACTERISTICS: Solum thickness is more than 60 inches. Reaction is very strongly acid or strongly acid except for surface layers that have been limed. Depth to the Btv horizon ranges from 24 to 58 inches.

The A horizon has hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 3; or it is neutral with value of 3 or 4. The E horizon, where present, has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2 to 4. Texture of the A and E horizons is sandy loam, fine sandy loam, very fine sandy loam, or loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 4 to 8. Texture is sandy loam, fine sandy loam, loam, or silt loam with 8 to 18 percent clay and 20 to 55 percent silt in the control section.

The Btv horizon has colors similar to the Bt horizon or it is mottled in varying shades of red, brown, yellow, or gray. Depth to mottles of chroma 2 or less is more than 30 inches. Percent by volume of plinthite is 5 to 25 percent. Texture of the Btv horizon is the same as the Bt horizon and includes clay loam and sandy clay loam below a depth of about 40 inches.

COMPETING SERIES: These are the Brogdon and Compass series. Brogdon soils are bisequal. Compass soils have less than 20 percent silt in the control section.

GEOGRAPHIC SETTING: These soils are on nearly level to gently sloping uplands of the Coastal Plain. Slopes range from 0 to 8 percent. The soils formed in marine deposits of unconsolidated sandy and loamy sediments. The climate is warm and humid. Near the type location the average annual temperature is 66 degrees F., and the average annual rainfall is about 58 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Atmore, Escambia, Fuquay, Irvington, Malbis, Notcher, Robertsdale, Saucier, and Stilson series. Atmore soils are on lower, dominantly depressional, landforms and have a matrix with chroma of 2 or less. Escambia, Irvington, Robertsdale, and Saucier soils are on slightly lower landforms and have

mottles with chroma of 2 or less within 30 inches of the surface. Fuquay and Stilson soils are on similar landforms, but have a sandy epipedon 20 to 40 inches thick. Malbis and Notcher soils are on similar landforms, but have a fine-loamy control section.

DRAINAGE AND PERMEABILITY: Well and moderately well drained. Slow to medium runoff and moderate to moderately slow permeability.

USE AND VEGETATION: Mostly cleared and used for the production of corn, cotton, soybeans, peanuts, small grains, and truck crops. Other areas are used for pasture and woodland. Forested areas have longleaf, loblolly, and slash pine with some hardwood.

DISTRIBUTION AND EXTENT: Alabama, Florida, Mississippi, and possibly Georgia, Louisiana, and South Carolina. Soil is of moderate extent.

MLRA OFFICE RESPONSIBLE: Auburn, Alabama

SERIES ESTABLISHED: Escambia County, Alabama; 1969

REMARKS: Chroma 2 colors at depths less than 30 inches are attributed to clean quartz grains rather than wetness. Data are available from samples of four pedons.

National Cooperative Soil Survey
U. S. A.

Appendix 4

WETLAND DELINEATION PHOTOS

NORTH

GRAPHIC SCALE

100 0 50 100 200

(IN FEET)

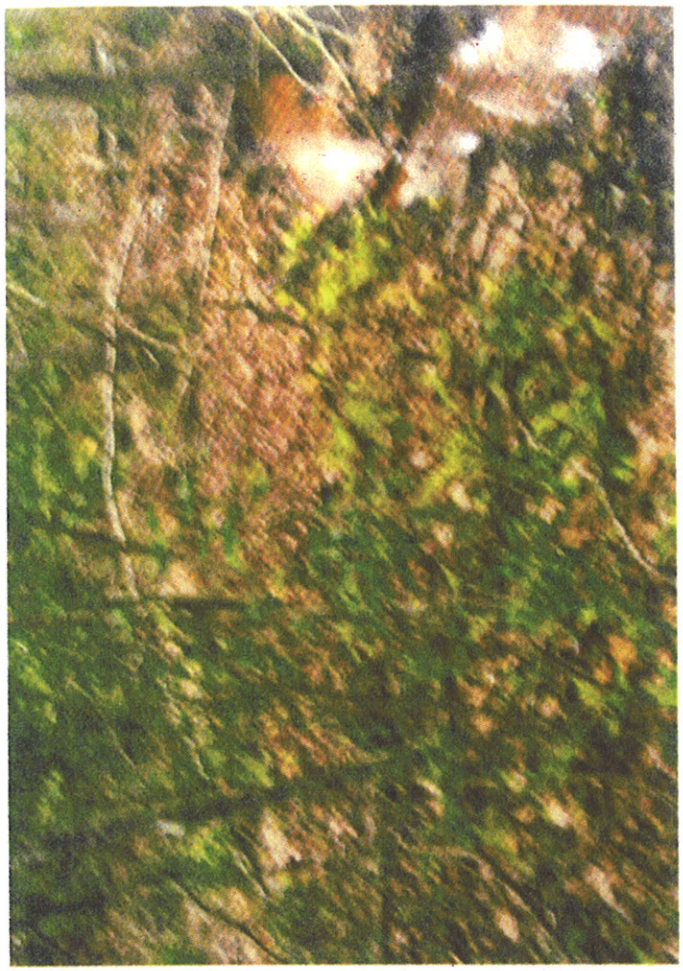
1 inch = 100 ft.

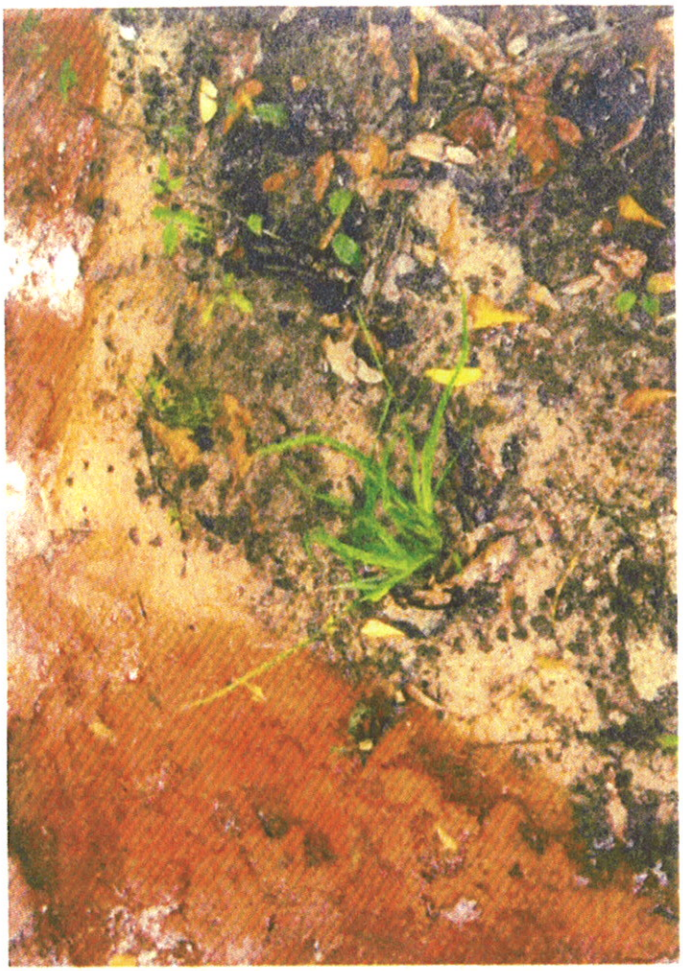
POPPS FERRY ROAD AND BRIDGE

ENVIRONMENTAL ASSESSMENT

WETLAND DELINEATION
AT NORTH ABUTMENT

BROWN & MITCHELL, INC.
Consulting Engineers
796 Vieux Marche, 2nd Floor Biloxi, MS 39530





Appendix 5

DEPARTMENT OF MARINE RESOURCES APPLICATION AND NOTIFICATION FOR BRIDGE CONSTRUCTION

2756-A JH
Rec'd
JAN 11 2008

MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES

January 9, 2008

Jill High
Brown & Mitchell, Inc.
796 Vieux Marche 2nd Floor
Biloxi, MS 39530

RE: DMR-080469

Dear Ms. High:

The Department of Marine Resources in cooperation with other state agencies is responsible under the Mississippi Coastal Program (MCP) for managing the coastal resources of Mississippi. Proposed activities in the coastal area are reviewed to insure that the activities are in compliance with the MCP.

The Department has received a request from the City of Biloxi to review the proposed improvements and upgrades of Popps Ferry Road, including the Popps Ferry Drawbridge where it crosses the Back Bay of Biloxi in Biloxi, Harrison County, Mississippi. Please note that construction of piers and other water dependent structures are activities that are regulated by this office as well as the U.S. Army Corps of Engineers. An application form (enclosed) should be submitted to this office for review of the proposed project. Thank you for the opportunity to comment on your project.

For more information or questions concerning this correspondence, contact Jana Guynes with the Bureau of Wetlands Permitting at (228) 523-4118 or jana.guynes@dmr.ms.gov.

Sincerely,

Willa Henriksen
Bureau Director, Wetlands Permitting

WH/jjg

Enclosure

MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES

To Whom It May Concern:

Enclosed is a copy of the USACE/MSDMR/MSDEQ Joint Application and Notification Form required to obtain authorization for conducting a regulated activity. To aid you in the application process, we have included the following:

- The USACE Mobile District General Permit Program (for construction within Hancock, Harrison and Jackson counties); and
- A sample drawing.

Also enclosed are forms that we may require under certain circumstances:

- An adjacent property owner authorization form (for construction of structures, other than bulkheads, within 10 feet of their property line); and
- An agent authorization form which gives the agent authorization to discuss and/or alter project design (required when you want someone to act as your agent in obtaining a permit).

When applying for a permit, please submit the completed application to our office with the following:

- A check made payable to the MS Department of Marine Resources for the appropriate fees (described in the permit application on page 5);
- Clear and concise instructions to the project site, including a map;
- An accurate drawing of the proposed activity;
- An adjacent property owner authorization form when applicable; and
- An agent authorization form when applicable.

Also remember to include your phone number and sign the application on page four.

If you need any assistance in completing this application, please contact the Bureau of Wetlands Permitting at (228)-374-5000

JOINT APPLICATION AND NOTIFICATION

U.S. ARMY CORPS OF ENGINEERS
MISSISSIPPI DEPARTMENT OF MARINE RESOURCES
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY/OFFICE OF POLLUTION CONTROL

This form is to be used for proposed activities in waters of the United States in Mississippi and for the erection of structures on suitable sites for water dependent industry. Note that some items, as indicated, apply only to projects located in the coastal area of Hancock, Harrison and Jackson Counties.

1. Date _____
month day year

2. Applicant name, mailing address, phone number and email address:	Agent name, mailing address, phone number and email address:	3. Official use only COE _____ DMR _____ DEQ _____ A95 _____ DATE RECEIVED _____

4. **Project location**
Street Address_____ City/Community_____
Name of Waterway_____ Latitude_____ Longitude (if known)_____
Geographic location: Section_____ Township_____ Range_____ County_____

5. **Project description**

New work___ Maintenance work___

Dredging

__Channel length_____ width_____ existing depth_____ proposed depth_____
__Canal length_____ width_____ existing depth_____ proposed depth_____
__Boat Slip length_____ width_____ existing depth_____ proposed depth_____
__Marina length_____ width_____ existing depth_____ proposed depth_____
__Other-Mooring Basin length_____ width_____ existing depth_____ proposed depth_____

Cubic yards of material to be removed_____ Type of material_____
Location of spoil disposal area_____
Dimensions of spoil area_____ Method of excavation_____
How will excavated material be contained?_____

Construction of structures

____Bulkhead Total length_____ Height above water_____
____Pier length_____ width_____ height_____
____Boat Ramp length_____ width_____ slope_____
____Boat House length_____ width_____ height_____

____Structures on designed sites for water dependent industry (Coastal area only). Explain in item 11 or include as attachment.
____Other (explain)_____

Filling

Dimensions of fill area_____
Cubic yards of fill_____ Type of fill_____

Other regulated activities (i.e. Seismic exploration, burning or clearing of marsh) Explain.

_____
_____
_____
_____

6. Additional information relating to the proposed activity

Does project area contain any marsh vegetation? Yes _____ No _____

(If yes, explain)_____

Is any portion of the activity for which authorization is sought now complete? Yes_____ No_____

(If yes, explain)_____

Month and year activity took place_____

If project is for maintenance work on existing structures or existing channels, describe legal authorization for the existing work. Provide permit number, dates or other form(s) of authorization._____

Has any agency denied approval for the activity described herein or for any activity that is directly related to the activity described herein?

Yes_____ No_____(If yes, explain)_____

7. **Project schedule**

Proposed start date_____Proposed completion date_____

Expected completion date (or development timetable) for any projects dependent on the activity described herein._____

8. **Estimated cost of the project**_____

9. **Describe the purpose of this project. Describe the relationship between this project and any secondary or future development the project is designed to support.**_____

Intended use: Private_____Commercial_____Public_____Other (Explain)_____

10. **Describe the public benefits of the proposed activity and of the projects dependent on the proposed activity. Also describe the extent of public use of the proposed project.**

11. **Narrative Project Description:**

12. Provide the names and addresses of the adjacent property owners. Also identify the property owners on the plan view of the drawing described in Attachment "A". (Attach additional sheets if necessary.)

1. 2.

13. List all approvals or certifications received or applied for from Federal, State and Local agencies for any structures, construction, discharges, deposits or other activities described in this application. Note that the signature in Item 14 certifies that application has been made to or that permits are not required from the following agencies. If permits are not required, place N/A in the space for Type Approval.

Agency	*Type Approval*	*Application Date*	*Approval Date*
Dept. of Environmental Quality			
Dept. of Marine Resources			
Army Corps of Engineers			
City/County_____			
Other_____			

14. Certification and signatures

Application is hereby made for authorization to conduct the activities described herein. I agree to provide any additional information/data that may be necessary to provide reasonable assurance or evidence to show that the proposed project will comply with the applicable state water quality standards or other environmental protection standards both during construction and after the project is completed. I also agree to provide entry to the project site for inspectors from the environmental protection agencies for the purpose of making preliminary analyses of the site and monitoring permitted works. I certify that I am familiar with and responsible for the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete and accurate. I further certify that I am the owner of the property where the proposed project is located or that I have a legal interest in the property and that I have full legal authority to seek this permit.

U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willingly falsifies, conceals, or covers up by any trick, scheme or device a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than five years, or both.

Mississippi Coastal Program (Coastal area only)

I certify that the proposed project for which authorization is sought complies with the approved Mississippi Coastal Program and will be conducted in a manner consistent with the program.

_____ _____

Signature of Applicant or Agent Date

15. Fees

Payable to MS Dept. of Marine Resources
$50.00 Single-family residential application fee
$500.00 Commercial application fee
Public notice fee may be required

Please include appropriate fees for all projects proposed in coastal areas of Hancock, Harrison and Jackson Counties.

16. **If project is in Hancock, Harrison or Jackson Counties, send one completed copy of this application form and appropriate fees listed in Item 15 to:**

Department of Marine Resources
Bureau of Wetlands Permitting
1141 Bayview Avenue
Biloxi, MS 39530
(228) 374-5000

If project <u>IS NOT</u> in Hancock, Harrison or Jackson Counties, send one completed copy of this application form to each agency listed below:

District Engineer
Mobile District
Attn: CESAM-RD
P.O. Box 2288
Mobile, AL 36628-0001

District Engineer
Vicksburg District
Regulatory Branch
Attn: CEMVK-OD-F
4155 Clay Street
Vicksburg, MS 39183-3435

Director
Mississippi Dept. of Environmental Quality
Office of Pollution Control
P.O. Box 10385
Jackson, MS 39289

7. **In addition to the completed application form, the following attachments are required:**

Attachment "A" Drawings

Provide a vicinity map showing the location of the proposed site along with a written description of how to reach the site from major highways or landmarks. Provide accurate drawings of the project site with proposed activities shown in detail. All drawings must be to scale or with dimensions noted on drawings and must show a plan view and cross section or elevation. Use 8 1/2 x 11" white paper or drawing sheet attached.

Attachment "B" Authorized Agent

If applicant desires to have an agent or consultant act in his behalf for permit coordination, a signed authorization designating said agent must be provided with the application forms. The authorized agent named may sign the application forms and the consistency statement.

Attachment "C" Environmental Assessment *(Coastal Area Only)*

Provide an appropriate report or statement assessing environmental impacts of the proposed activity and the final project dependent on it. The project's effects on the wetlands and the effects on the life dependent on them should be addressed. Also provide a complete description of any measures to be taken to reduce detrimental offsite effects to the coastal wetlands during and after the proposed activity. Alternative analysis, minimization and mitigation information may be required to complete project evaluation.

Attachment "D" Variance or Revisions to Mississippi Coastal Program *(Coastal area only)*

If the applicant is requesting a variance to the guidelines in Section 2, Part III or a revision to the Coastal Wetlands Use Plan in Section 2, Part IV of the Rules, Regulations, Guidelines and Procedures of the Mississippi Coastal Program, a request and justification must be provided.

Attachment "A" Drawings

Adjacent Property Owner Authorization

Date: _____

DMR #_____
(For Office Use Only)

_____has my permission to construct the intended
(Print Applicant Name)

_____
(Project Description; examples: Pier, Boathouse, etc.)

within a distance of less than ten feet (10') of my adjacent property line as shown in the signed, attached diagram*.

Signature: _____
(Adjacent Property Owner)

Adjacent Property Information:	Applicant Information:
_____	_____
Print Name	Print Name
_____	_____
Print Address	Print Address
_____	_____
City, State and Zip Code	City, State and Zip Code
_____	_____
Phone Number	Phone Number

* Adjacent property owner must sign diagram of proposed project.

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

Agent Authorization

I authorize the person(s) and/or company listed below to act as my agent regarding the proposed project as described in the Joint Application and Notification at the location listed below:

_____ (name of agent)

_____ (location of project)

_____ (address)

_____

_____ (city, state, zip code)

_____

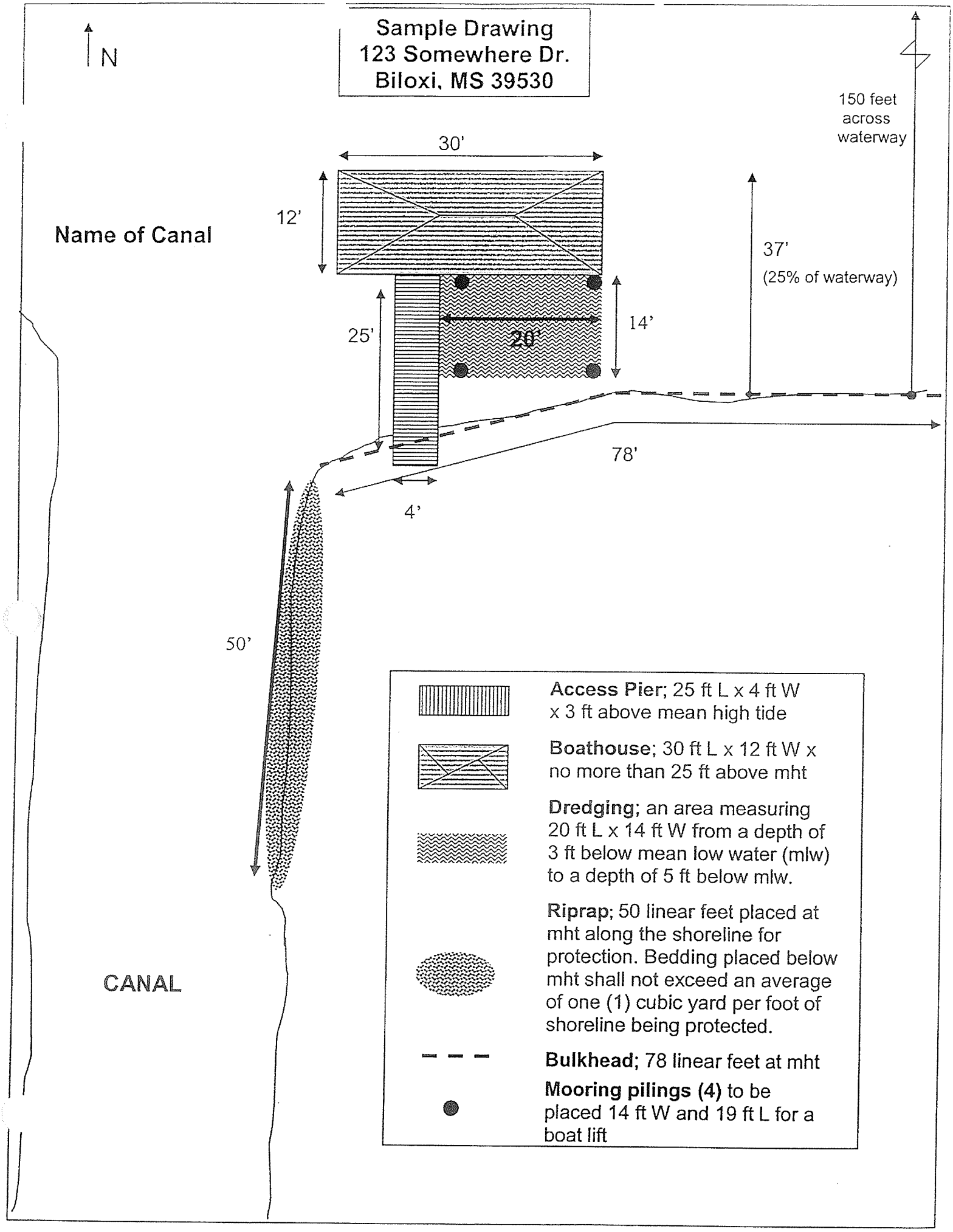
_____ (agent phone number)

_____ (print your name)

_____ (your signature)

_____ (date)

Do you want the permit mailed to the agent? _____Yes _____ No


N
Sample Drawing
123 Somewhere Dr.
Biloxi, MS 39530
150 feet
across
waterway
30'
12'
Name of Canal
37'
(25% of waterway)
25'
14'
20'
78'
4'
50'
CANAL
Access Pier; 25 ft L x 4 ft W x 3 ft above mean high tide
Boathouse; 30 ft L x 12 ft W x no more than 25 ft above mht
Dredging; an area measuring 20 ft L x 14 ft W from a depth of 3 ft below mean low water (mlw) to a depth of 5 ft below mlw.
Riprap; 50 linear feet placed at mht along the shoreline for protection. Bedding placed below mht shall not exceed an average of one (1) cubic yard per foot of shoreline being protected.
Bulkhead; 78 linear feet at mht
Mooring pilings (4) to be placed 14 ft W and 19 ft L for a boat lift

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

REPLY TO
ATTENTION OF:

Coastal Branch
Regulatory Division

JAN 5 2007

SAM-2006-2004-ALF; MS-GP-01 for SHORELINE STABILIZATION
SAM-2006-2020-ALF; MS-GP-02 for DOCKS, PIERS, WHARVES
SAM-2006-2023-ALF; MS-GP-04 for MOORING PILINGS
SAM-2006-2025-ALF; MS-GP-05 for BOAT SLIPS/BOAT BERTHS
SAM-2006-2027-ALF; MS-GP-06 for BOAT RAMPS
SAM-2006-2029-ALF; MS-GP-07 for MAINTENANCE DREDGING
SAM-2006-2030-ALF; MS-GP-08 for NEW WORK CHANNEL DREDGING
SAM-2006-2031-ALF; MS-GP-09 for FILL IN PREVIOUSLY DREDGED AREAS
SAM-2006-2032-ALF; MS-GP-10 for DEBRIS REMOVAL
SAM-2006-2034-ALF; MS-GP-11 for INTAKE/DISCHARGE STRUCTURES
SAM-2006-2035-ALF; MS-GP-12 for SUBSURFACE UTILITY LINES

U.S. ARMY CORPS OF ENGINEERS

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

Summary of Mississippi General Permits for Minor Structures and Activities within the Coastal Counties of the State of Mississippi, Located within the Regulatory Boundaries of the Mobile District of the U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers, Mobile District (District), will regulate, under Regional General Permits, minor structures and activities in waters of the U.S., in the three coastal counties (Jackson, Harrison, and Hancock Counties) of the state of Mississippi and outer continental shelf waters off the coast of Mississippi, within the Regulatory boundaries of the Mobile District, subject to Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403), Section 404 of the Clean Water Act (33 USC 1344), and/or Section 4(e) of the Outer Continental Shelf Lands Act of 1953 (67 Stat. 463; 43 USC 1333(e)). The District's authority to issue these permits is found in 33 CFR Part 325.5.

The Mississippi Department of Marine Resources (DMR) has regulatory authority in the coastal zone of Mississippi in accordance with the Coastal Wetlands Protection Law (Sections 49-27-1 through 69), enabling legislation in Section 57-15-6 for the Mississippi Coastal Program and the guidelines of the Mississippi Coastal Program.

In accordance with Section 401 of the Clean Water Act (33 USC 1341), the Mississippi Department of Environmental Quality/ Office of Pollution Control (DEQ) issues water quality certification for permits which may result in any discharge into waters of the U.S.

SAM-2006-2004-ALF

MS-GP-01 - SHORELINE STABILIZATION:

This permit authorizes the placement of bulkheads, armoring systems (riprap), bioengineering, and other standard shoreline protection/stabilization devices roughly paralleling, and at the shoreline or bank.

Length Limitations:

- Bulkhead placement is limited to a total project length of 1000 feet.
- There is no limit to the length that may be authorized for other protection devices.

Placement of Structure(s): Protection structures must be at mean high tide line in tidal waterbodies, ordinary high water line in non-tidal waterbodies, or landward of all jurisdictional wetlands.

Wetland Concerns:

- No wetlands shall be filled, although protection may be provided for wetland areas as long as the wetlands themselves are not otherwise adversely affected.
- If the area or any portion to be protected is a wetland, no fill will be placed in the wetland and the shore protection device must be designed to allow the normal hydrologic regime to be maintained in wetland areas.
- Flow-through bulkheads designed to dissipate wave energy in wetland areas may be constructed waterward of the wetlands and placed below the line of mean high tide or ordinary high water if they are designed to allow for the normal hydrologic regime to be maintained in the wetland areas and they do not pose a hazard to navigation.

Rip Rap limitations: Material placed below the plane of ordinary high water or the plane of mean high tide may not exceed an average of one (1) cubic yard per foot of shoreline being protected.

Construction Limitations:

- Vertical face structures intended to replace failing erosion control structures may be placed waterward of the line of mean high tide or ordinary high water, but shall not extend more than 24 inches waterward from the base of the failed structure. In no instance shall vegetated wetlands (emergent or submerged) or shellfish beds be filled.
- Riprap stabilization shall not extend farther than 3-6 feet into the waterway from the mean high tide line or ordinary high water line.

Construction Material Requirements:

- Filter Fabric: Use of the appropriate filter fabric is required.
- Backfill Material: Only clean material free of waste, metal and organic trash, unsightly debris, petroleum products (asphalt), etc., may be used as backfill.
- Riprap Material: Only clean riprap material, free of exposed rebar, asphalt, plastic, soil, etc., may be used. Riprap may be used to augment other protection methods.

Prohibited Structures: Solid groins and jetties roughly perpendicular to the shoreline are not authorized under this General Permit. This permit may not be used to regain land lost due to erosion, or otherwise accrete land.

Existing Marinas:

- Altering pier configuration or adding berthing spaces within existing marina boundaries may be permitted.
- If construction results in additional boats being berthed, a wastewater pump out facility may be required.
- New marinas and expansions of existing marinas beyond existing boundaries may not be permitted under this Permit.

Other: Fueling facilities, toilets, and/or habitable structures, and activities that produce "gray water" are not authorized by this General Permit. This permit does not authorize the mechanical clearing or filling of wetlands.

SAM-2006-2023-ALF

MS-GP-04 – MOORING PILINGS:

This permit authorizes mooring pilings, dolphins, and single-pile structures. A limit of 3 residential-use boat berthing areas, including berthing for personal watercraft, can be authorized under this Permit.

Permanent Mooring: Structures for the permanent mooring of houseboats are not authorized by this permit.

Single-Pile Structures:

- Single-pile structures may include posts for wood duck nests, osprey platforms, etc.
- Single-pile structures shall be limited to 25' in height above mean high water.

Setback: A minimum of 10 feet shall be maintained between the authorized structure and the adjacent property lines and projections thereof into the waterway.

Dolphins: Should dolphin construction (cluster pilings) require any material other than pilings or similar solid, linear structures being placed in waters of the U.S., all project details must be submitted to the authorizing agency. Additionally, only clean material free of waste, metal and organic trash, unsightly debris, etc. may be used as stabilization material in dolphin construction.

Creosote Materials: No creosote or asphalt building material shall be used in construction.

Public Trust Tidelands: A public trust tidelands lease from the Mississippi Secretary of State may be required for certain structures.

SAM-2006-2025-ALF

MS-GP-05 – BOAT SLIPS/BOAT BERTHS:

This permit authorizes the construction and/or modification of boat slips and boat berths. For proposals in the Mississippi Sound, project specific authorization must be obtained through the Mobile District, versus the DMR, so as to allow for completion of consultation with the National Marine Fisheries Service regarding Gulf sturgeon critical habitat.

Cubic Yards of Dredged Material:

- This permit allows dredging of up to 500 cubic yards of material from below the mean high tide line or ordinary high water mark.
- If an existing slip or berth is being modified or enlarged, the total volume dredged originally, plus that being dredged now, cannot exceed 500 cubic yards of material below mean high tide line or ordinary high water mark.

Best Management Practices: Best management practices should be used at all times during construction

Disposal Area:

- All dredged material must be properly confined in an upland area unless otherwise authorized.
- Hydraulic dredging will require an upland bermed disposal area (or other suitable methods of retention). Additional best management practices will apply regarding the return water from the bermed disposal area.
- Spoil disposal areas shall be immediately seeded and stabilized to prevent the movement of sediment off-site and into adjacent drainage areas.

Special Aquatic Sites: No dredging or filling is authorized in wetlands, submerged grassbeds, or shellfish beds and no dredged material shall be used to raise the elevation of any wetlands.

SAM-2006-2029-ALF

MS-GP-07 – MAINTENANCE DREDGING:

Area to be Dredged: Dredging is limited to the previously dredged and previously authorized dimensions. For proposals in the Mississippi Sound, project specific authorization must be obtained through the Mobile District, versus the DMR, so as to allow for completion of consultation with the National Marine Fisheries Service regarding Gulf sturgeon critical habitat.

Cubic Yards of Material to be Removed: Maintenance dredging of up to 2,500 cubic yards of material is authorized by this permit; however, maintenance dredging of previously authorized residential boat slips or open-water berths shall be limited to 500 cubic yards of material.

Best Management Practices: Best management practices should be used at all times during construction to minimize turbidity at both the dredged and spoil sites. Methods should include, but not limited to, the use of staked hay bales; staked filter cloth; sodding, seeding and mulching; staged construction; and the installation of turbidity screens around the immediate project site. Any effluent from the disposal area should be routed through a return swale system and filtered through a series of hay bales and silt fences so as to reduce the turbidity of the effluent.

Disposal Area:

- All dredged material must be properly confined in an upland area unless otherwise authorized.
- Hydraulic dredging will require an upland bermed disposal area (or other suitable methods of retention). Additional best management practices as required by the Mississippi Department of Environmental Quality will apply regarding the return water from the bermed disposal area.
- Spoil disposal areas shall be immediately seeded and stabilized to prevent the movement of sediment off-site and into adjacent drainage areas.

Hydrographic Survey: Before and after hydrographic surveys may be required based on local knowledge of the waterway and likelihood that important aquatic resources or special aquatic sites could be present.

Special Aquatic Sites: No dredging of wetlands, submerged grassbeds, or shellfish beds is authorized (exceptions may be made for noxious vegetation in man-made waterbodies).

Fill Material: Only clean material free of waste, metal and organic trash, unsightly debris, etc., may be used as fill.

Areas Excluded:

- No wetlands, submerged grass beds, natural streams, shellfish beds, or natural channels may be filled.
- No area providing mitigation, enhancement, or flushing of an aquatic system may be filled.

SAM-2006-2032-ALF

MS-GP-10 – DEBRIS REMOVAL:

This permit allows debris to be removed from any waterway for navigation, drainage, and/or pollution control.

Debris Definition: Debris includes, but is not limited to, non-imbedded stumps, tree limbs, appliances, lumber, metal objects, etc.

Non-Authorized Work:

- Dredging of gravel, sand, silt, and the removal of hazardous materials, etc., is not authorized under this permit.
- Snagging of dead (imbedded) or living trees from a stream bank is not authorized under this permit. However, trees imbedded in the bank may be cut off but their stumps may not be removed from the bank.
- Impacts to submerged aquatic vegetation are not authorized under this permit.

Disposal Area: All debris must be properly placed in an approved landfill. Alternative sites for the disposal of woody debris may be authorized on a case-by-case basis.

Burning of Debris: Woody debris should not be burned unless full coordination with the Mississippi Department of Environmental Quality/ Air Division has been completed.

SAM-2006-2034-ALF

MS-GP-11 – INTAKE/DISCHARGE STRUCTURES:

This permit authorizes the construction or modification of intake and/or discharge structures in navigable waters of the United States.

Work May Include:

- This includes minor excavation, filling, and other work associated with the installation and maintenance of intake/discharge structures. Authorization includes the minimal dredging or filling necessary to create/maintain serviceable intake/discharge structures.
- Modifications to existing intake/discharge structures may also be authorized.
- This permit does not authorize dredging or filling for access and/or work pads.

Dredging/Disposal: Dredging associated with maintenance of an intake structure may be authorized, provided dredged material is properly deposited in an upland area.

Navigation Concerns: Work authorized by this permit shall not adversely affect general navigation or the maintenance of Federal navigation projects.

GENERAL CONDITIONS

NOTE: The term "you" and its derivatives, means the permittee or any future transferee. The term "District" refers to the Mobile District, U.S. Army Corps of Engineers, and/or resource agencies that administers the General Permits within the area of their management. The above-described structures and activities may be authorized under these General Permits subject to the following conditions:

A. You must submit satisfactory plans and you are advised that all State and local permits must be obtained before work can be initiated. Conformance with descriptions and quantities contained herein does not necessarily guarantee consideration and/or subsequent authorizations. Additionally, you must have the requisite property rights to perform the requested work.

B. These General Permits will be valid for a 5 year period or until suspended, revoked, or extended. An authorization to perform work pursuant to a General Permit is good for 5 years from the date of issuance. Unless circumstances require either a prompt completion of the authorized activity or a reevaluation of the public interest decision, favorable consideration will normally be given to a request for a time extension.

C. Authorizations will not be issued which will adversely impact threatened or endangered species, or their critical habitat.

D. Authorizations will not be issued which will impact, affect or otherwise degrade cultural resources such as archaeological, scientific, prehistoric, or historic sites or data. Activities that will impact cultural resources will be evaluated as Standard Permits or Letters of Permission. If you discover any previously unknown historic or archaeological remains while accomplishing an authorized activity, you must immediately notify the Mobile District, of what you have found. We will initiate the Federal and State coordination required to determine if the site warrants a recovery effort or if it is eligible for listing in the National Register of Historic Places.

E. Authorizations will not be issued for activities located in State or National Wild and Scenic streams, rivers, or components thereof, or other areas provided special protection unless the administrating agency concurs.

F. Creosote material shall be not utilized in waters of the United States.

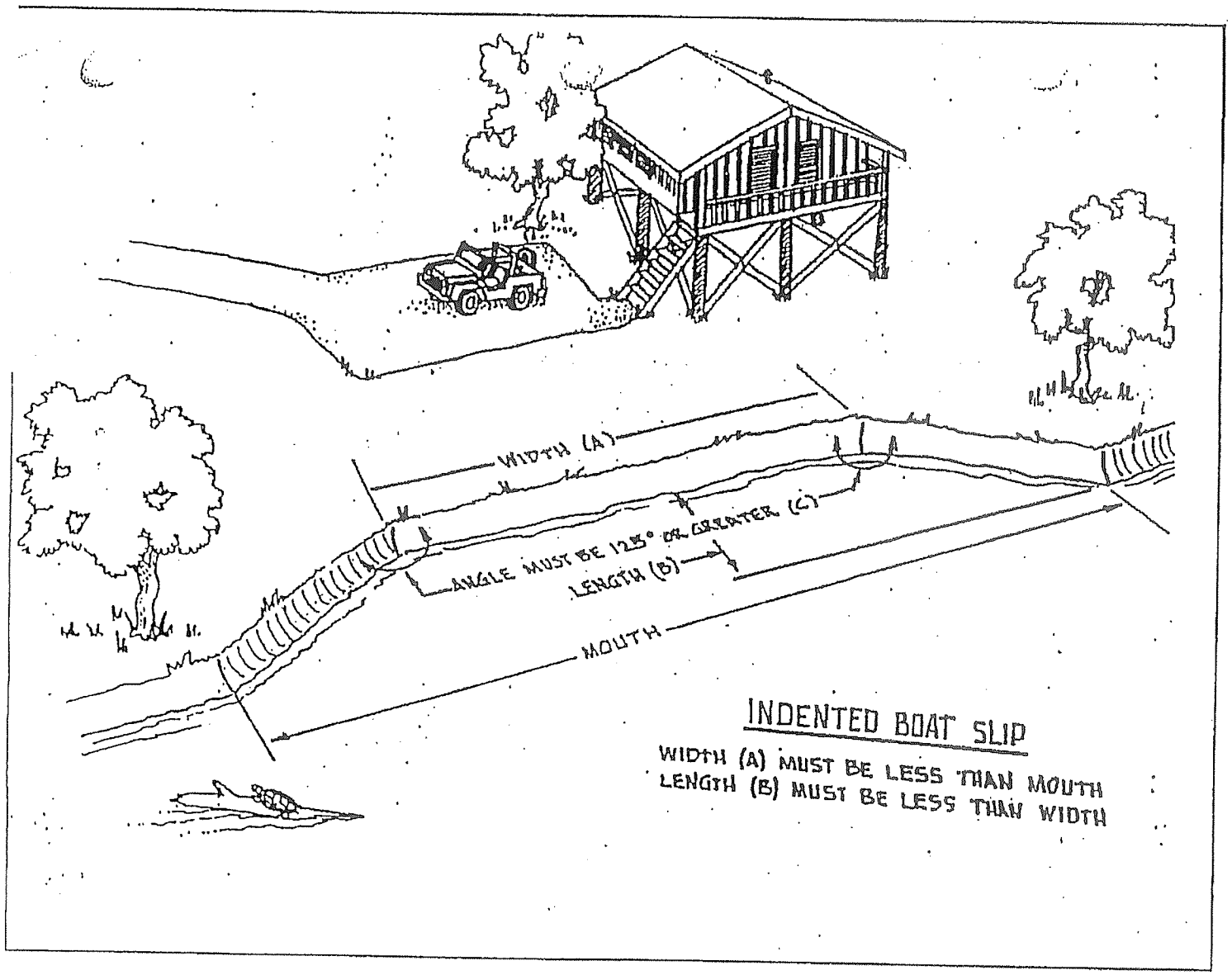
G. Authorizations will be suspended if State water quality standards are not met.

(i)The depths of any channels and/or slips shall gradually increase toward open water and shall not exceed the controlling navigational depth. No "sumps" shall be created by proposed dredging.

(ii) No sewage, oil, refuse, or other pollutants shall be discharged into the watercourse.

(iii) Turbidity outside the limits of a 750-foot mixing zone shall not exceed the ambient turbidity by more than 50 Nephelometric Turbidity Units.

H. You must maintain the authorized activity in good condition and conformance with the terms and conditions of your authorization. You are not relieved of this requirement if you abandon the authorized activity.



INDENTED BOAT SLIP

WIDTH (A) MUST BE LESS THAN MOUTH
LENGTH (B) MUST BE LESS THAN WIDTH

Appendix 6

THREATENED AND ENDANGERED SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mississippi Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

May 26, 2010

Ms. Jill High
Brown and Mitchell, Inc.
796 Vieux Marche – 2nd Floor
Biloxi, Mississippi 39530

JUN 01 2010

Dear Ms. High:

The Fish and Wildlife Service (Service) has reviewed the information in your letter dated May 14, 2010, regarding an "Effects Determination" for the Popps Ferry Road and Bridge Environmental Assessment. The project occurs in Biloxi in Harrison County, Mississippi.

Your letter stated that "a determination of "May Affect, but Not Likely to Adversely Affect" was made for Alabama red-bellied turtle *(Pseudemys alabamensis)*. Based on the information provided in your letter, the Service concurs that this project "May Affect, but Not Likely to Adversely Affect" federally protected species. No further consultation with this office is required unless there are changes in the scope or location of the proposed project. However, if any federally listed species are discovered during construction, all activities must cease, and this office must be notified immediately.

Our comments are submitted in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). If you have any questions, please contact Sandra Kilpatrick at our office, telephone: (601) 321-1135.

Sincerely,

for **Stephen M. Ricks**
Field Supervisor
MS Field Office

Brown & Mitchell, Inc.
Consulting Engineers
Gulfport, MS — Biloxi, MS

May 14, 2010

David Felder/Sandie Kilpatrick
Fish and Wildlife Biologist
MDOT Liaison
U. S. Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, MS 39213

RE: Effects Determination – "May Affect, but Not Likely to Adversely Affect"
Popps Ferry Road and Bridge Environmental Assessment
Biloxi, Harrison County, Mississsippi

This letter is presenting an "Effects Determination" for the Popps Ferry Road and Bridge Environmental Assessment. A letter received by us January 10, 2008 from the USFWS listed two (2) species of concern that may be found in this area; 1) Brown Pelican (*Pelecanus occidentalis*) (which has since been de-listed as of 2010 – and will not be addressed in this letter), and Alabama Red-Bellied turtle (*Pseudemys alabamensis*). A determination of "May Affect, but Not Likely to Adversely Affect," has been recommended due to the following environmental findings:

1) The habitat requirements for the Alabama Red-Bellied turtle suggests that they could occur in this area, however, no documented sightings have been recorded.

2) The construction of a new bridge will yield minimal impact to the habitat required by this species (e.g. brackish water, submerged and emergent vegetation, and Juncus marsh). Effects to emergent marsh will be indirect and temporary due to construction activities. Permanently affected (i.e., removal of such) marsh habitat is limited to the outer edges of the upland, low-quality area under the northern incline of the bridge, not a significant area of habitat for this species. Water quality in this area will be temporarily affected during construction, due to siltation and turbidity, but construction activities will not be permanently impact overall water quality of the effluent water.

3) Stormwater runoff will be handled according to BMP's for this type of construction, which will be determined during the Design Phase.

4) Construction activities will be monitored such that any sightings of the species of concern will be reported immediately to USFWS and work will cease until further consultation occurs.

It is hereby determined that the proposed improvements to Popp's Ferry Road and Bridge are not likely to jeopardize the continued existence of any endangered or threatened species, and will not destroy/adversely modify designated critical habitat within the project area.

If any questions arise, please feel free to contact me or Kreg Overstreet.

Sincerely,

Jill High
Brown and Mitchell, Inc.
Biloxi Office

U.S. Fish & Wildlife Service

Threatened & Endangered Species System

Mississippi

Notes:

- *This report shows the listed species associated in some way with this state.*
- *This list does not include experimental populations and similarity of appearance listings.*
- *This list includes non-nesting sea turtles and whales in State/Territory coastal waters.*
- *This list includes species or populations under the sole jurisdiction of the National Marine Fisheries Service.*
- *Click on the highlighted scientific names below to view a Species Profile for each listing.*

Listings and occurrences for Mississippi -- 42 listings

- **34 occurring in Mississippi**
- **8 not occurring in Mississippi**
- **3 species listed in some other state occurring in Mississippi**

Animals -- 38 listings

- **30 occurring in Mississippi**
- **8 not occurring in Mississippi**
- **3 species listed in some other state occurring in Mississippi**

Status	***Species listed in this state and that occur in this state***
E	Bat, Indiana (*Myotis sodalis*)
T	Bear, Louisiana black (*Ursus americanus luteolus*)
E	Clubshell, black (*Pleurobema curtum*)
E	Clubshell, ovate (*Pleurobema perovatum*)
E	Clubshell, southern (*Pleurobema decisum*)
E	Combshell, southern (*Epioblasma penita*)
E	Crane, Mississippi sandhill (*Grus canadensis pulla*)
T	Darter, bayou (*Etheostoma rubrum*)
E	Frog, Mississippi gopher Wherever found west of Mobile and Tombigbee Rivers in AL, MS, and LA (*Rana*
T	Moccasinshell, Alabama (*Medionidus acutissimus*)
T	Mucket, orangenacre (*Lampsilis perovalis*)
E	Pelican, brown except U.S. Atlantic coast, FL, AL (*Pelecanus occidentalis*)

E	Pigtoe, flat (*Pleurobema marshalli*)
T	Plover, piping except Great Lakes watershed (*Charadrius melodus*)
E	Pocketbook, fat (*Potamilus capax*)
T	Sea turtle, green except where endangered (*Chelonia mydas*)
E	Sea turtle, hawksbill (*Eretmochelys imbricata*)
E	Sea turtle, Kemp's ridley (*Lepidochelys kempii*)
E	Sea turtle, leatherback (*Dermochelys coriacea*)
T	Sea turtle, loggerhead (*Caretta caretta*)
E	Stirrupshell (*Quadrula stapes*)
E	Sturgeon, Alabama (*Scaphirhynchus suttkusi*)
T	Sturgeon, gulf (*Acipenser oxyrinchus desotoi*)
E	Sturgeon, pallid (*Scaphirhynchus albus*)
E	Tern, least interior pop. (*Sterna antillarum*)
T	Turtle, ringed map (*Graptemys oculifera*)
T	Turtle, yellow-blotched map (*Graptemys flavimaculata*)
E	Whale, finback (*Balaenoptera physalus*)
E	Whale, humpback (*Megaptera novaeangliae*)
E	Woodpecker, red-cockaded (*Picoides borealis*)

Status	***Species listed in this state that do not occur in this state***
E	Beetle, American burying (*Nicrophorus americanus*)
E	Combshell, Cumberlandian Entire Range; Except where listed as Experimental Populations (*Epioblasma b*
E	Curlew, Eskimo (*Numenius borealis*)
T	Heelsplitter, Alabama (=inflated) (*Potamilus inflatus*)
E	Panther, Florida (*Puma (=Felis) concolor coryi*)
E	Pigtoe, heavy (*Pleurobema taitianum*)
T	Snake, eastern indigo (*Drymarchon corais couperi*)
E	Wolf, gray Lower 48 States, except where delisted and where EXPN. Mexico. (*Canis lupus*)

Status	***Listed species occurring in this state that are not listed in this state***

E	Sawfish, smalltooth (*Pristis pectinata*)
T	Tortoise, gopher W of of Mobile/Tombigbee Rs. (*Gopherus polyphemus*)
E	Turtle, Alabama red-belly (*Pseudemys alabamensis*)

Plants -- 4 listings

- **4 occurring in Mississippi**
- **0 not occurring in Mississippi**
- **0 species listed in some other state occurring in Mississippi**

Status	***Species listed in this state and that occur in this state***
E	Chaffseed, American (*Schwalbea americana*)
E	Pondberry (*Lindera melissifolia*)
T	Potato-bean, Price's (*Apios priceana*)
E	Quillwort, Louisiana (*Isoetes louisianensis*)

Appendix 7

SOLICITATION OF VIEWS LETTER
MAILING LIST
AND
RESPONSES

January 3, 2008

Name
Agency
Address
City, zip

Re: Solicitation of Views
Popps Ferry Road and Bridge Improvements Project
Harrison County Project No.: STPD-9376-00(004)/104384-101000

Dear Mr._____:

The City of Biloxi is proposing improvements/upgrades to be made to Popps Ferry Road and Bridge from the intersection with North Country Club Lane south to Pass Road. The improvements will facilitate traffic flow along this arterial. This solicitation of views is presented to Federal, State, and local agencies, organizations, and individuals. Your comments will provide necessary information and expertise in assisting the City of Biloxi with the early identification of possible adverse economic, social, or environmental concerns during the anticipated environmental assessment ("EA") process. Views and comments should be presented in writing and addressed to the office of the managing consultant, ***Brown & Mitchell, Inc., 796 Vieux Marche 2nd Floor, Biloxi, MS 39530, attn. Jill High***.

Included with this letter is a preliminary project description and vicinity map of the proposed area. We ask that you review the information provided, and furnish us with your views and comments. This letter is intended to provide formal notification regarding the project to your agency and to encourage comments.

The improvements to this section of roadway will involve the crossing of a navigable waterway, specifically the Popps Ferry Drawbridge where it crosses the Back Bay of Biloxi (Lat N 30° 24.884 Lon W 088° 58.532). The improvements may involve the construction of a new bridge and provide for the reconstruction of the existing bridge for additional navigation clearance.

The need for additional right-of-way will be considered during this project. Studies have been initiated to look at the resultant relocations of residences and businesses. The public will have an opportunity to address these issues. It is anticipated that the project will proceed through the environmental process utilizing an Environmental Assessment, and through the public process, each stakeholder will be given the opportunity to review the Draft EA and present comments and concerns.

There is the possibility of wetland disturbance with the improvements. The impact will be carefully studied and coordinated with the Department of Marine Resources and the Corps of Engineers to mitigate as necessary. Similarly, threatened and endangered species, as well as possible archaeological impacts will be fully investigated and handled accordingly.

Once completed, the Draft Environmental Assessment for this project will be released to the public. Its release will initiate a 30-day review period during which the City of Biloxi will actively solicit comments from the public and from interested agency representatives. A copy of the document will be made available for your review and comment. If you have any questions regarding the project at this point, please contact either Jill High, Project Manager, or Kreg Overstreet, Project Engineer, Brown & Mitchell, Inc., 228-436-7612.

Sincerely,

Jill High
Brown & Mitchell, Managing Consultant and representative for the City of Biloxi

Jh

Cc: Mayor A.J. Holloway
Damon Torricelli, P.E.

enclosures

Solicitation of Views
Mailing List

Nathan Sullivan
City of Biloxi
Director of Parks and Recreation
City Hall Annex
138 Lameuse Street
P.O. Box 775
Biloxi, MS 39533
228-435-6294

Secretary of State, Eric Clark
Heber Ladner Bldg.
401 Mississippi Street
Jackson, MS 39201
Local contact: Gerald McWhorter 228-864-0254

Jim Woodrick
Review and Compliance Officer
Mississippi Department of Archives and History
P.O. Box 571
Jackson, MS 39205
601-576-6850

David Felder
U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, MS 39213

Jerry Cain
Mississippi Department of Environmental Quality
P.O. Box 10385
2380 Highway 80 West
Jackson, MS 39289

Mr. Jan Boyd
Mississippi Department of Marine Resources
1141 Bayview Avenue, Suite 101
Biloxi, MS 39530

Jason Steele, Team Leader
Mississippi Division, Regulatory Branch
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, AL 36628-0001

Sherry Surrette
Mississippi Natural Heritage Program
Mississippi Department of Wildlife, Fisheries, and Parks
2148 Riverside Drive
Jackson, MS 39202

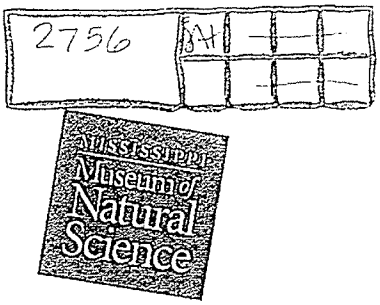
Margaret Bretz
Secretary of State Office
P.O. Box 97
Gulfport, MS 39502

District Commander R.A. Whitehead
Eighth Coast Guard District
Hale Boggs Federal Building
500 Poydras St.
New Orleans, LA 70130

Claiborne Barnwell
Mississippi Department of Transportation
401 North West Street
Jackson, MS 39201

Mayor A.J. Holloway
City of Biloxi
P.O. Box 429
Biloxi, MS 39533

Mr. Damon Torricelli, P.E.
Engineer, City of Biloxi
P.O. Box 429
Biloxi, MS 39533



January 11, 2008

Jill High
Brown & Mitchell, Inc.
796 Vieux Marche – 2nd Floor
Biloxi, MS 39530

Re: Solicitation of Views
Popps Ferry Road and Bridge Improvements Project R# 6411
Harrison County Project No.:STPD-9376-00(004)/104384-101000

To Jill High:

In response to your request for information dated January 8, 2008, we have searched our database for occurrences of state or federally listed species and species of special concern that occur within 2 miles of the site of the proposed project. Please find our comments and recommendations below.

It is possible that the federally and state endangered **Alabama Red-bellied Turtle** (***Pseudemys alabamensis***) occurs in areas where the Popps Ferry Road Bridge is to be constructed. The Mississippi Department of Wildlife, Fisheries, and Parks is currently in the process of collecting data to determine if red-bellied turtles occur in waters surrounding the project area. If submerged vegetation beds occur in the waters of Cedar Point, it is likely that red-bellied turtle species will be found near bridge construction areas. However, since the bridge will not be constructed using fill materials, it is unlikely that the bridge construction project will have a negative effect on Alabama red-bellied turtles or their habitats.

Based on information provided, we conclude that if best management practices are implemented, particularly measures to prevent or, at least, minimize negative impacts to water quality, the proposed project likely poses no threat to listed species or their habitats. We recommend that best management practices are implemented and monitored for compliance, specifically measures that will prevent ANY suspended silt and contaminants from leaving the site in stormwater run-off as this may negatively affect water quality and habitat conditions within nearby streams and waterbodies.

If the existing Popps Ferry Drawbridge is to be destroyed using explosives, we highly recommend that the seasonality of operations be considered during times when Alabama Red-bellied turtles, **gulf sturgeon** (***Acipenser oxyrinchus desotoi***), and **manatees** (***Trichechus manatus***) are less likely to be in the area. In addition, if dredging is conducted during bridge construction, we strongly recommend that precautions are taken to ensure that dredging gear does not entrain/kill any state/federally listed species or damage nearby seagrass beds. We also recommend that dredging operations occur (1) during seasons when gulf sturgeon and manatee are least likely to be moving through these coastal waters and (2) not during the nesting season (May-July) for the Alabama

red-bellied turtle. To minimize the probability of entraining gulf sturgeon with dredging gear, dredging operations should be conducted between October and January. Winter time dredging may also reduce the risk of entraining manatees as well. We strongly recommend that the applicant consult with the US Fish and Wildlife Service and the National Marine Fisheries Service to discuss pre-dredging trawling techniques that may help to identify and safely relocate gulf sturgeon, and potentially other federally protected aquatic species, that are in areas proposed for dredging.

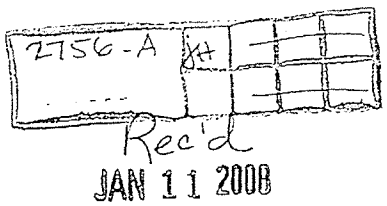
Please feel free to contact us if we can provide any additional information, resources, or assistance that will help minimize negative impacts to the species and/or ecological communities identified in this review. We are happy to work with you to ensure that our state's precious natural heritage is conserved and preserved for future Mississippians.

Sincerely,

Sherry B. Surrette

Sherry B. Surrette, Coordinator
Mississippi Natural Heritage Program
(601) 354-6367, ext. 118

The Mississippi Natural Heritage Program (MNHP) has compiled a database that is the most complete source of information about Mississippi's rare, threatened, and endangered plants, animals, and ecological communities The quantity and quality of data collected by MNHP are dependent on the research and observations of many individuals and organizations In many cases, this information is not the result of comprehensive or site-specific field surveys; most natural areas in Mississippi have not been thoroughly surveyed and new occurrences of plant and animal species are often discovered Heritage reports summarize the existing information known to the MNHP at the time of the request and cannot always be considered a definitive statement on the presence, absence or condition of biological elements on a particular site



MISSISSIPPI
DEPARTMENT OF MARINE RESOURCES

January 9, 2008

Jill High
Brown & Mitchell, Inc.
796 Vieux Marche 2nd Floor
Biloxi, MS 39530

RE: DMR-080469

Dear Ms. High:

The Department of Marine Resources in cooperation with other state agencies is responsible under the Mississippi Coastal Program (MCP) for managing the coastal resources of Mississippi. Proposed activities in the coastal area are reviewed to insure that the activities are in compliance with the MCP.

The Department has received a request from the City of Biloxi to review the proposed improvements and upgrades of Popps Ferry Road, including the Popps Ferry Drawbridge where it crosses the Back Bay of Biloxi in Biloxi, Harrison County, Mississippi. Please note that construction of piers and other water dependent structures are activities that are regulated by this office as well as the U.S. Army Corps of Engineers. An application form (enclosed) should be submitted to this office for review of the proposed project. Thank you for the opportunity to comment on your project.

For more information or questions concerning this correspondence, contact Jana Guynes with the Bureau of Wetlands Permitting at (228) 523-4118 or jana.guynes@dmr.ms.gov.

Sincerely,

Willa Henriksen
Bureau Director, Wetlands Permitting

WH/jjg

Enclosure

United States Department of the Interior

2756-A JH

FISH AND WILDLIFE SERVICE
Mississippi Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

JAN 14 2008

January 10, 2007

Ms. Jill High
Brown & Mitchell, Inc
796 Vieux Marche -2nd Floor
Biloxi, Mississippi 39530

Dear Ms High.

The U.S. Fish and Wildlife Service (Service) has reviewed the information in your letter dated January 3, 2008, regarding the proposed Popp's Ferry Road and Bridge Improvement project in Harrison County, Mississippi. Our comments are submitted in accordance with the Endangered Species Act (87 Stat 884, as amended; 16 U.S C. 1531 et seq.)

There are two federally listed species that may be found in the project vicinity. The endangered brown pelican (*Pelecanus occidentalis*) is found in the coastal waters along the Mississippi Gulf Coast The brown pelican nests mostly on offshore islands, but has been known to nest in onshore estuaries. Nesting areas are usually in low shrubs, trees or on the ground, and contain groups of 25-250 birds. They also congregate to feed near coastal wharves and pilings. Disturbance of nesting areas should be avoided

The endangered Alabama red-bellied turtle (*Pseudemys alabamensis*) is a large, basking turtle with yellow stripes on the limbs, neck, and head. The carapace exhibits a network of yellowish, orangish, or reddish stripes on an olive, brown, or black background. This species is found in brackish water with submerged and emergent vegetation, typically in channels bordered by *Juncas* marsh.

If any of these species or their habitats is identified, further consultation with the Service will be necessary. If you have any questions, please contact our office, telephone: (601) 321-1139.

Sincerely,

David Felder
Fish and Wildlife Biologist

MISSISSIPPI Department of
MDAH
ARCHIVES & HISTORY

PO Box 571, Jackson, MS 39205-0571
601-576-6850 • Fax 601-576-6975
mdah.state.ms.us
H. T. Holmes, Director

2756 MH

January 14, 2008

JAN 17 2008

Jill High
Brown & Mitchell, Inc.
796 Vieux Marche, 2nd Floor
Biloxi, Mississippi 39350

RE: Proposed Pops Ferry Road and Bridge Improvements Project (STPD-9376-00(004)/104384-101000, MDAH Project Log #01-024-08, Harrison County

Dear Jill:

Thank you for recent letter regarding the above project. We look forward to reviewing the Environmental Assessment upon completion, at which time we will be able to provide comments, in accordance with our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. If you have any questions regarding cultural resources assessment in developing the draft EA, please do not hesitate to contact us at (601) 576-6940.

Sincerely,

Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, MOBILE DISTRICT
P.O. BOX 2288
MOBILE, ALABAMA 36628-0001

2756

JKO

FEB 04 2008

Reply To
Attention Of:

January 31, 2008

Coastal Branch
Regulatory Division

SUBJECT: Popps Ferry Road and Bridge Improvements Project – Project File Number SAM-2008-0053-SMZ

Brown & Mitchell, Inc.
Attention: Ms. Jill High
796 Vieux Marche, 2nd Floor
Biloxi, Mississippi 39530

Dear Ms. Hill:

Reference is made to the letter dated January 3, 2008, that you recently submitted regarding improvements to Popps Ferry Road and Bridge. The proposed work would occur from the intersection with North Country Club Lane south to Pass Road, Biloxi, Harrison County, Mississippi. The application has been assigned number SAM-2008-0053-SMZ. Please refer to this number in future correspondence. Per your request, this office has completed an initial review of your project.

Based on the information you provided, the project will require Department of the Army (DA) authorization under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act of 1977 (33 USC 1344). Section 10 requires authorization from the Secretary of the Army, acting through the U.S. Army Corps of Engineers, for the construction of any structure in or over any navigable water of the United States. Section 404 prohibits the placement of dredged or fill material into waters of the United States, including wetlands, unless the work has been authorized by a DA permit.

A Joint Application and Notification form should be completed and submitted for your project. The application may be obtained from our website: www.sam.usace.army.mil/rd/reg/application.htm. As part of the application process, a wetlands delineation should be prepared in accordance with Regulatory Guidance Letter 07-01 – Practices for Documenting Jurisdiction under Sections 9 & 10 of the Rivers & Harbor Act of 1899 and Section 404 of the Clean Water Act at: www.usace.army.mil/cw/cecwo/reg/rgIsindx.htm. The wetlands delineation will identify all waters of the United States on site and is necessary for determining wetland impacts associated with your project.

In addition, an Alternatives Analysis should be prepared for the project. This analysis should include a discussion of the *avoidance* of impacts to waters of the United States, *minimization* of impacts to waters of the United States and finally a *mitigation plan* for impacts that are unavoidable. Guidance documents for preparing an Alternatives Analysis can be found at: www.sam.usace.army.mil/rd/reg/App_comp.htm. The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. For additional information about our Regulatory Program and the permitting process, visit our web site at: www.sam.usace.army.mil/rd/reg.

For future projects, we would like to request involvement during the early planning stages of the project. Thank you for your cooperation with our permit program. If you have any questions concerning this matter, please contact me at (251) 690-2349.

Sincerely,

Sheri M. Zettle, P.G.
Coastal Branch
Regulatory Division

U.S. Department of Homeland Security

United States Coast Guard

Commandant
United States Coast Guard
Hale Boggs Federal Building

500 Poydras Street
New Orleans, LA 70130-3310
Staff Symbol: dpb
Phone: (504) 671-2128
Fax: (504) 671-2133

2756

16591A
January 28, 2008

BROWN & MITCHELL, INC.
ATTN MS JILL HIGH
796 VIEUX MARCHE, 2ND FLOOR
BILOXI MS 39530

FEB 04 2008

Dear Ms. High:

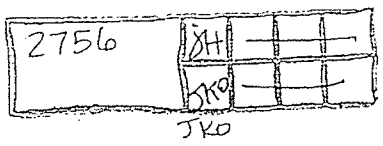
We have received your solicitation of views dated January 3, 2008 regarding the Back Bay of Biloxi, Popps Ferry Drawbridge, Harrison County, Mississippi. The United States Coast Guard will act as a cooperating agency in the preparation of the environmental documentation as requested.

Please contact this office at the above address and to the attention of Mr. David M. Frank, Administrator. Correspondence addressed incorrectly may delay and prevent assignment to one of the bridge management specialists.

Sincerely,

DAVID M. FRANK
Bridge Administrator, Eighth Coast Guard District
By direction of the District Commander

dog:D8Shares:dpb:\Coop Agency Ltrs\MS. Popps Ferry Bridge, Harrison County, 1-25-08



POST OFFICE BOX 97
GULFPORT, MISSISSIPPI 39502-0097

STATE OF MISSISSIPPI
SECRETARY OF STATE
DELBERT HOSEMANN

TELEPHONE (228) 864-0254
FACSIMILE (228) 864-0325

Rec'd Feb. 19, 2008

February 15, 2008

Ms. Jill High
Brown & Mitchell, Inc.
796 Vieux Marche
2nd Floor
Biloxi MS 39530

Re: Solicitation of Views
Popps Ferry Road and Bridge Improvements Project
Harrison County Project No.: STPD-9376-00(004)/104384-101000

Dear Ms. High:

Thank you for forwarding a copy of the proposed project to this office for review. Please be advised that the City of Biloxi currently holds a public trust tidelands lease in the area of the proposed road and bridge improvement project for the public purposes of recreation, education and access to tidelands. I've enclosed a copy of the lease for your use. Please advise what impact the proposed project will have on the Popps Ferry recreation project, and the current status of same.

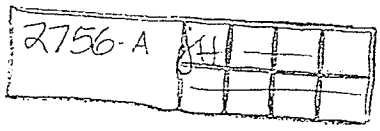
I look forward to hearing from you at your earliest convenience.

Sincerely,

Margaret Bretz by RH

MARGARET ANNE BRETZ
Senior Attorney

Encl.



STATE OF MISSISSIPPI
HALEY BARBOUR
GOVERNOR
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
TRUDY D FISHER, EXECUTIVE DIRECTOR

March 4, 2008

Ms. Jill Hill
Brown & Mitchell, Inc.
796 Vieux Marche 2nd Floor
Biloxi, Mississippi 39530

MAR 13 2008

Dear Ms. Hill:

Re: Solicitation of Views
Popps Ferry Road and Bridge Improvements Project
Harrison County Porject No.:
STPD-9376-00(004)/104383-101000

The Mississippi Department of Environmental Quality is presently reviewing the above referenced project in which the applicant, the City of Biloxi, is considering applying for a Department of the Army permit to make improvements to Popps Ferry Road and Bridge from the intersection with North Country Club Lane south to Pass Road. The project would span a small 10-acre park and a marsh area under the existing drawbridge. The project site is in Harrison County, Biloxi, Mississippi.

The applicant should address the following initial comments. Additional comments may follow pending future, additional information.

1. Information regarding feasible alternatives should be provided. This information should include other alternatives considered and the amount of impacts associated with these alternatives.

2. After the least damaging feasible alternative has been selected, information should be provided that demonstrates steps taken to avoid/minimize the impacts associated with the project.

3. The Department requests a list and description of any potential impacts to state waters and waters of the U.S. This includes any potential impacts to wetlands, marshes, or submerged aquatic vegetation.

4. Information regarding controls for post-construction stormwater should be supplied. This would include methods for treatment of runoff from both the bridge span and other areas to be improved.

5. Information should be provided which outlines the plan for the existing roadway. It is unclear from the information provided whether this roadway would stay in service or be abandoned. Should this roadway be abandoned, information should be provided which outlines whether it would be removed.

6. This project may also require coverage under a Stormwater Construction General NPDES permit. The applicant should contact Mr. Tim Parrish at (601)-961-5169 to obtain an application.

These concerns must be addressed before 401 Water Quality Certification can be issued. The applicant should respond to these comments within 30 days from the date of this letter. Upon receipt of this information, the Department will continue the certification review process. You may contact me at (601) 961-5578.

Sincerely,

Andy Sanderson

Andy Sanderson
Water Quality Certification Branch

Appendix 8

CULTURAL RESOURCES REPORT

MISSISSIPPI DEPARTMENT *of* ARCHIVES AND HISTORY

MDAH

HISTORIC PRESERVATION
Ken P'Pool, director • Jim Woodrick, acting director
PO Box 571, Jackson, MS 39205-0571
601-576-6940 • Fax 601-576-6955
mdah.state.ms.us

February 24, 2010

Ms. Kim Thurman
MDOT
Environmental Division
P.O. Box 1850
Jackson, Mississippi 39125-1850

RE: Addendum to A Cultural Resources Assessment of Three Proposed Realignment Alternatives Along Popps Ferry Road, Sections 14, 37, 22 and 27, T7S, R10W, in the City of Biloxi, Project No. STPD-9376-00(004), MDAH Project Log #01-161-10 and 01-005-10 (re: #07-230-08), Harrison County

Dear Kim:

We have reviewed the revised January 2010 cultural resources survey report by Dr. Robert M. Thorne, Archaeologist, received on January 29, 2010, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur with Dr. Thorne's recommendation that the portion of the remaining midden beneath the present Popps Ferry Road bridge be set aside as a no work area during bridge construction, and that an archaeologist be present to monitor construction activities or when other work might impact the cultural deposit. In addition, the area west of the existing bridge encompassing the remaining portions of 22Hr520/551 should also be designated as a no work zone, although this area is already identified as outside the current APE. With these conditions, it is our recommendation that the project may proceed accordingly.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Dr. Thorne. If you need further information, please let us know.

Sincerely,

Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

Board of Trustees: Kane Ditto, president / Rosemary Taylor Williams, vice president / Reuben V. Anderson / Lynn Crosby Gammill / E. Jackson Garner / Duncan M. Morgan / Hilda Cope Povall / Martis D. Ramage, Jr. / Roland Weeks / *Department director: H. T. Holmes*

ADDENDUM AND RESPONSE TO MDAH Project Log #07-230-08

A CULTURAL RESOURCES ASSESSMENT OF THREE PROPOSED REALIGNMENT ALTERNATIVES ALONG POPPS FERRY ROAD, SECTIONS 14, 37, 22, AND 27, T7S, R10W IN THE CITY OF BILOXI, HARRISON COUNTY, MISSISSIPPI Project No. STPD-9376-00(004)

PECI Project 22231.01

Prepared by

Robert M. Thorne, Ph. D., RPA
Pickering Firm Inc.
460 Briarwood Drive, Suite 515
Jackson, MS 39206

December 2009

Pickering

EXECUTIVE SUMMARY

This addendum has been prepared is response to comments and questions raised by the Review Staff of the Department of Archives and History (MDAH) as authorized by Section 106 of the National Historic Preservation Act. The delay in responding to the comments dated August 29, 2008 is the direct result of the delay in receipt of those comments, and they were in fact, received from MDAH as a direct request. Several circumstances have changed during the hiatus between submission of the original report and the preparation of this response. Those changes will, however, alter the recommendations that were contained in the original report.

Briefly, MDAH staff were concerned that some of the structures that would be potentially impacted by four-laning of Popps Ferry Road exceeded the 50-year rule, and the potential existed that one or more of those structures might meet the criteria for listing on the National Register. It was their determination that the photographs of structures were insufficient to allow MDAH Staff to determine Register eligibility status. Rather than photograph the structures that appeared to have the potential for listing, the simplest solution was to clearly demonstrate that none of the structures met the age criteria. The Natural Resources Conservation Service (NRCS) [Soil Conservation Service at that time] aerial photographs of Popps Ferry Road taken in 1958 clearly indicate that there were no structures along the length of the road that will be included in the present improvement project. The 1958 aerial indicates that the subdivision on the western side of the Road on the southern end was under development and the subdivision streets were in the early stage of construction. The next available NRCS aerial was flown in 1972 and during the 14-year hiatus between the two photographs, residential and commercial development began between Pass Road and Old Bay Road on the south end of the project and Sabrina Drive and North Country Club Lane on the northern side of Biloxi Bay. None of the structures, either residential or commercial, are fifty years old or older.

Of more importance is the National Register eligibility of archaeological site 22-HR-520/551 (Coran/Michelle site[s]), and the horizontal distribution of cultural debris. The conclusions presented in the original report were predicated by a visual surface survey of the exposed shoreline on the eastern side of the bridge and three shovel tests that were spaced 25' apart and above the cutbank along the shoreline and three additional tests located about 5' above the first three. A shallow deposit of *Rangia* shell was present for the first inch at the top of the units nearest the top of the cutbank, but absent five feet further up the slope. The shoreline was marked with varying quantities of shell, but no artifacts were either observed or recovered. The surface deposit of shell was noted as tapering out east of the bridge. Although no commentary was offered in the original report concerning the western side of the bridge, it must be noted that a drainage ditch paralleling Popps Ferry Road appears to functionally separate the cultural deposit numbered 22-Hr-520/551 into two physical parts. The operational assumption is that the two numbered resources probably constituted a single occupation/settlement/utilization area during the prehistoric period.

The current plan is to add two new bridge lanes on the eastern side of the existing bridge, and all work will be on the eastern side. The area identified as 22-Hr-520/551 that lies to the west of the present bridge will not be within the proposed work reach. To that end, the area of concern is beneath the present bridge and to the east. The first cultural resource assessment for the present project did not include the area beneath the bridge, but as noted above, concentrated on the area to the east. That assessment was deemed to be negative (subsurface) for an extant cultural deposit. The site was reinspected on December 17, 2009, and an exposed *Rangia* midden was noted beneath the bridge. Shovel testing at three locations beneath the bridge near the center of the structure revealed approximately 0.90' of midden near the current high tide line, the midden deposit was found to still be present 20' nearer the end of the structure, but no midden was found adjacent to the bridge bent. A test unit placed 30' to the east of the edge of the bridge and on the side slope of the hill was negative, as was one that was placed 80' east of the edge of the bridge. These two tests confirm the negative test results of the six shovel tests that were completed in July of 2008. November 2, 2005 aerial photographs of the northern end of Popps Ferry bridge showed the location of the cultural deposit being used as an access way to work barges used in replacing a Katrina damaged span of the bridge.

The current plan it to build the eastern side of the new bridge first, and once finished, the present span will be removed and the western half of the new bridge completed. The span between bridge piers will be sufficient and the new bridge high enough that the recorded cultural deposit beneath the present bridge can be avoided by designating the archaeological site as a no work zone. While no evidence of an intact cultural deposit has been demonstrated to the east of the present bridge, *Rangia* shell is scatted on the surface above the shoreline about 100' to the east of the present bridge. No artifacts were noted on the surface above the shoreline, and none were present below the normal high tide line. An archaeologist should be present when the no work set aside area is designated, and at any point in time that construction activities might encroach on the cultural deposit within that reach.

INTRODUCTORY STATEMENT

The inspection of the site files clearly illustrated the changes in site location techniques that have been put in place since 22-Hr-520 was first recorded in 1970. The official site location record of that time period did not require the inclusion of a portion of the appropriate quad, and sites were most accurately described by part Section, Township, and Range. While not suspect, professionally recorded information of the period was as vague as that provided by some of the artifact collectors of the area. A very few of the collectors were sincerely dedicated to their avocation, and have made major contributions to our data base. Those individuals have provided site location information, and made their artifact collections available for professional inspection. The process of specific site location determination if one relies on the site cards is a guess at best. Unfortunately, Marshall's original site card location places 22-Hr-520 at the level of a quarter of a quarter of a Section (± 40-acres accuracy). Dale Greenwell's 1974 location data is somewhat better since he provides estimated distances from landmarks or topographic features to the site, as well as an estimate of site size. The 1992 updated card contains a map with sites 22-Hr-520 and Hr-551 subsumed into a single cross-hatched area with Hr-520 emphasized with heavier lines. As plotted on the 1992 updated site card, sites 22-Hr-520/Hr-551 (Coran/Michelle sites) cover and area in excess of 20 – acres (The playing surface on a football field is slightly over one acre.). Greenwell's site size estimate is recorded as being "more than 500' x 150'". This appears to be a more realistic estimate of the size of Hr-520 since an area that is 500' x 150' is circa 1.7-acres. Greenwell describes the site as being ¼-mile east of the Popps Ferry Bridge. On a straight-line measurement from the bridge eastward, the ¼ -mile distance would place the site slightly further to the west than it is currently plotted on the 1992 site card, but in keeping with the Comment on the 1992 site card that the site is all east of the present bridge. Greenwell's site dimensions are tied to a ravine that was present in 1974, and his ground cover description includes dead cedars that are reminiscent of the area name – Cedar Point. The only mapped topographic feature in the area that appears to be a ravine is to the east of the present bridge, and is large enough to accommodate the site dimensions provided by Greenwell. The assessment completed in support of the construction of a new bridge crossing on Popps Ferry Road may serve to partially clarify the site location issue and the status of the remaining cultural deposit vis-à-vis National Register eligibility.

A search of the aerial photographic record maintained by the Harrison County Natural Resources Conservation Service office provided a record for the period of construction of both residences and commercial structures within the proposed Popps Ferry Road realignment and modification. The National Register eligibility of structures that may be relocated or removed during construction is moot. Supporting aerial photographic data will be provided in the section that follows.

STANDING STRUCTURE ELIGIBILITY

The Natural Resources Conservation Service (NRCS) Office in Gulfport maintains a well organized files of aerial photographs that extend beyond the fifty-year rule for the determination of potential Register eligibility. For purposes of the present project, two aerial photographs of Popps Ferry Road were inspected as a means of

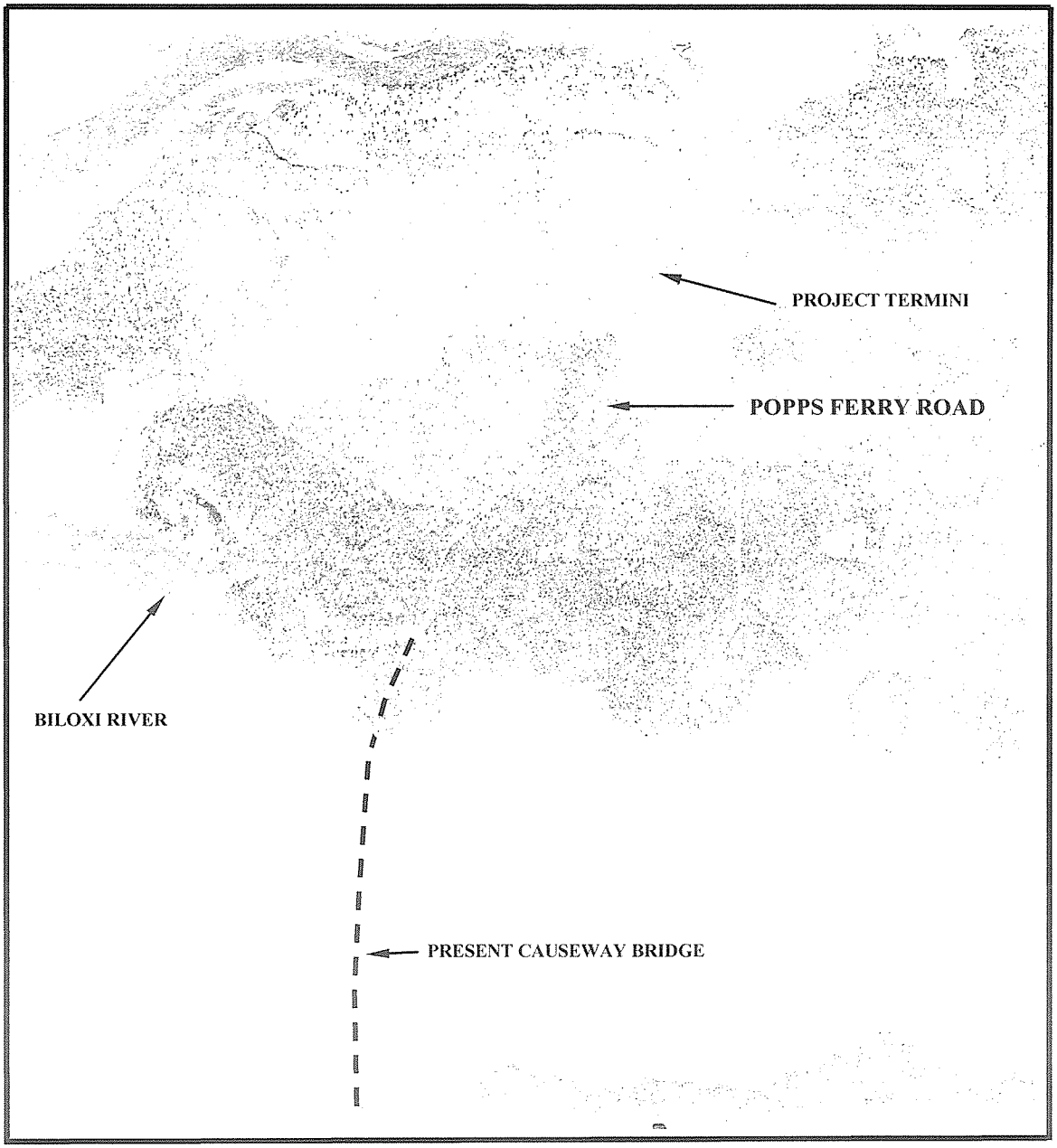


Figure 1. Popps Ferry Road Project Area to the North of Biloxi Bay in 1958

determining the period of building construction within the proposed impact area. The older of the two was a photograph taken in1958, while the younger was taken in 1972. The 1958 aerial is presented in Figures 1 and 2, with Figure 1 showing Popps Ferry Road to the north of Biloxi Bay and Figure 2 showing Popps Ferry Road to the south of the Bay. The 1972 overflight is shown as Figure 3. No structures were present along Popps Ferry Road on the northern side of the Bay and in the project area in 1958. On the southern side of the Bay, subdivision development had begun on the western side of Popps Ferry Road and commercial development had begun on both the eastern and western sides of Popps Ferry Road at its intersection with Pass Road. As may be seen

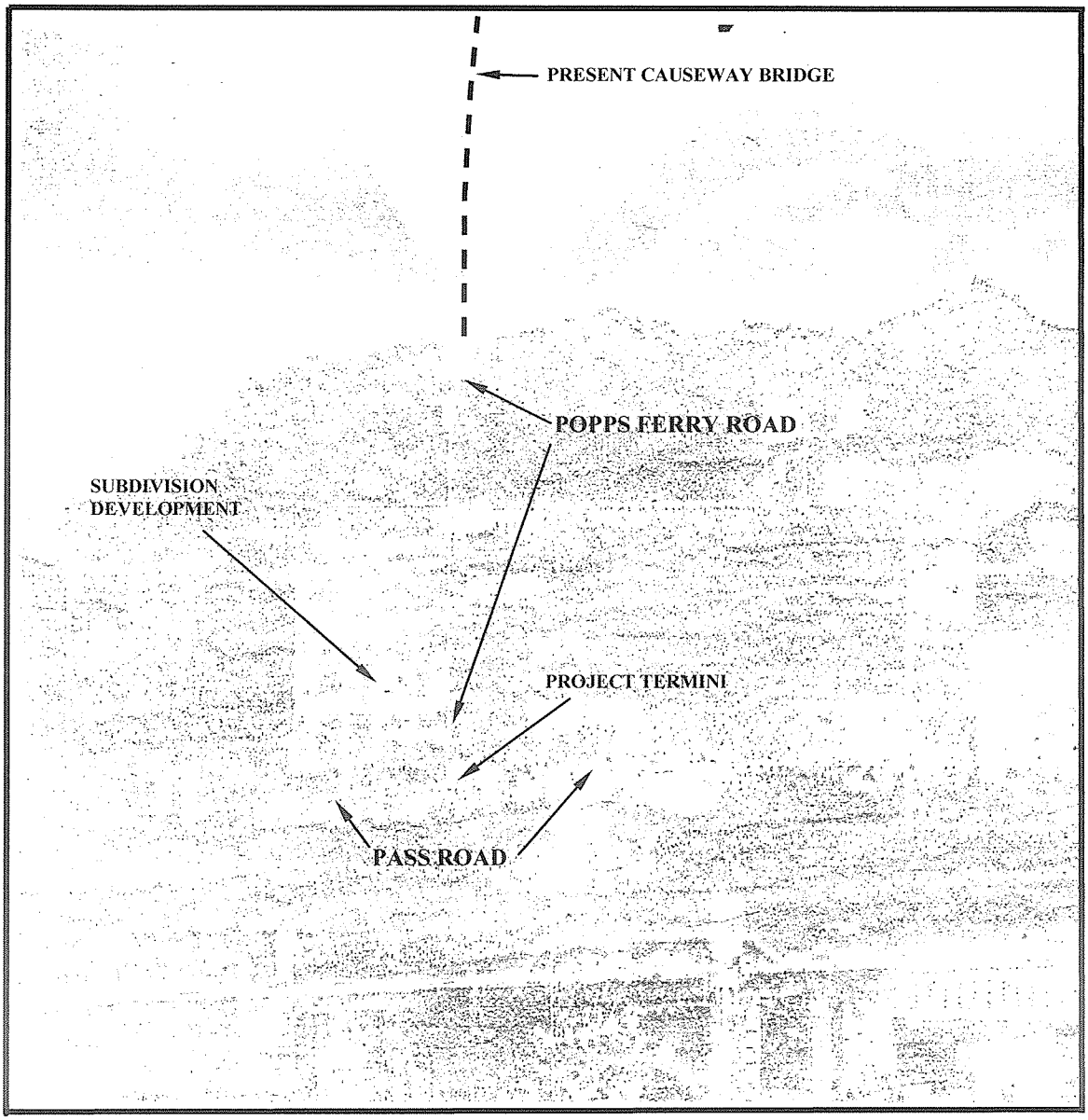


Figure 2. Popps Ferry Road Project Area to the South of Biloxi Bay in 1958

in Figure 2, subdivision development had not progressed beyond the initial stages of street construction.

During the fourteen years between the available photographs, residences were built in the subdivision noted on Figure 2, and along the central section of Popps Ferry Road on the northern side of the Bay. According to Mr. Tyree Harrington, NRCS District Conservationist, he visited friends who lived in the previously noted subdivision and along Popps Ferry Road in the early to middle 1960's. His childhood memory of the houses was that they were new at that time. Photographic evidence and the personal recollection of a resident of the area indicates that none of the structures along Popps Ferry Road meet or exceed the fifty year rule for listing on the National Register.

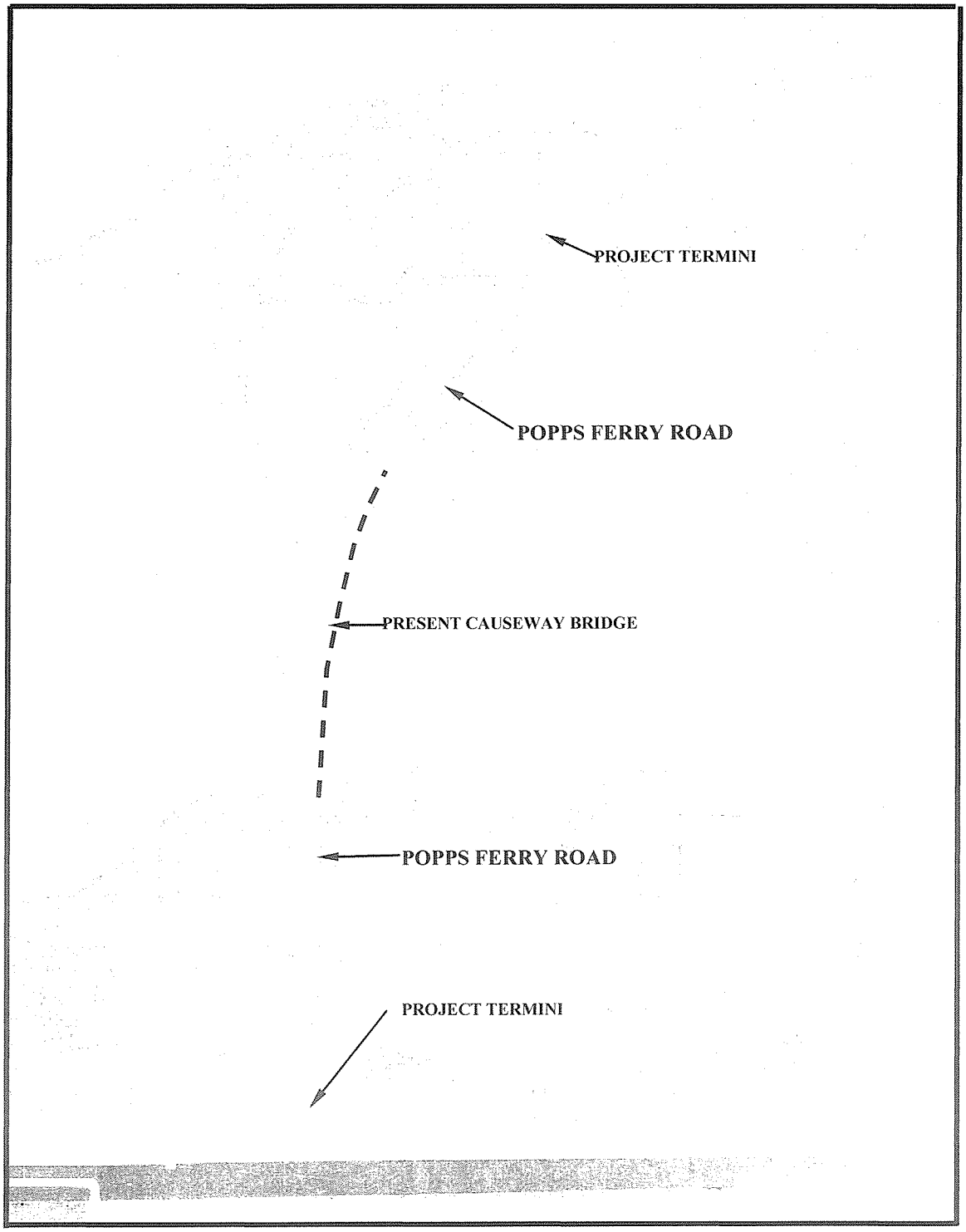


Figure 3. Popps Ferry Road Project Area on Either Side of Biloxi Bay in 1972

22-HR-520/22-HR-551 (CARON/MICHELLE SITE)

As noted above, the spatial locations of sites Hr-520 and Hr-551 have become increasingly confused as has the size of either or both of these sites or for that matter, the two combined. For purposes of the present project, these issues are of lesser importance than the issue of the presence of an intact midden deposit and its eligibility for listing on the Register. As noted in the report prepared following site testing in July of 2008, no evidence of an intact cultural deposit was found on the eastern side of the present causeway bridge. Additional shovel testing was completed again in December of 2009 with the same results for the area to the east of the bridge. The area beneath the bridge was not tested in 2008 because it was assumed that any cultural deposit that was directly beneath the bridge had been destroyed during the course of bridge construction. It was further assumed that additional damage to 22-Hr-520 would have resulted from the Katrina storm surge. These proved to be at least partially faulty assumptions!

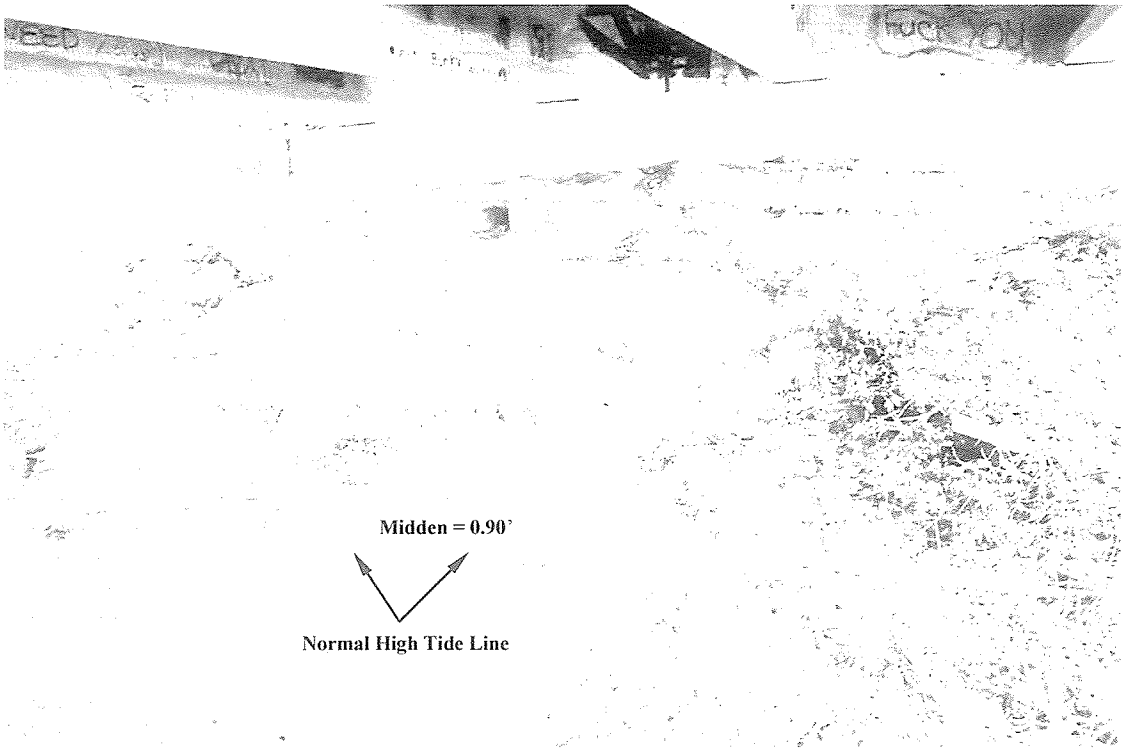


Figure 4. 22-Hr-520/551 Undisturbed Midden Deposit Beneath the Popps Ferry Bridge

The latest round of testing confirmed the absence of archaeological materials on the eastern side of the bridge, but did provide continued surface evidence of the past presence of a shell midden. Two additional test units were placed east of the bridge during the present assessment with neither providing any evidence of an extant cultural deposit. That this proved to be the case confirmed the original assumption that at least a portion of the site had been destroyed. Shovel testing directly beneath the present structure demonstrated that a portion of the site remains intact, and apparently was inadvertently covered over and protected when the structure was under construction. Storm surges through the years following construction has apparently covered and

uncovered the midden deposit, and those cycles probably account for the cyclical presence and absence of artifacts on the shoreline. Figure 4 shows the undisturbed cultural deposit beneath the bridge. The surface deposit of shell in the foreground is beneath the normal high tide line. Figure 5 is a view of the midden deposit taken from the western side of the bridge.

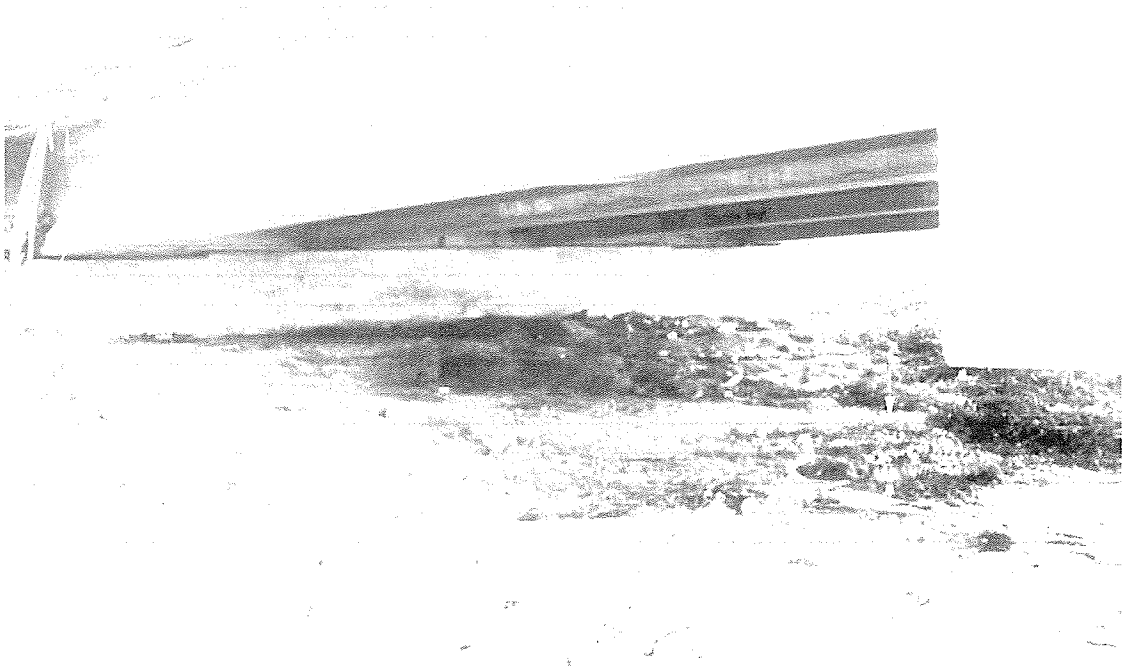


Figure 5. Northeasterly View of Midden at 22-Hr-520/Hr-551

The face of the sub-deposit sand was cleaned and inspected for evidence of water laid lenses that would have indicated the presence of a shoreline below the level of the cultural deposit. No lenses were noted, and the unit beneath the cultural deposit is a tightly compacted sand with a lighter color than the midden deposit value recorded at Test Unit 1. The midden deposit is a matrix of sand and shell at 5YR2.5/1. Test Unit 1 was located 8.4' to the north of the face of the midden and was excavated to a depth of one-foot beneath the surface. At the one-foot level, the Test Unit almost immediately began to fill with water. Figure 6 is a view of Test Unit 1. Pamela Lieb was consulted prior to the beginning of the tests, and the decision was reached that shovel testing would be limited in an effort to minimize damage to any cultural deposit that might be present. Figure 6 shows Test Unit 1. Test Unit 2 was placed 20' to the north of Test Unit 1 toward the first bent of the bridge. This unit fell at the base of the stepped area shown in Figures 4 and 5. The covering of sand and underlying cultural deposit was the same as in Test Unit 1. Test Unit 3 was placed 23' to the north of Test Unit 2 and adjacent to the first bent of the bridge. No cultural deposit was present to a depth of three feet, and the matrix was sand. It appeared that this Unit was within the area that was disturbed during bridge construction, although no extraneous fill material was identified.

Figure 6. Test Unit 1, 22-Hr-520/Hr-551 Beneath Popps Ferry Bridge (*Scale is in Tenths)* [Note water in bottom of the test unit.]

Figure 7. Test Unit 4

Test Unit 4 was placed 53' to the east of Test Unit 1. Shovel Test Unit 4 lies 30' to the east of the eastern side of the present bridge. The surface in this area has been armored with broken concrete and is almost completely paved. The concrete pieces are tightly compacted and only a small area was open enough to be able to dig a small test unit. The unit was approximately 12" square and was completed to a depth of 1.6'. The upper 0.6' consists of a tightly compacted level of clay gravel that is underlain by a grayish-black unit that is devoid of artifacts and shell. As was the case with Test Unit 1, water began to quickly fill the hole. This unit was placed near the location of two of the test units placed in this part of the site location in July of 2008. The absence of an artifact and shell bearing matrix supports the conclusion reached in 2008---no extant midden deposit is present at this location. Figure 7 shown the profile exposed in Test Unit 4.

Test Unit 5 was placed 80' to the east of the bridge on a point that is littered with shell on the surface. No artifacts are present on the surface, and the area is overgrown with holly (*Ilex vomitoria*), a large oak, and briars. An erosional cutbank about three feet high marks the southern edge of the slope. Figure 8 is a northerly view of the eastern bankline where surface shell ends. The general visual impression is that the shell has been washed onto the surface since none is exposed in the cutbank. No shell was present on the surface at the time of the present assessment. Figure 9 is the fieldwork sketch map

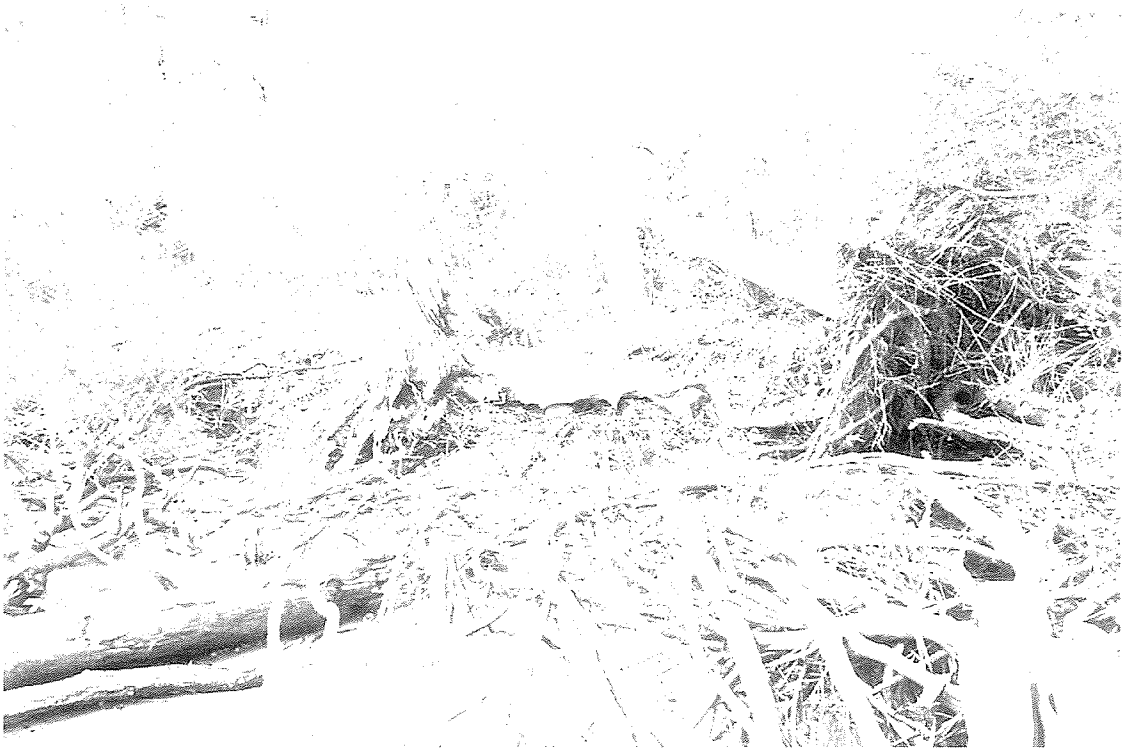


Figure 8. Cutbank at Eastern End of Surface Scatter of Shell

showing the locations of test units that were dug in 2008 and 2009 (shown in red).

Figure 9. Fieldwork Sketch Map Showing Test Unit Locations, 2008 and 2009

The extent of surface and slope disturbance on the eastern side of the bridge did not appear to be necessarily related to the construction of the Popps Ferry Bridge. Bankline protection with crushed concrete (rubble) is a common construction practice, but in this case, the rubble did not extend to the high tide line. Only the foreslope was protected. A search of the post-Katrina aerial photographs provided the reason for armoring the bankline on the eastern side of the bridge. The Katrina surge had removed a span of the bridge, and the sloped area on the eastern side of the bridge was used for access to the construction barges that were used during construction of the replacement span. The portion of the 22-Hr-520/551 archaeological deposit that lay on the eastern side of the bridge was completely removed as a part of the Katrina recovery effort when the bridge span was replaced. Figure 10, taken in November of 2005 shows the construction area at the northeastern side of the bridge and the work barges docked against the shoreline. The concrete rubble on the slope from Popps Ferry Road to the water was used as a hard surface for construction vehicles. While the enlargement of the principal photograph in Figure 10 is blurred, it does serve to indicate the extent of construction activity during bridge repair.

Figure 10. Construction Area at 22-Hr-520/551 (*www.biloxi.ms.us/gallery*)

CONCLUSIONS AND RECOMMENDATIONS

In the original report, the suggestion was offered that some of the structures along Popps Ferry Road were 50-years of age and potentially eligible for listing on the Register. Natural Resources Conservation Service (formerly Soil Conservation Service) aerial photographs (Figures 2 and 3) available at the Gulfport NRCS office clearly show that there were no structures along Popps Ferry Road that meet the age requirement for Register eligibility. Subdivision development along Popps Ferry Road was only beginning in 1958, and in fact was continuing in 1972. The National Register admissibility of standing structures along Popps Ferry Road that may be removed during the improvement of the travel way appears to be moot.

More importantly, the portion of archaeological site 22-Hr-520/551 that lies within the potential impact zone during the replacement of the Popps Ferry bridge is situated beneath the existing structure. Historically, the fact that any portion of the midden deposit still exists appears to be purely fortuitous. Bridge construction simply did not require excavation across the midden deposit, and the bridge served to protect the cultural deposit during the post-Katrina replacement of the lost span. The proposed impact area on the western side of the existing structure will be limited to the right-of-way on that side, and all proposed work will be to the east of the present structure. As a consequence, the area outside of the right-of-way to the west of the proposed impact area was not included in this assessment. If the area on the western side of Popps Ferry Road that has been designated as 22-Hr-520/551 is scheduled for development in the future, systematic testing will be necessary to accurately delineate the true size of the cultural deposit. None of that area is included in the proposed work reach for the construction of a new Popps Ferry Road bridge.

For purposes of the present assessment, the remnants of the cultural deposit can be considered for National Register eligibility under Criteria D. The size of the deposit within the proposed work zone is small, measuring less than 50' x 50', and currently protected by the present bridge. Access to the site by foot is difficult, but the site can be easily accessed from the water. There was no apparent evidence of collecting or looting, and Boudreaux (2009) does not indicate that any was evident when the site was visited during his assessment of coastal sites. The remnant cultural deposit beneath the existing bridge should be set aside as a no work reach during construction of the new bridge. An archaeologist should be present when the set aside area is designated, and at any point in time that construction related activities may encroach on the cultural deposit.

REFERENCES CITED

Boudreaux, Edmund, III

2009 A Post-Hurricane Katrina Archaeological Site Assessment Survey Along the Mississippi Gulf Coast. Report submitted to the Historic Preservation Division, Mississippi Department of Archives and History and the Transitional Recovery Office, Federal Emergency Management Agency, U. S. Department of Homeland Security. Report on file at the Historic Preservation Division, Jackson, MS.

U. S. Government

NA Aerial Photograph Files, Multiple Years on File. Harrison County Office Natural Resources Conservation Service, U. S. Department of Agriculture, Gulfport, MS.

www.biloxi.ms.us/gallery

MISSISSIPPI DEPARTMENT of ARCHIVES AND HISTORY

MDAH

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February 24, 2010

Ms. Kim Thurman
MDOT
Environmental Division
P.O. Box 1850
Jackson, Mississippi 39125-1850

RE: Addendum to A Cultural Resources Assessment of Three Proposed Realignment Alternatives Along Popps Ferry Road, Sections 14, 37, 22 and 27, T7S, R10W, in the City of Biloxi, Project No. STPD-9376-00(004), MDAH Project Log #01-161-10 and 01-005-10 (re: #07-230-08), Harrison County

Dear Kim:

We have reviewed the revised January 2010 cultural resources survey report by Dr. Robert M. Thorne, Archaeologist, received on January 29, 2010, for the above referenced undertaking, pursuant to our responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR Part 800. After review, we concur with Dr. Thorne's recommendation that the portion of the remaining midden beneath the present Popps Ferry Road bridge be set aside as a no work area during bridge construction, and that an archaeologist be present to monitor construction activities or when other work might impact the cultural deposit. In addition, the area west of the existing bridge encompassing the remaining portions of 22Hr520/551 should also be designated as a no work zone, although this area is already identified as outside the current APE. With these conditions, it is our recommendation that the project may proceed accordingly.

There remains the possibility that unrecorded cultural resources may be encountered during the project. Should this occur, we would appreciate your contacting this office immediately in order that we may offer appropriate comments under 36 CFR 800.13.

Please provide a copy of this letter to Dr. Thorne. If you need further information, please let us know.

Sincerely,

Jim Woodrick
Review and Compliance Officer

FOR: H.T. Holmes
State Historic Preservation Officer

Board of Trustees: Kane Ditto, president / Rosemary Taylor Williams, vice president / Reuben V. Anderson / Lynn Crosby Gammill / E. Jackson Garner / Duncan M. Morgan / Hilda Cope Povall / Martis D. Ramage, Jr. / Roland Weeks / *Department director: H. T. Holmes*

MISSISSIPPI DIVISION

U.S. Department
of Transportation
Federal Highway Administration

666 North Street, Suite 105
Jackson, Mississippi 39202-3199
(601) 965-4215 (601) 965-4231 FAX
In Reply Refer To: HRW-MS

August 6, 2008

Miko Beasley Denson
Mississippi Band of Choctaw Indians
P.O. Box 6010
Philadelphia, MS 39350

Dear Miko Denson:

Subject: Invitation to Participate in the Project Review of an Environmental Assessment (EA) for Improvements to Popps Ferry Bridge and Road in Biloxi, in Harrison County, Mississippi Project Number STP – 9376 - 00 (004)

The Mississippi Department of Transportation (MDOT), in cooperation with the Federal Highway Administration (FHWA), is pursuing an EA for the purpose of widening Popps Ferry Bridge and road in Biloxi from Pass Road to Riverview Road located in Harrison County, Mississippi.

The Advisory Council on Historic Preservation regulations stipulate that Indian tribes, which attach religious and cultural significance to historic properties that may be affected by an undertaking, be invited to participate in the environmental review as consulting parties.

A Cultural Resources Survey has been completed on this project and a copy is attached. The survey did not reveal any historic or cultural resources deemed eligible for inclusion on the National Register of Historic Places. As a part of this project, we propose to make a "call of no effect" regarding archaeological and historic resources, provided that you do not have any issues with the project. However, if you are aware of issues that we need to consider as part of the environmental review, or if you have other concerns, please let us know.

If you would like additional information, please contact Mr. Dickie Walters at your earliest convenience via letter, by telephone (601) 965-4217 or e-mail at Dickie.Walters@fhwa.dot.gov. Thank you for your assistance regarding this important matter and I look forward to hearing from you.

Sincerely yours,

Andrew H. Hughes
Division Administrator

Attachment

cc: Mr. Bruce Gray, 87-01
Mr. Hank Holmes, Mississippi Department of Archives and History
File W\NativeAmericanInfo\Popps Ferry Bridge EA Tribal letter - Biloxi
(dwalters) Dwalters:dw/jh 8-6-08

*Each person on the attached list received the same letter

MOVING THE AMERICAN ECONOMY

A CULTURAL RESOURCES ASSESSMENT OF THREE PROPOSED REALIGNMENT ALTERNATIVES ALONG POPPS FERRY ROAD, SECTIONS 14, 37, 22, AND 27, T7S, R10W IN THE CITY OF BILOXI, HARRISON COUNTY, MISSISSIPPI

Project No. STPD-9376-00(004)

Pickering

July 2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....1

INTRODUCTION.....2

LOCATION.....6

PHYSIOGRAPHIC SETTING AND SOILS.....6

SURVEY METHODOLOGY.....6

CONCLUSIONS AND RECOMMENDATIONS.....11

PHOTOGRAPHIC APPENDIX.....12

LIST OF FIGURES

Figure 1. Project Location (Taken from the 1992 *Biloxi, Miss.* Quad)..... 3

Figure 2. Project Location Showing the Three Proposed Alignment Locations... 4

Figure 3. 1971 Aerial Photograph of Project Area Indicating Development..... 5

Figure 4. Landscaping on Site 22-HR-691..... 7

Figure 5. Vegetation Growth at Top of Slope Above 22-HR-520..... 8

Figure 6. Shoreline Immediately West of 22-HR-520..... 8

Figure 7. Typical Shell Distribution Along Shoreline at 22-HR-520..... 9

Figure 8. Open Lot Previously Surveyed for an Apparent Road Alignment..... 10

Photographic Appendix

Commercial Development at South Terminus with Pass Road (Looking Southeast).....13

Commercial Development at South Terminus with Pass Road (Looking Southwest).....13

Commercial Development at South Terminus with Pass Road (Looking East).....14

Popps Ferry Road Looking South Toward Pass Road in Oldest Residential Area.....14

Typical Residences in Older Neighborhood (Note driveways enter Popps Ferry Road).....15

Typical Residences in Older Neighborhood (Note driveways enter Popps Ferry Road).....15

Security Fence in Newer Neighborhood (Note absence of driveways).....16

Older Residences with Drives on Left, Newer Residences With Security Fences on Right.....16

Typical Residential Architecture in Older Neighborhood.....17

Apartment Complex on Southwestern Corner of Popps Ferry Road Causeway...17

Closed Fish Camp and Restaurant on Southeast End of Popps Ferry Road Causeway.....18

A CULTURAL RESOURCES ASSESSMENT OF THREE PROPOSED REALIGNMENT ALTERNATIVES ALONG POPPS FERRY ROAD, SECTIONS 14, 37, 22, AND 27, T7S, R10W IN THE CITY OF BILOXI, HARRISON COUNTY, MISSISSIPPI

Project No. STPD-9376-00(004)

by

Robert M. Thorne, Ph. D., RPA
Pickering Environmental Consultants, Inc.
460 Briarwood Drive, Suite 515
Jackson, MS 39206

July 2008

EXECUTIVE SUMMARY

This report chronicles and reports on the findings of a cultural resources assessment of three alternate locations for the proposed widening of Popps Ferry Road in the City of Biloxi, Harrison County, Mississippi. The southern end of the proposed project is at the intersection of Popps Ferry Road and Pass Road and the northern terminus is at the intersection of Popps Ferry Road and Riverview Road.

Popps Ferry Road is a two-lane travel way that serves as a connector between Pass Road and Interstate 10, and is heavily traveled since this route provides access from I-10 across the Biloxi Back Bay at its intersection with Big Lake. The area surrounding the portion of the road is residential on the northern side of the Bay and is mixed residential and commercial on the southern side of the Bay. Commercial development is at its heaviest in the Pass Road – Popps Ferry Road intersection area. The effects of the Hurricane Katrina storm surge are most noticeable on the northern and southern sides of the Bay near the ends of the Bay Bridge. The more recently developed portions of the residential neighborhoods along the right-of-way are screened from the adjoining residences by privacy fences while the older sections are open to view from the street. Some sections have sidewalks present while others do not. In places the distance from the curb to the privacy fences is the width of a travel lane. Curb and gutter is present over the full length of the project.

Three proposed alignment alternatives were included in the present assessment, and all three will require the relocation of a number of residences. While some of these structures are over 50 years old, none will meet the criteria for admission to the National Register. There are two previously recorded archaeological sites within the proposed alignments, and both are on or near the Back Bay and adjacent to the bridge. The remnant of 22-HR 520 is located at the northeastern corner of the Back Bay bridge and was a midden dominated by *Rangia* shell that included some ceramics. This site is currently a shallow exposure of shell on a low cutbank on the north side of the Back Bay. A dense covering of vines and small trees is present over the narrow cultural deposit. Edmond Boudreaux visited the site in 1992 and reported to the Department of Archives and History that the site was partially destroyed by Bay Bridge construction in the late 1970's. Subsequent erosion has effectively removed most of the remaining cultural deposit. Three shovel tests located about two feet above the top of the cutbank and spaced approximately 25' apart along the shoreline produced no artifacts and a shell deposit that was 1" deep near the bridge and the same depth 50' to the east. A companion set of tests spaced approximately 5' above the first set were negative. This remnant cultural deposit is not considered eligible for the Register. Site 22-HR-691 was located on the western side of Popps Ferry Road just to the south of the southern end of the Bridge. The site was removed when the townhouse complex property was developed and landscaped.

After a careful inspection of the historic maps and aerial photographs of the proposed alignments, the decision was made that shovel testing was not necessary unless high probability site location areas could be identified on the ground. Street and subdivision development that accompanied the removal of the pine forest along the street indicated

that undisturbed areas on the higher elevations along the right-of-way and in the residential lots would be absent. Shovel testing was not attempted in any of the privately owned lots along the street.

Two locations are currently free of development, with one having been tested previously for a proposed road realignment, and the other being the site of a demolished structure. Neither of these properties contained cultural resources. Pedestrian survey and reconciliation of historic data within the public access portions of the three proposed alignments indicated that these proposed alignments were very low probability areas for the presence of unrecorded archaeological.

The National Register properties listed for Harrison County are located well away from the proposed realignment of Popps Ferry Road, and none of the Harrison County Register properties in the County will be adversely impacted. Archival research, adequate shovel testing, and a visual inspection demonstrated that there are no properties within any of the three proposed alignments that meet Register eligibility admission criteria, No previously unrecorded sites were documented during this project, and each of the three alternative alignments should be considered cleared of cultural resources.

INTRODUCTION

The cultural resource assessment was completed as a part of the environmental assessment for the widening of Popps Ferry Road and the addition of new lanes over the Biloxi Back Bay bridge. The existing road and bridge will be incorporated in the widened travel way. Three potential alignments were identified, with additional right-of-way required for each of the alternatives. Real estate on both sides of Popps Ferry Road is nearly completely developed, with predominately single family residences on the northern side of the Bay and a mix of single family residences, townhouses, and commercial establishments along that portion of the project area south of the Bay. The southern terminus is at the intersection of Popps Ferry Road and Pass Road, while the northern terminus is at the intersection of Popps Ferry Road and Riverview Road. The heaviest commercial development is at the southern terminus. A portion of the alignment to the north of the Bay has limited access, with privacy fences along this portion that mark the rear property line of the residential lots. The limited access feature is preferred throughout the length of the project, in part because Popps Ferry Road is a connector between Pass Road and downtown Biloxi and the beach area to the south and Interstate 10 to the north. The project location is shown on Figure 1 taken from the *Biloxi, Miss.* 1992 Quadrangle map

The proposed right-of-way for the completed widening project will be 120', including the existing 80' of right-of-way. As may be seen from Figure 2, each of the three alignment alternatives (blue, red, and yellow lines) are consistently located along the present alignment. In no case do the proposed alignments extend more than 40' outside of the existing right-of-way, regardless of its placement along the existing street. The length of the project, excluding the causeway, is 9,680'. The causeway length is circa 3,983.5'. Acreage calculated for the non-causeway portion of the project is 26.66 acres that includes 17.77 acres within the existing right-of-way.

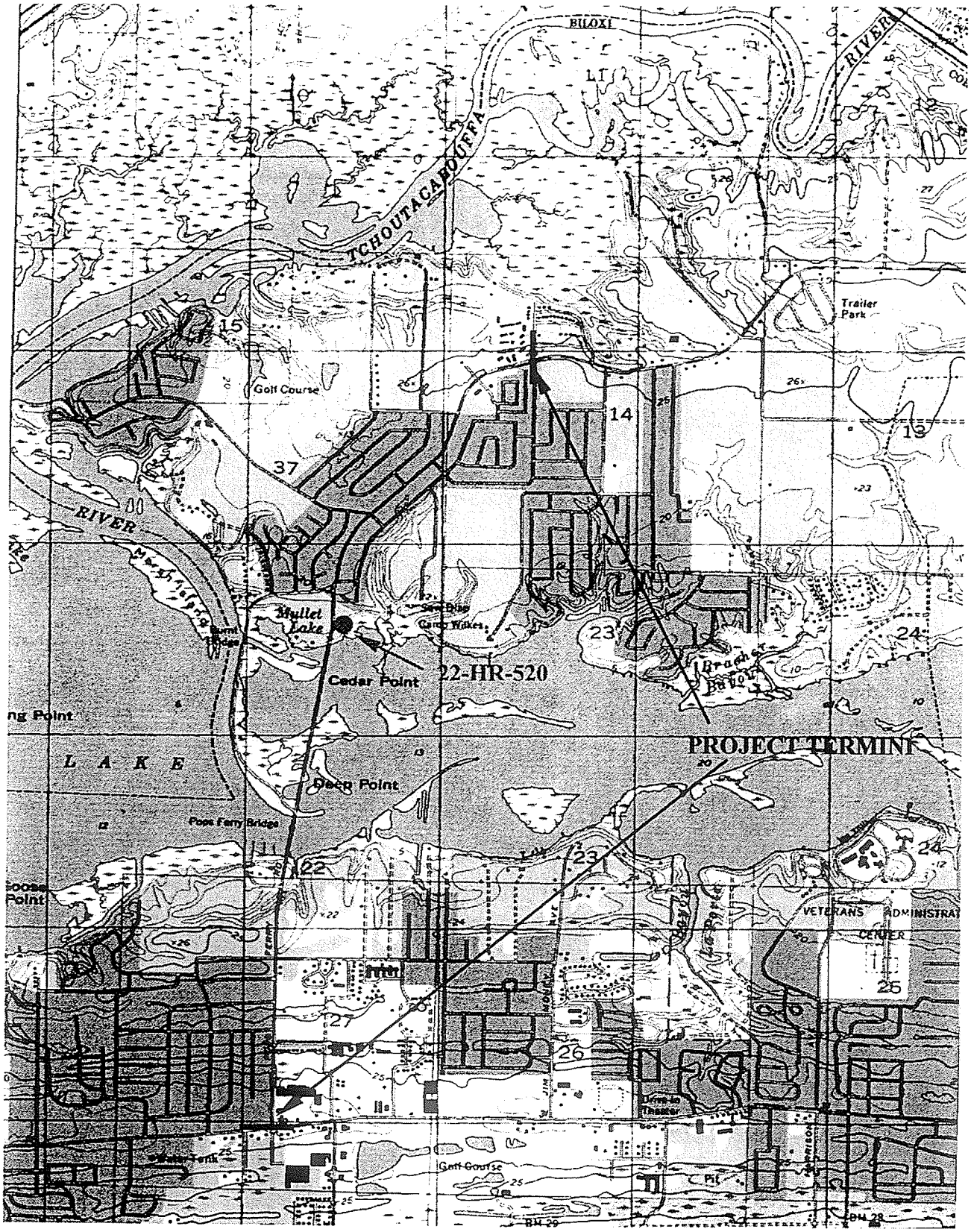


Figure 1. Project Location (Taken from the 1992 *Biloxi, Miss.* Quad.)

Figure 2. Project Location Showing the Three Proposed Alignment Locations

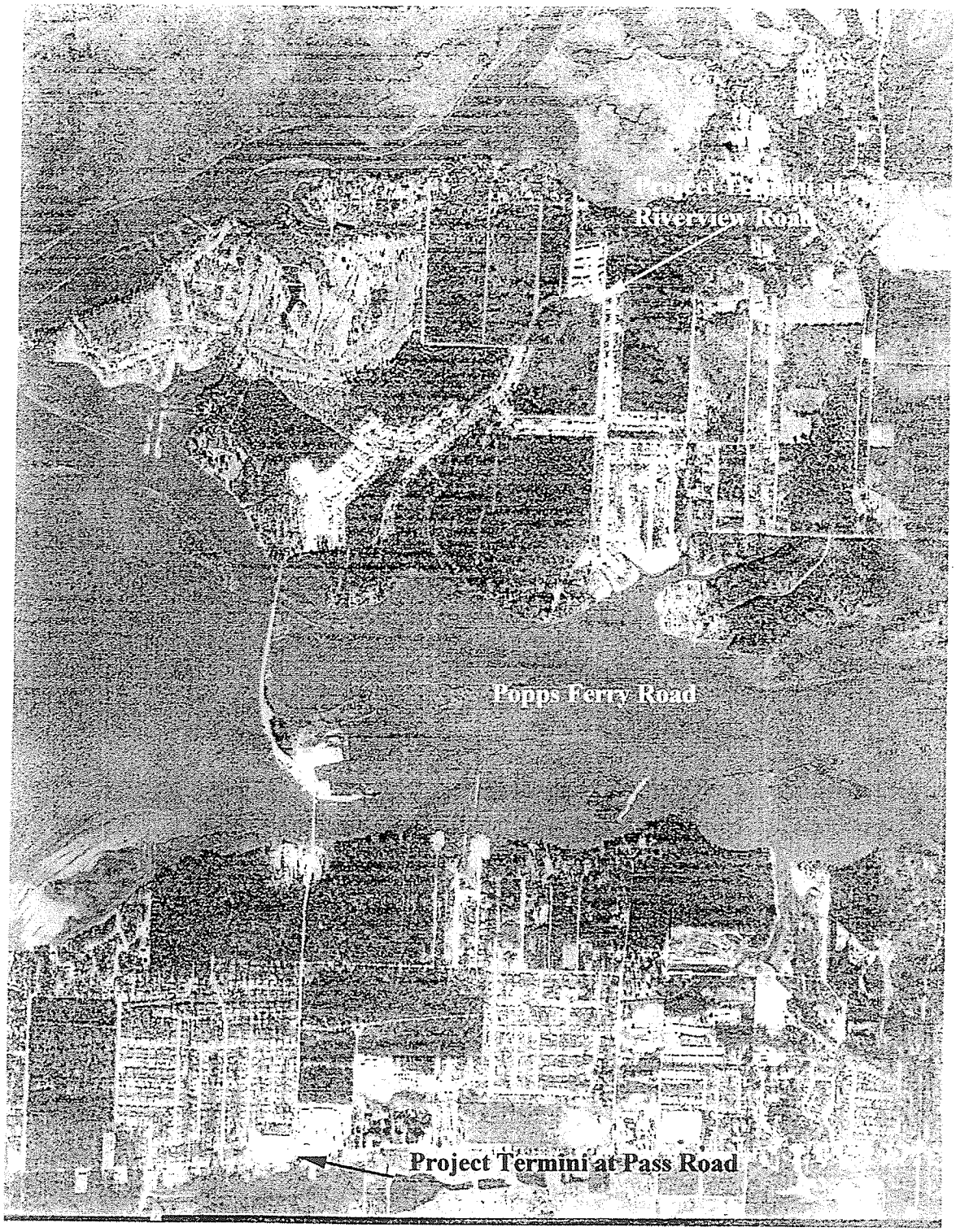


Figure 3. 1971 Aerial Photograph of Project Area Indicating Development

Residential and commercial development along Popps Ferry Road has intensified since the construction of the new Popps Ferry bridge and the extension and realignment of Popps Ferry Road in 1979. An inspection of the 1971 (Figure 3) aerial photo of the project area indicates that residential development along the exiting portion of the road north of the Bay bridge was already well underway by that time. Similarly, commercial development was already present along the southern end of the project area near the intersection of Pass Road and Popps Ferry Road. Residential development was also well underway on the western side of Popps Ferry Road. Residential and commercial development on the eastern side of Popps Ferry Road and south of the bay was largely absent. Accessibility across the bay provided by the new bridge supported the development of the adjoining residential neighborhoods. All of the standing structures along Popps Ferry Road are less than 50 years old, and many are less than 40. Residences in the older neighborhoods along Popps Ferry Road have driveways that lead directly to the street while residences in the newer neighborhoods face away from Popps Ferry Road and privacy fences are in place that shield the rear view of the homes from the Road. These fences are set back from the street and are along the street right-of-way. These unpaved right-of-way sections were disturbed when the area was cleared and grubbed for street improvement and bridge replacement. Sidewalks are a common feature along the full length of the project area, and are indicative of project location disturbance within the right-of-way.

LOCATION

The portion of Popps Ferry Road that is included in this project lies between the intersection of Pass Road and Popps Ferry Road on the southern end and the intersection of Riverview Road and Popps Ferry Road on the northern end The alignment will pass through portions of Sections 14, 37, 22, and 27, T7S, R10W in Harrison County, and inside of the corporate limits of the City of Biloxi.

PHYSIOGRAPHIC SETTING AND SOILS

The traditional physiographic placement of the project location is within the Gulf Coast Flatwoods unit of the Gulf Coastal Plain. This unit was traditionally described as extending over a mile to the north of the Biloxi Back Bay in the vicinity of the project location. The more useful *Ecoregions of Mississippi* approach to describing the physiographic region continues to place the project location in the Gulf Coast Flatwoods. This is an area of Quaternary quartz sands and silts that supported a slash pine flatwoods/savanna with wiregrass and longleaf pine savanna with palmetto. Soils across the length of the survey area include Eustis loamy sand, 0-5% slopes, Plummer loamy sand, and Eustis and Poarch soils with slopes between 8 and 17%. Elevations range between sea level and circa 25' AMSL

SURVEY METHODOLOGY

An inspection of the site location files produced the location of two previously recorded prehistoric sites within the proposed project area. Two areas along the proposed alignment and the existing street have seen surveyed at an earlier date. The survey of a tract on the southwestern corner of the intersection of the Bridge and Popps Ferry Road identified the location of site 22-HR-691. The site is located on the southern side of the

bridge and is now incorporated in the street side landscaping of an apartment complex (Figure 4). As may be seen in Figure 4, the site has been destroyed by the landscaping effort. This resource requires no further consideration.

Figure 4. Landscaping on Site 22-HR-691

A second survey on the southeastern side of the Bridge is indicated on the master file map and appears to be the alignment of a proposed road. That survey is listed by reference number 87-227, but the report is no longer in the Harrison County file for that year. A search of the Harrison County report files between 1982 and 1992 failed to locate the report as having been misfiled. No sites appear to have been located during that assessment.

A second previously recorded site, 22-HR-520 is recorded on the shoreline on the northeastern corner of the Popps Ferry Bridge. The site is a *Raangia cuneata* shell midden. Ceramics have also been reported to be a part of the cultural expression at this site, but lithics appeared to be absent. The site location, with vague boundaries, appears to have been originally reported by Richard Marshall. Edmund Boudreau revisited the site in 1992 and reported a more precise location of the cultural deposit as well as more clearly described the composition of the site as being a *Rangia* shell midden that contained ceramics but no lithics and bone. The site lies in an area of Eustis and Poarch soils whose slope is between 8 and 17%. The gradient immediately north of the shell

Figure 5. Vegetation Growth at Top of Slope Above 22-HR-520

Figure 6. Shoreline Immediately West of 22-HR-520

Figure 7. Typical Shell Distribution Along Shoreline at 22-HR-520

midden approaches the upper limit of the soils description and appears to be near the 17% mark. According to information recorded on the site card, the cultural deposit was largely confined to the beach zone. The site was relocated during this assessment and proved to be confined to a narrow band lying at the base of the hill rising from the shoreline, with shell scattered along the narrow exposed shoreline surface. Three shovel tests located about two feet above the top of the cutbank and spaced approximately 25' apart along the shoreline produced no artifacts and a shell deposit that was approximately 1" deep at the edge of the Popps Ferry Road right-of-way near the bridge and the same depth 50' to the east. A second row of three shovel tests spaced about 5' above the first row and on the cutbank were negative. The shell deposit nearest the bridge was looser than in the other two locations, and the lack of density of the shell may indicate that the deposit in that location was redeposited during bridge construction. Boudreaux and McGahey indicate that the site was destroyed during bridge construction. While this represents a likely sequence of events, it appeared more probable that the destruction of the shell deposit resulted from the combined effects of construction and wave activity that removed the majority of the deposit away from the shore. This remnant cultural deposit is not considered eligible for the Register and no further consideration is warranted.

The area that was previously surveyed for what appears to be a road was walked out and bare areas were visually searched for any evidence of artifacts. The area is a vacant lot with a sandy road crossing it from south to north. Grass free areas are also present over the project area. Figure 7 is a northward view showing the lot. The dirt track that crosses

the property is visible in the center of the photograph. This is privately held land and was not shovel tested since it had been previously surveyed.

An inspection and comparison of various historic maps for the project alignment indicates the degree of residential development since the 1950 aerial photographs

Figure 7. Open Lot Previously Surveyed for an Apparent Road Alignment

were taken. The 1954 *Biloxi, Miss.* Quad shows post-1950 subdivision development that was present along the northern portion of the proposed alignments when the quad was photorevised in 1970 and 1976. The 1971 aerial photo (Figure 3) does not show that extent of development, suggesting that most of the development on the northern portion of Popps Ferry Road occurred after 1970. The aerial photos taken in 1972 for the *Harrison County Soil* Survey Show a single row of houses on either side of the street. Similarly, the 1954 quad indicates that the southern end of the Road in the northwestern corner of its intersection with Pass Road was already developed. The eastern side of Pass Road along the southern end was not developed in the early 1970's according to these same historical maps. The earliest subdivisions were developed with driveways that led directly to Popps Ferry Road, while those subdivisions that post-date the 1970's face away from Popps Ferry Road. The presence of privacy fences along the right of way indicate later development while driveways entering the street are indicative of earlier development. Examples of architectural styles for the earliest construction are included in the Appendix. None of the standing structures within the proposed alignments meet the criteria for admission to the Register.

The presence of 22-HR-520 along the northern shoreline suggested that the possibility existed that a site or a remnant of 22-HT-520 might exist on the western side of the bridge and opposite the remnants of HR-520. This area is currently without a residential development, and the shoreline is open for visual inspection. This area was walked out and visually searched for evidence of shell deposits. No evidence of archaeological materials was located

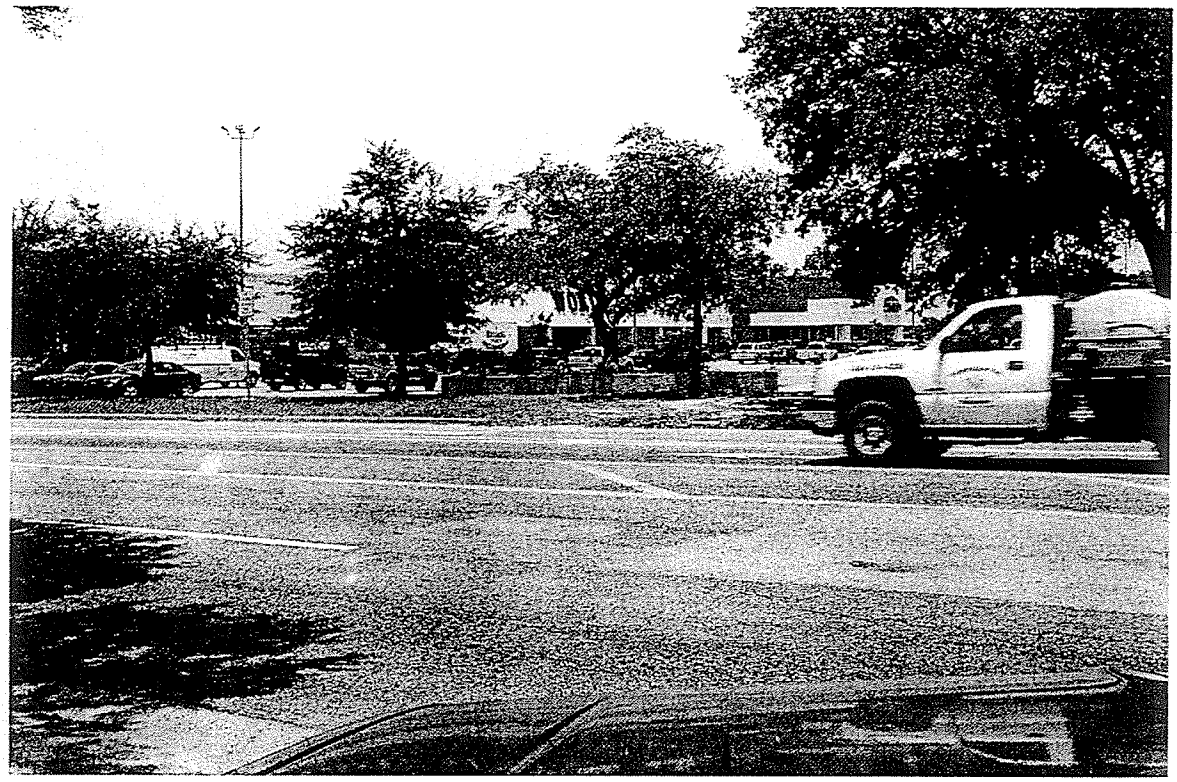
CONCLUSIONS AND RECOMMENDATIONS

There are two previously recorded archaeological site locations within the proposed work reach. One, 22-HR-691, was destroyed by apartment complex development, and the other, 22-HR-520 was reduced to a shoreline expression as a combined result of the construction of the causeway bridge and shoreline erosion. McGahey noted the destruction of this resource in 1992. No additional archaeological sites were recorded as a consequence of this assessment, and no standing structures that meet Register criteria were located. National Register properties in Harrison County are well away from the work reach and will not be adversely impacted as a result of project construction. As a result, I recommend that the proposed work reach for the road improvement and bridge addition be considered cleared of cultural resources.

PHOTOGRAPHIC APPENDIX

Commercial Development at South Terminus with Pass Road (looking Southeast)

Commercial Development at South Terminus with Pass Road (Looking Southwest)

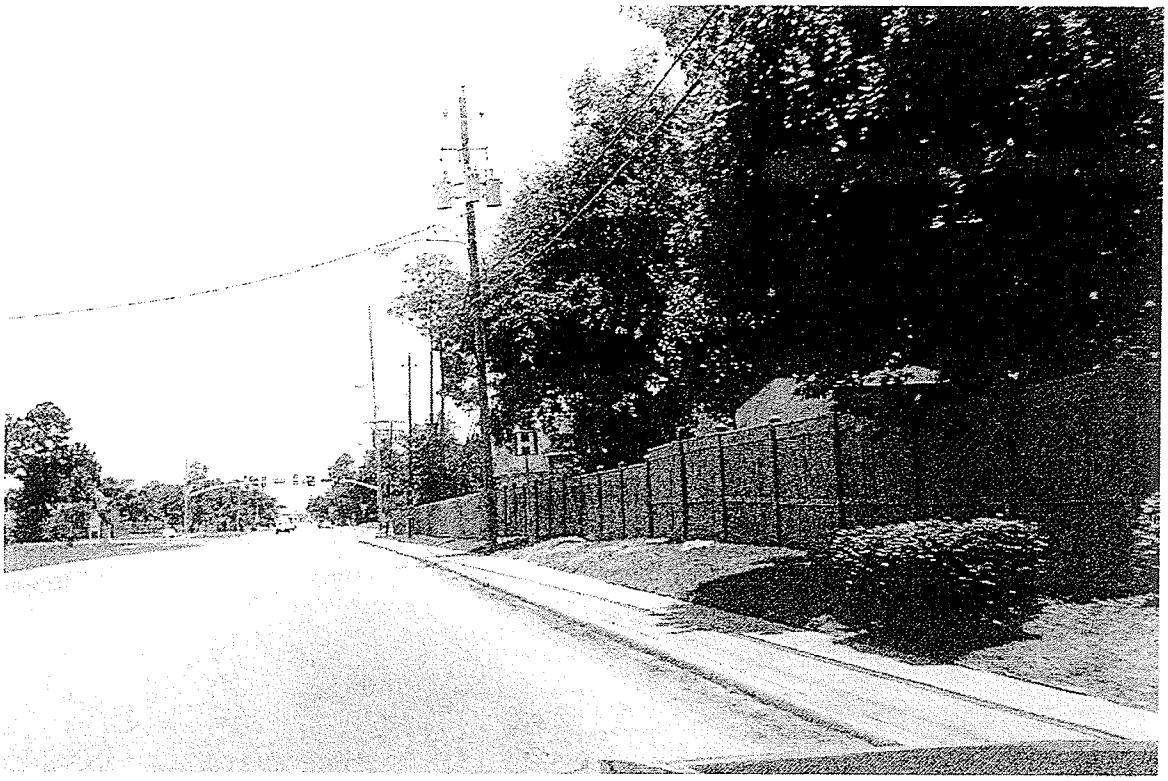


Commercial Development Near South Terminus with Pass Road (Looking East)

Popps Ferry Road Looking South Toward Pass Road in Oldest Residential Development

Typical Residences in Older Neighborhood (Note driveways enter Popps Ferry Road)

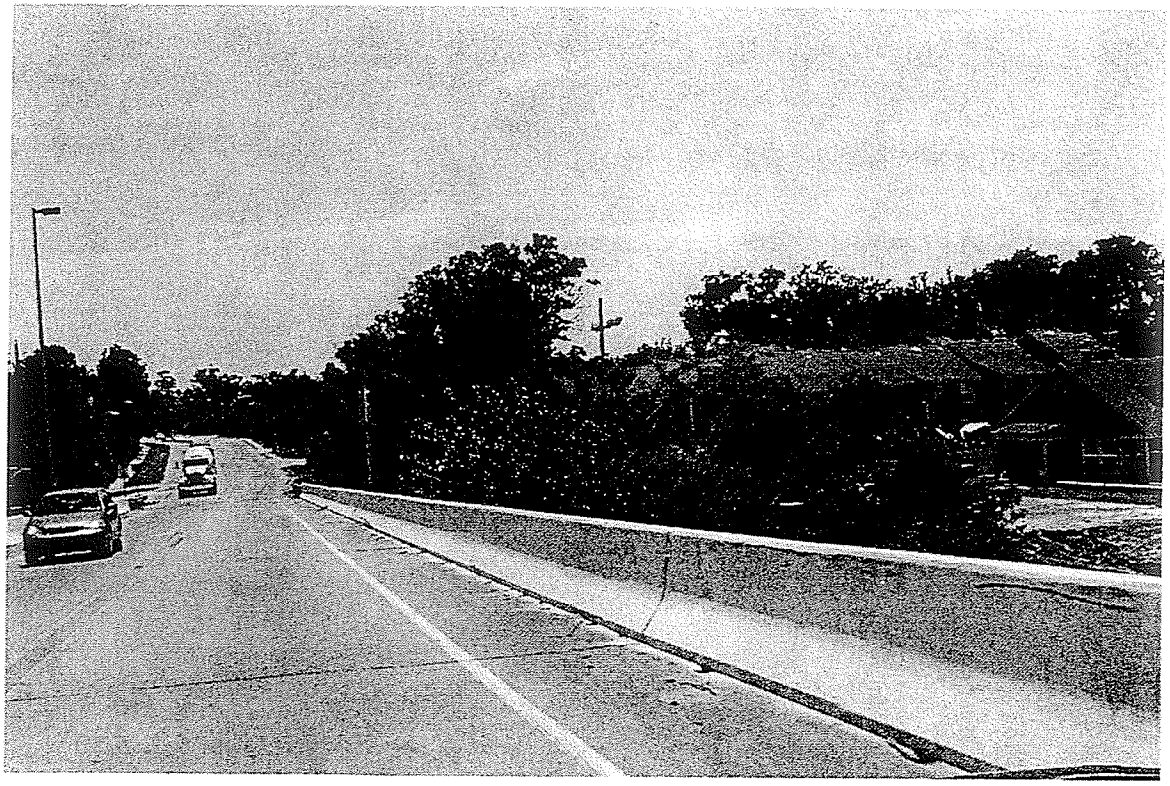
Typical Residences in Older Neighborhood (Note driveways enter Popps Ferry Road)



Security Fence in Newer Neighborhood (Note absence of driveways)

Older Residences with Drives on Left, Newer Residences With Security Fences on Right

Typical Residential Architecture in Older Neighborhood



Apartment Complex on Southwestern Corner of Popps Ferry Road Causeway

Closed Fish Camp and Restaurant on Southeast End of Popps Ferry Road Causeway

Appendix 9

HAZARDOUS MATERIALS SUMMARY REPORT

Appendix 9
Hazardous Material sites located within ¼ mile radius
of proposed project area footprint

Federal Regulatory Review

Federal record databases were reviewed for available listings of hazardous materials.

North Section:

One site was found within a ¼ mile radius of a proposed alternative, but not within the required right of way for construction.

ERNS - Emergency Response Notification System - contains information of sudden or accidental releases of oil and hazardous substances into the environment.

1) 2269 Baywood Drive: February 10, 2007. One ERNS report was noted: one 55-gallon drum, contents unknown, was found in an inlet near a private residence (Map site "2").

Bridge Section:

No hazardous material sites were located within a ¼ mile radius of the proposed alternatives for the bridge.

South Section:

Several hazardous materials sites were found within ¼ mile of the project area, but none are located within the required right of way for construction. Further information on each site can be found in Appendix 10.

RCRA-LGQ – Large Quantity Generators

1) Walgreens #4712, 2405 Pass Road (Map site "D")

RCRA-CESQG – Small Quantity Generators

1) WalMart Store #1088, 2381 Pass Road (Map site "C")
2) Star Cleaners, 2363 Pass Road (Map site "14")
3) Coastal Chiropractic Centres, 2406 Pass Road (Map site "D")
4) Powershack International, 291 Covenant Square (Map site "24")
5) Sabbatinis Details, 2337 Pass Road (Map site "B")

FINDS – Facility Index System: includes RCRIS, PCS, RCRIS-J, CERCLIS

1) Popps Ferry Elementary School, 364 Nelson Road (Map site "9")
2) WalMart Store #1088, 2381 Pass Road (Map site "C")
3) Walgreens #4172 (Map site "D")
5) Star Cleaners, 2363 Pass Road (Map site "14")
6) Coastal Chiropractic Centres, 2406 Pass Road (Map site "D")
7) Powershack International, 291 Covenant Square (Map site "24")
8) Sabbatinis Details, 2337 Pass Road (Map site "B")

State and Local Regulatory Review

North Section:

LUST – Leaking Underground Storage Tank

1) Popps Majik Market, 2111 Popps Ferry Road (Map site "25")

UST – Underground Storage Tank

1) Popps Majik Market, 2111 Popps Ferry Road (Map site "25")

PERMITS – Regulatory Programs, NPDES Program, Air Title V, Construction and Operating Programs, Solid and Hazardous Waste Programs

1) P.E. LaMoreaux and Associates, 2111 Popps Ferry Road (Map site "25")

Bridge Section:

No hazardous waste sites were mapped in the State and Local Regulatory Review for the bridge section.

South Section:

SHWS – State Hazardous Waste Sites (equivalent to CERCLIS)

1) Popps Ferry Elementary School, 364 Nelson Road (Map site "9")
2) Chevron Food Shop #21, 2351 Pass Road (Map site "B")

UST – Underground Storage Tank

1) Clarks Exxon #16, 2392 Pass Road (Map site "C")
2) WalMart Store #1088, 2381 Pass Road (Map site "C")
3) Phillips 66 #016429, Pass Road and Popps Ferry (Map site "D")
4) Eagle Energy #240, 2404 Pass Road (Map site "D")
5) Chevron Food Shop #21, 2351 Pass Road (Map site "B")
6) Hill Behan Lumber Company, 290 Beauvoir Road (Map site "22")

PERMITS - Regulatory Programs, NPDES Program, Air Title V, Construction and Operating Programs, Solid and Hazardous Waste Programs

1) WalMart Stores Inc., 2381 Pass Road (Map site "C")
2) Exxon Company USA #5581, 2392 Pass Road (Map site "C")
3) Coastal Chiropractic Centers, 2406 Pass Road (Map site "D")

Appendix 10

STATEMENT OF NO-IMPACT TO 4(f) PROPERTY FROM SECRETARY OF STATE

POST OFFICE BOX 97
GULFPORT, MISSISSIPPI 39502-0097

STATE OF MISSISSIPPI
SECRETARY OF STATE
DELBERT HOSEMANN

TELEPHONE (228) 864-0254
FACSIMILE (228) 864-0325

August 28, 2008

Ms. Jill High
Brown & Mitchell, Inc
796 Vieux Marche
2nd Floor
Biloxi MS 39530

Re: Solicitation of Views
Popps Ferry Road and Bridge Improvements Project
Harrison County Project No.: STPD-9376-00(004)/104384-101000

Dear Ms. High:

Please be advised that we have reviewed the information you provided regarding the Popps Ferry bridge replacement and in our opinion, the structure will have minimal, if any, adverse impacts to recreational values of the State's public trust tidelands in the bridge's path.

Thank you for the opportunity to review the project for Section 4(f) impacts
Please contact me if you have further questions concerning this matter.

Sincerely,

Margaret Bretz by RD

MARGARET ANNE BRETZ
Senior Attorney

Cc: Mr. Kreg Overstreet

Appendix 11

KICKOFF MEETING AGENDA

Kickoff Meeting
POPPS FERRY ROAD BRIDGE STUDY
November 28, 2007

AGENDA

Introductions

Develop Contact List – who should be included

- Team member list
- Outside contacts list – i.e. Federal Hwy., DMR, etc.

Review and edit schedule

- Need input on time requirements for City reviews/approvals, etc.

Discuss report format and document submittals

What document items are available now?

- Maps
- Existing (current) surveys/reports

Adjourn

Appendix 12

SCOPING MEETING AGENDA
AND
MEETING NOTES

Agenda

Popps Ferry Road and bridge environmental assessment

December 20, 2007

- Project summary (email)
- Schedule of tasks
- Calendar –public meeting dates (need suggestions from Mayor on when to meet with Biloxi City Council)
- Progress report from NS, Pickering
- General discussion
  - Include EPA in solicitation of views?
  - Others to include?
  - Current concerns re: EA

- FHWA – enough public meetings set for your requirements?

DECEMBER 20, 2007

Meeting notes:

Attendees:

Jill High	BM	228-436-7612
Kreg Overstreet	"	"
Rick Ferguson	PI	601-956-3663
Curt Craig	"	"
Sid Thompson	"	"
David Taylor	GRPC	228-864-1167
Brad McKnight	PI	601-956-3663
Brian Fulton	NS	228-374-1211
Damon Torricelli	Biloxi	228-435-6265
David Staehling	"	228-435-6314
Mayor AJ Holloway	"	228-435-6314
Dickie Walters	FWHA	601-965-4217
M. Craig High	NS	228-374-1211
Sharpie Smith	MDOT – Hbg	601-544-6511
Wes Stafford	MDOT – Env.	601-359-7924
Jeffrey Altman	MDOT – Planning	601-359-7685

Re: Popps Ferry Expansion Project

Damon: No one is hired yet for the Popps Ferry Expansion – south of this project

Mayor AJ : 4mil coming from MDA for Expansion, 2mil from GRPC

Re: Popps Ferry Road and Bridge Study

?: MDOT has a goal sheet to use for this study.

Dickie: re: Native Americans, FWHA will send letters via Pickering

Wes: asked about which Resource Agencies will get SOV's.

Mayor AJ: Gave brief history of bridge and problems that have been encountered over the years

Sharpie: Said MDOT needs money to spent to improve span

Craig H.: defined Public Hearing (w/court reporter) vs. Public Meeting (fliers to public)

Wes: suggested Public Meetings are ideal with smaller groups. This is where we listen for "showstoppers"

Kreg: need map with some alignments for Public Meeting

Brian: Thinks east side is more likely for bridge expansion.

? : Discussed 4f property, safety, deMinimus

David: GRPC may have boundaries of Causeway Park

Rick to Dickie: Mitigation possibilities?? Margaret Bretz, Sec. Of State, for boundaries of Causeway Park. May be able to mitigate but Federal policy says to avoid at all costs. Must show no way to avoid park.

Wes: Wanted definition of Cooperating vs. Participating agencies

Dickie: We send invitation for cooperating/participating agencies (notes may not be correct on this……)

Rick to Sharpie: what is the policy on moveable spans vs. highrises. Discussed clearance on Hwy 90 span… has 80 ft. clearance.

Wes: brought aerial map and this began casual discussion.

Adjourned at approx. 3pm.

Appendix 13

INFORMATION PACKET PRESENTED TO MAYOR AND COUNCIL

POPPS FERRY ROAD & BRIDGE ENVIRONMENTAL ASSESSMENT

AGENCIES - CONTACT INFO - RESPONSIBILITIES

Brown and Mitchell, Inc. – Lead – 40%
Neel-Schaffer, Inc. – 30%
Pickering, Inc. – 30%

Council's packet
Feb. 12, 2008

Brown and Mitchell, Inc.
796 Vieux Marche, 2nd floor
Biloxi, MS 39530

- Lead professional
- Environmental aspects
- Preparation of EA

Contact person for questions regarding this project: **Jill High**
228-436-7612 office
228-436-7676 fax
228-380-1176 cell
jill@brownandmitchell.com <mailto:jill@brownandmitchell.com>

Neel-Schaffer, Inc.
772 Howard Avenue
Biloxi, MS 39530

- Alignments
- Traffic studies
- Alternatives

Pickering, Inc.
460 Briarwood Drive
Suite 515
Jackson, MS 39206

- Bridge design and issues
- Noise study
- Cultural resources

POPPS FERRY ROAD & BRIDGE
ENVIRONMENTAL ASSESSMENT

PRELIMINARY PROJECT DESCRIPTION

PURPOSE and NEED
for an Environmental Assessment for the realigning and expansion of Popps Ferry Road and Bridge:

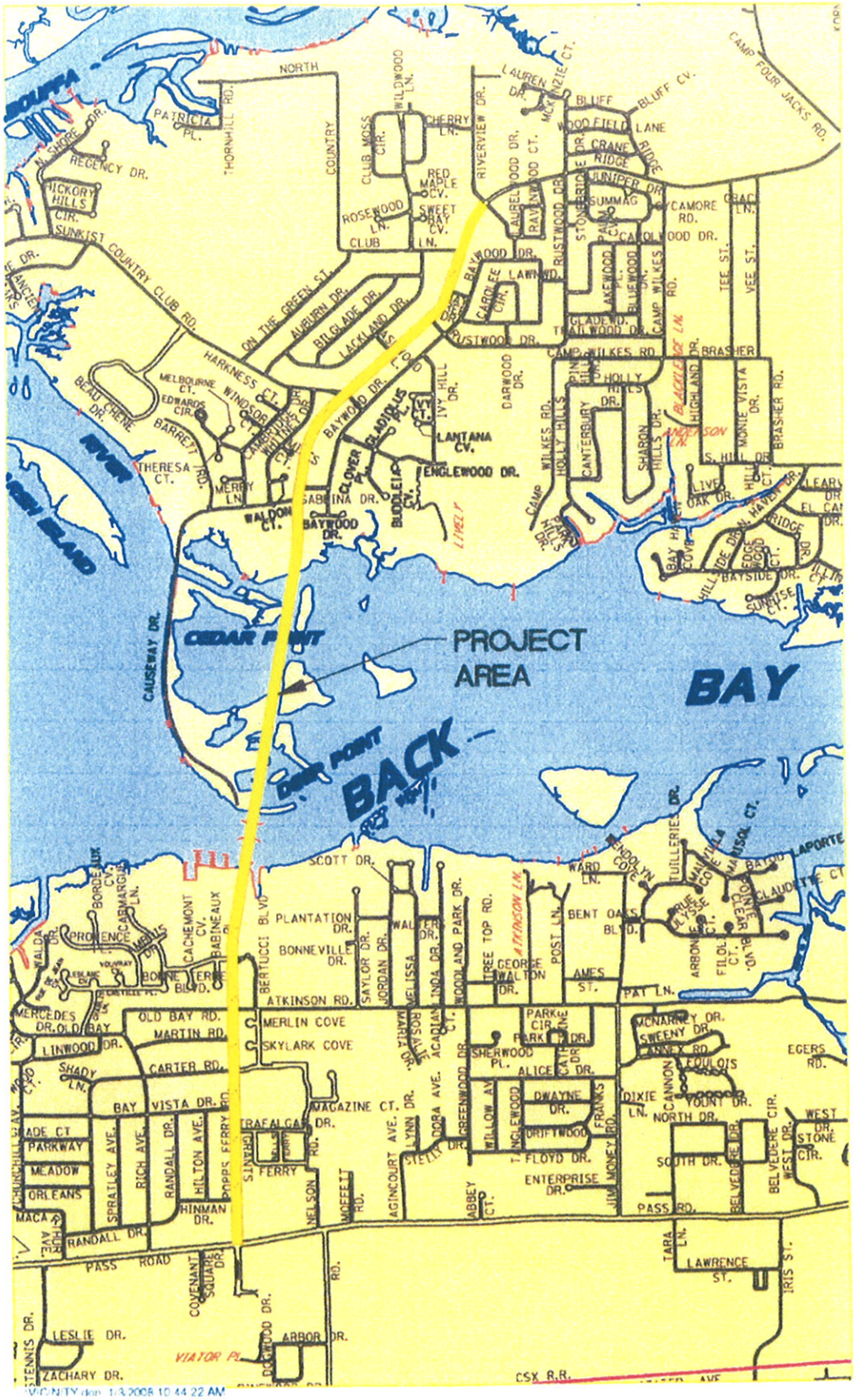
The City of Biloxi has contracted with Brown and Mitchell, Inc. to perform an environmental assessment ("EA") on a portion of Popps Ferry Road including possible bridge expansion. This EA will evaluate the feasibility of expanding the existing roadway to accommodate existing and projected traffic patterns. The area under consideration is currently a 4-lane section of roadway and bridge with 5-lane sections immediately north and south of the project area.

PROPOSED SCHEDULE

We foresee approximately 16 months as the time needed to complete the necessary items and compile the data for the Final EA. The target date for the deliverable is February 28, 2009.

PROJECT AREA

The portion of Popps Ferry Road being considered begins at the intersection with Riverview Drive south approximately 2 miles to Pass Road. The bridge portion spans a small 10-acre park (Causeway Park) and marsh area under the existing drawbridge, as well as the navigable waterway under the control of the U.S. Coast Guard. Residential/single family dwellings and business properties can be found adjacent to the existing roadway along the entire length of the project area.



POPPS FERRY ROAD AND BRIDGE
Environmental Assessment

BASE MAP CREATED
BY NEEL-SCHAFFER, INC.

BROWN & MITCHELL, INC.
Consulting Engineers
796 Vieux Marche, 2nd Floor Biloxi, MS 39530
Ph (228) 436-7612 Fax 436-7676 Web: brownandmitchell.com

FEBRUARY 2008

Project Title POI ERRY BRIDGE STUDY

Conceptual Project Schedule

B Brown & Mitchell | Neel-Schaffer | P Pickering | A All

Week

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	27	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	43	54	55	56	57	58	59	60	61	62	53	64	65
Nov '07			Dec '07				Jan '08					Feb '08				Mar '08				Apr '08				May '08			Jun '08				Jul '08					Aug '08				Sep '08					Oct '08					Nov '08				Dec '08				Jan '09					Feb '09			

PROJECT MANAGEMENT

- **Project Organization and Schedule**
- **Project Kickoff Meeting** — A
- **Monthly Progress Reports**
- **Project Coordination**
- **Final Project Submittal** — B B B B B

PUBLIC INVOLVEMENT PROGRAM

- **Public Involvement Plan Elements**
- Project Mailing Addresses and Database Management — B B
- Local Outreach Meetings (up to 6) — P B P B
- Elected Officials Meetings (3)
- Agency Scoping Meetings (2)
- Public Meeting (1)
- Public Hearing (1)
- Media Relations
- Fact Sheet

ENVIRONMENTAL DATA COLLECTION AND EVALUATION

- **Socio-Economic Data**
- Land Use Data — B
- Cultural Features and Community Services — B
- Relocation Impact Data — B
- Census Tract and Socioeconomic Data — P B
- Farmlands — B
- Visual Effects and Aesthetics — P
- Hazardous Materials — B — P B
- **Natural Features Data** — B
- Wetlands — B B B B
- Outstanding Waters — B
- Soils — B
- Floral Communities — B
- Faunal Communities — B
- Terrain — B
- Threatened and Endangered Species — B
- Permit Requirements — P P P B
- Water Quality — B
- **Noise Study** — P P P P P P B B
- **Cultural Resources** — P P P P P P B B
- **Secondary and Cumulative Effects** — P P P B

ENGINEERING ANALYSIS

- **Alternative Traffic Study**
- Develop Traffic Forecasts — B
- Alternative Scenario Analyses — B B
- **Other Engineering Data Collection and Evaluation**
- Mapping — B
- Engineering Data — B
- **Engineering and Concept Design of Alternatives**
- Establish Design Criteria — B
- Geometry and Typical Sections — B
- Floodplain Analysis — B
- Drainage Review and Studies — B
- Intersection Analysis and Schematic Layouts — B B
- Alternatives Analysis — B B

PREPARE THE DRAFT ENVIRONMENTAL ASSESSMENT (EA)

- **Studies and Text Preparation**
- Cover Sheet
- Summary
- Table of Contents
- Purpose and Need for Action — P B
- Alternatives — P B
- **Submit Pre-Draft EA** — P P B
- **Project Team Review Meeting (1)**
- **Submit the Draft EA** — B B B B

PREPARE THE FINAL ENVIRONMENTAL ASSESSMENT (EA)

- **Prepare and Submit the Final EA/FONSI** — P P B B B B B B B B B
- Address Issues Raised at Public Meetings — B B B B B B B B B
- Revisions to Selected Alternatives including bridges — P B B B B B B B B B
- Review Draft Impact Section and Revise if necessary — B B B B B B B B B
- List Public Hearing Comments and Responses — P B B B B B B B B
- Review and Revise Comments and Coordination Section — P B B B B B B B B
- Prepare Document for FHWA Conclusions — P P B B B B B B B B
- Revise the Draft Document and Submit to MDOT — P P B B B B B B B B

Appendix 14

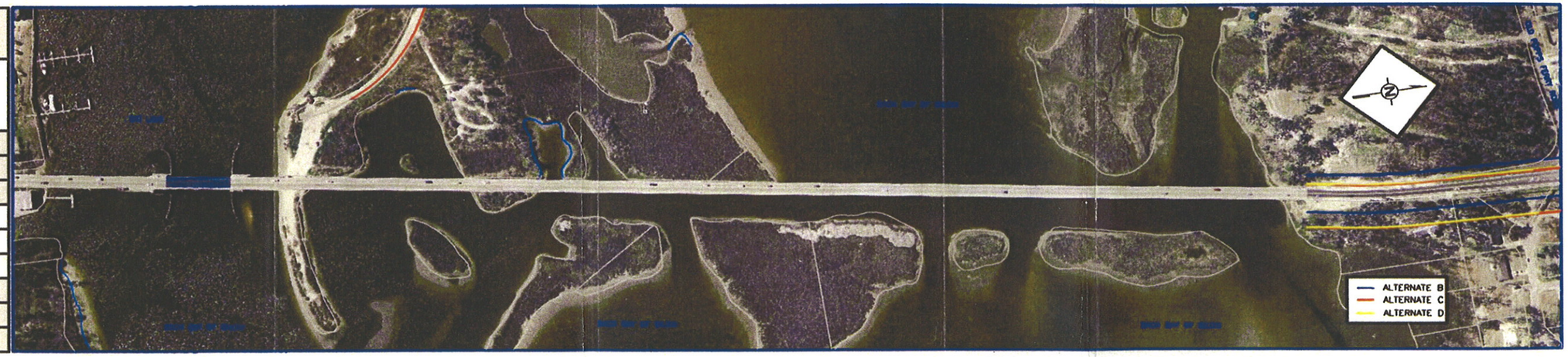
EXHIBITS USED IN PUBLIC INVOLVEMENT

SOUTHERN SECTION
(from causeway abutment south to Pass Road)

A	**no build**	
B	*ROW needed*	120′
	Parcel acquisition	23 east/29 west
	Relocations	0 east/21 west
C	*ROW needed*	120′
	Parcel Acquisition	18 east/0 west
	Relocations	8 east/0 west
D	*ROW needed*	120′
	Parcel Acquisition	18 east/26 west
	Relocations	6 east/4 west

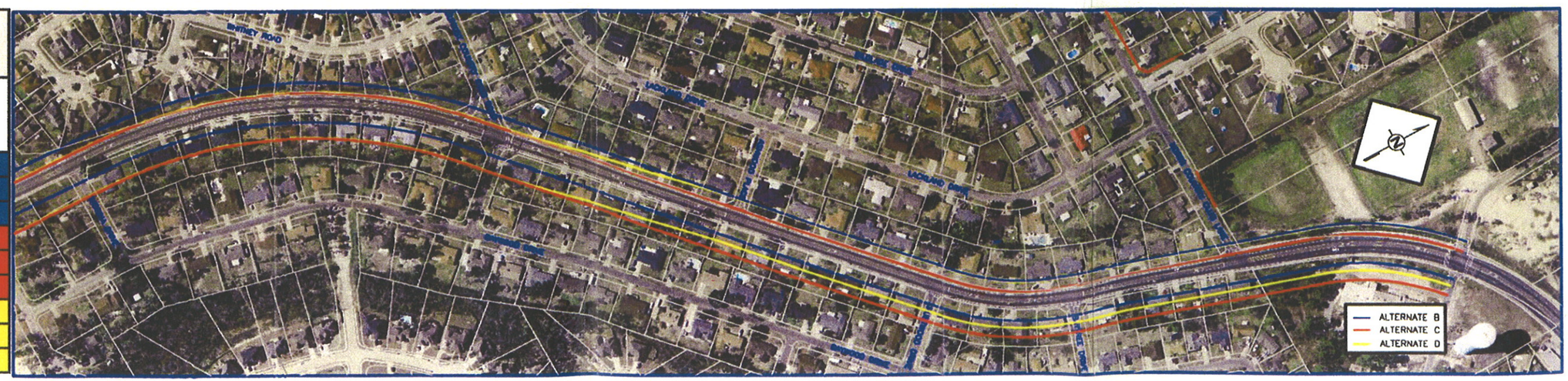
CAUSEWAY/BRIDGE

A	**No build**	
B	*Type of structure*	Draw bridge
	# of traffic lanes	4
	Max. height	65′
C	*Type of bridge*	High-rise
	# of traffic lanes	4
	Max. height	90′
D	*Type of bridge*	Twin bridges
	# of traffic lanes	2 each
	Max. height	90′



NORTHERN SECTION
(from causeway abutment north to Library)

A	**no build**	
B	*ROW needed*	120′
	Parcel Acquisition	41 east/39 west
	Relocations	40 east/28 west
C	*ROW needed*	120′
	Parcel Acquisition	41 east/0 west
	Relocations	40 east /0 west
D	*ROW needed*	120′
	Parcel Acquisition	41 east/23 west
	Relocations	40 east/22 west



- Alternatives B, C, and D do not necessarily correspond with B, C, and D in any other section. They are being studied independently of each other until a final alignment is determined.
- Parcel acquisition is *estimated* until surveys determine exact measurements.

SOUTHERN SECTION

(from causeway abutment south to Pass Road)

Alternative A - No build alternative

Alternative B – Widen Popps Ferry Road to 120′ of right-of-way from the current centerline along Popps Ferry road south to the Popps Ferry/Pass Road intersection. A total of 52 parcels will be acquired and 21of those will be relocations.

Alternative C – Widen Popps Ferry Road from west right-of-way 120′ to the east, adjusting the centerline accordingly, continuing south along this trajectory to the Popps Ferry Road/Pass Road intersection. A total of 18 parcels will be acquired and 8 (east side only) will be relocations.

Alternative D – Widen Popps Ferry Road to the east from the current west right-of-way line to 120′ of right-of-way continuing south along this trajectory to, but not including, the Winn Dixie Shopping Center. A total of 44 parcels will be acquired and 10 will be relocations. At the Winn Dixie Shopping Center, the right-of-way will be reduced to 100-110′ of right-of-way along this trajectory south to the Popps Ferry/Pass Road intersection. No businesses will be affected.

CAUSEWAY/BRIDGE

Alternative A - No build alternative

Alternative B – The proposed improvement of this section would consist of constructing a new structure parallel to the existing Popps Ferry Causeway accommodating four lanes of traffic with shoulders. The required horizontal and vertical navigational clearances will be obtained by utilizing a bascule (draw bridge) span for the navigational channel.

Alternative C – The proposed improvement of this section would consist of constructing a new structure parallel to the existing Popps Ferry Causeway, accommodating four lanes of traffic with shoulders. Portions of the existing causeway may be upgraded and utilized, particularly north of the proposed bridge. The required horizontal and vertical navigational clearances of the bridge will be obtained by utilizing a high-rise fixed span for the navigational channel.

Alternative D – The proposed improvement of this section would consist of constructing twin bridges. 1) a new high-rise fixed span structure parallel to the existing Popps Ferry Causeway, accommodating two lanes of traffic with shoulders. 2) the existing bascule bridge would be removed and replaced with a new high-rise fixed span structure, accommodating two lanes of traffic with shoulders. Portions of the existing causeway would be utilized where possible. Each bridge would meet the required horizontal and vertical navigational clearances.

NORTHERN SECTION

(from causeway abutment north to Sherry Library)

Alternative A – No build alternative.

Alternative B – Popps Ferry Road will be widened to the east and west, expanding to 120′ of right-of-way. This alternative would require homes to be removed from the east and west sides of Popps Ferry Road along the length of this section. 80 parcels will be acquired and 68 of those will be relocations.

Alternative C - At the current west right–of-way would be expand 120′ to the east. The current centerline would be adjusted to the east. 41 parcels will be acquired and 40 of those (east side only) will be relocations. Access to the homes on the west side of Popps Ferry will remain.

Alternative D - Widen to the east and west expanding to 120′ of right-of-way along the current centerline continuing south to Sunkist Country Club Road intersection. The right-of-way will be realigned to the east 120′from the existing west right-of-way. This alternative would create a limited-access roadway. 64 parcels will be acquired, and 62 of those will be relocations. This alternative will create a minimum 20′ green space between the homes remaining and Popps Ferry Road.

PROCESS OF PROJECT

1. Mayor's request to widen a portion of Popps Ferry Road and Bridge
2. City hires consultant to perform Environmental Assessment (EA)
3. Funding for EA is approved
4. EA process: takes approx. 16 months
5. EA approval from MDOT: takes approx. 3 months
6. Funding for design/construction is approved
7. Final design process begins: takes approx. 18 months
8. Construction bid process begins: takes approx. 3 months
9. Construction/widening begins

Brown & Mitchell, Inc.
CONSULTING ENGINEERS

NEEL-SCHAFFER
Solutions you can build upon

Pickering

On behalf of the City of Biloxi, welcome! Thank you for your concern for our community and your dedication to making it a better place to live and work! We are here tonight to let you know about a potential project the City is considering, and to listen to your comments and concerns before any decisions are made. The professional teams and city leaders involved in this project are here tonight, and we invite you to feel free to discuss issues with us.

The project we are discussing tonight is the first step in the process of improving a 2-mile portion of Popps Ferry Road and bridge. This initial phase is an Environmental Assessment, which will address issues that can arise during the future phases of the project.

Issues addressed in an EA include:

- Comparison of various alignments, including public input
- Traffic patterns and projections
- Analysis of impacts to properties along the project area
- Noise and Land Use assessments and impacts
- Ecological impacts such as endangered species, wetlands
- Cultural resources and hazardous materials analysis
- Coast Guard requirements regarding bridge design
- Visual aesthetics of centerline adjustment and widening
- Identifying "best scenario" alternative

PUBLIC MEETING

To discuss an environmental assessment for a portion of Popp's Ferry Road and the Popp's Ferry Bridge

Thursday, March 6, 2008, anytime between 5:30 and 7:30 p.m.

Donal M. Snyder Sr. Community Center, 2520 Pass Road

The first phase of improving the Popp's Ferry Bridge and Popp's Ferry Road between Pass Road and Riverview Drive (across from the Margaret Sherry Library) is to perform an environmental assessment. An environmental assessment is a preliminary analysis to identify any issues to be addressed before the construction phase would begin.

Public input is vital at this early stage of the assessment. Please encourage neighbors and business owners to attend this meeting and bring any questions you may have.

No formal presentation will be made. Instead, this will be an informal setting where you will be able to individually look at the maps, discuss issues with the design team and public leaders, and provide comments on this potential project.

The environmental assessment will take as long as 16 months and will evaluate the feasibility of expanding the existing roadway to accommodate existing and projected traffic patterns.

This is not a discussion regarding a "North/South Corridor" between I-10 and U.S. 90. Instead, this project is an assessment of widening or building a new Popp's Ferry Bridge and improving the portion of Popp's Ferry Road from Pass Road to the Margaret Sherry Library.

Brown & Mitchell, Inc.
CONSULTING ENGINEERS

NEEL-SCHAFFER
Solutions you can build upon

Pickering

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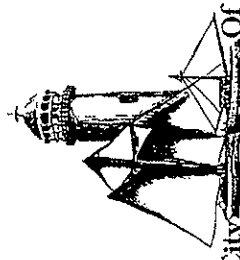


City Of BILOXI
P.O. Box 429
Biloxi, MS 39533

ıre you in the loop?
ign up at biloxi.ms.us

Summary of March 6, 2008 Public Meeting
Popps Ferry Road and Bridge Environmental Assessment

Attendance: 175

News coverage: WLOX
Biloxi/Diberville Press
Sun Herald

General attitude of attendees: positive feedback, a few disagreed with project, but overall, most seemed to want something done to PF Road and Bridge for better traffic flow, regardless of impacts to homes.

Written comments to note:

1) Build bridge at Rodenburg
2) Take homes which would be left without safe frontage to enter and exit their driveway. Keep it safe in front (yards) for children.
3) Include noise buffer for Baywood Court - noisy after Katrina. Design a lighted bridge
4) Upgrade Atkinson Road w/curb, sidewalk
5) Dredge new channel and put in high-rise
6) Build somewhere else!
7) Dumping 5 lanes of traffic on Pass Rd. will not work.
8) No limited access road
9) What access is planned for Anatole Bay?

# of comment cards returned - 66 total
High Rise - 47
Draw Bridge - 16
Five Lane - 31
Limited Access - 30

emails received - 3 Wakham
Beard
Farish

calls after meeting - appx. 5

1 request to attend Homeowners Association meeting at Anatole Bay 4:30, Thurs. 3-13-08, to inform residents of project. By Mr. Farish, HOA president?

Jill

From: Jill
Sent: Monday, June 02, 2008 10:41 AM
To: Ed Gemmill (E-mail)
Cc: David Staehling (E-mail); Craig High (E-mail); Rick Ferguson (E-mail); Kreg Overstreet
Subject: Popps Ferry Road EA update

Mr. Gemmill,

In response to your request last week for an update on Popps Ferry Road and Bridge Environmental Assessment, here it is!

We are well into the data collection portion of the project, from which we will analyse the best alternative for widening and improving the road and bridge. This should be complete by late summer.

As of now, we have not selected the favored alternative for either, nor have we determined the type of bridge(s) we will build.

We have analysed some of the bridge data and have determined that the replacement bridge(s) will need to be at least 55 ft. high, with a drawbridge, maybe higher. At 55 ft., we have satisfied our goal of getting 90% of the *current* openings under the new bridge without opening.

We expect to bring our findings to the public, through a public meeting, sometime in the fall.

Any comments or questions on this project are always welcome!! Just email or call me or Kreg Overstreet at the contact information below.

With Regards,

Jill High
Brown & Mitchell, Inc.
796 Vieux Marche, 2nd Floor
Biloxi, MS 39530
228-436-7612 office
228-380-1176 cell
jill@brownandmitchell.com

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment

March 6, 2008

Which type of **bridge** do you prefer: (CIRCLE ONE)

1. High Rise Bridge - like Ocean Springs/Biloxi Bridge
2. Draw Bridge – like Cowan Lorraine Bridge
3. Other – please explain:

What type of **roadway** do you prefer: (CIRCLE ONE)

1. Five-lane section – like Pass Road
2. Limited access roadway with a boulevard – like Caillavet Street
3. Other – please explain

Any other comment you have regarding this project, please list below or email us:

Questions: contact Jill High at Brown & Mitchell, (228) 436-7612 or jill@brownandmitchell.com

BROWN & MITCHELL, INC.
796 Vieux Marché, 2nd Floor
Biloxi, MS 39530

Wards 4 and 6
Town Meeting

The purpose of this meeting will be to discuss the New Popps Ferry Road 4-Lane Bridge. Come out and voice your concerns.

Councilmember Mike Fitzpatrick, Ward 4
Councilmember Ed Gemmill, Ward 6

Tuesday, November 25, 2008

6:00 P.M.

Location:
Donal Snyder Community Center
2520 Pass Road
Biloxi, MS 39531

For more information you can contact the City Council Office at 435-6257
Citycouncil@biloxi.ms.us

www.biloxi.ms.us

STATE OF MISSISSIPPI

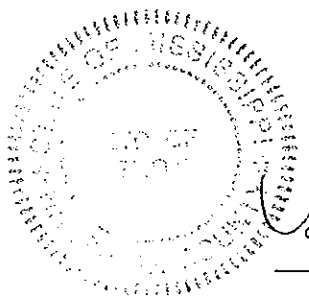
COUNTY OF HARRISON

CITY OF BILOXI

CERTIFICATE

I, the undersigned, Keri L. Campbell, Deputy Clerk of the Council of the City of Biloxi, Mississippi, do hereby certify that the attached Resolution Number 817-08 is a true copy of the original Resolution which will be placed on the record of the Council Minutes of the City of Biloxi, Mississippi, of a duly held Meeting on the 2nd day of December, 2008 and that the original Resolution appears on record in the Clerk of Council's Office from which this copy is taken and compared.

DONE this the 8th day of December, 2008.



Keri L. Campbell

RESOLUTION NO. 817-08

RESOLUTION OF CONCURRENCE WITH THE COMPLETION OF THE DRAFT ENVIRONMENTAL ASSESSMENT FOR THE POPP'S FERRY ROAD AND BRIDGE IMPROVEMENTS

WHEREAS, the City of Biloxi proposes to undertake the Popp's Ferry Road and Bridge Improvements; and

WHEREAS, the City of Biloxi, under the direction of the Federal Highway Department and the Mississippi Department of Transportation requested the City of Biloxi to complete an Environmental Assessment on the proposed Popp's Ferry Road and Bridge Improvements; and

WHEREAS, Brown and Mitchell, Inc., has completed the draft environmental assessment for the Popp's Ferry Road and Bridge Improvements and request approval to submit the Draft Environmental Assessment to the Mississippi Department of Transportation; and

WHEREAS, the Popp's Ferry Road and Bridge Improvements Draft Environmental Assessment is on file and available for review in the City of Biloxi's Clerk of Council's Office;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF BILOXI, MISSISSIPPI, THAT:

SECTION ONE: The findings, conclusions, and statements of fact contained in the foregoing preamble are hereby adopted, ratified and incorporated herein.

SECTION TWO: The City of Biloxi is hereby authorized to submit the Draft Environmental Assessment on the Popp's Ferry Road and Bridge Improvements to the Mississippi Department of Transportation and Federal Highway Department.

SECTION THREE: The City of Biloxi approves the Preferred Alternative ("Alternative E") which includes 120-foot Right-of-Way and a 65-foot vertical clearance bascule bridge, as

Res. No. 817-08

described in the Draft Environmental Assessment on the Popp's Ferry Road and Bridge Improvements.

The foregoing Resolution having first been reduced to writing, was read by the Clerk and moved by Councilmember Fitzpatrick seconded by Councilmember Harrison and was adopted by the following vote:

YEAS:	Lawrence	Fitzpatrick	NAYS:	None
	Stallworth	Gemmill		
	Harrison	Fayard		

ABSENT: Wall* (*absent from room during discussion and voting only)

The President then declared the Resolution adopted this the 2nd day of December, 2008.

STATE OF MISSISSIPPI
CITY OF BILOXI
HARRISON COUNTY

ATTEST:

DEPUTYCLERK OF THE COUNCIL

APPROVED:

PRESIDENT OF THE COUNCIL

Submitted to and approved by the Mayor, this the 3rd day of December, 2008.

APPROVED:

MAYOR

Appendix 15

PROOF OF PUBLIC ANNOUNCEMENTS FOR PUBLIC HEARING

PROOF OF PUBLICATION

LEGAL NOTICE FOR OPEN FORUM PUBLIC HEARING
Popps Ferry Road FROM Riverview Drive TO Pass Road
Biloxi, Harrison County
PROJECT STPD-9376-00(004)/104384/811000
The City of Biloxi has scheduled an open forum public hearing to discuss improvements to Popps Ferry Road and Bridge in Biloxi, Harrison County. The hearing will be held Wednesday, September 23, 2009, from 4:00 pm to 7:00 pm at the Donal Snyder Community Center, 2520 Pass Rd., Biloxi, MS 39531-2726. (228) 436-5191. Citizens are invited to come and go as they please during the hours of the hearing to view alternatives and to speak with project representatives concerning design, right-of-way acquisition, and environmental issues. Although there will be no provisions made for formal presentations by individuals or groups, citizens are invited and encouraged to make written and/or taped comments that will become part of the hearing's permanent record.
In summary, the City of Biloxi is proposing to widen and upgrade an existing 2.4 mile section of Popps Ferry Road, including the existing causeway and bridge. The upgrades will allow for a 4-lane boulevard section with turning bays, vegetated medians, curb and gutter and sidewalks consistent with federal roadway standards.
Alternative E- Northern Section
Follow Center to Ashwood Place, transition East to Sabrina Drive, transition back to Center
Alternative E- Northern Section begins at the Margaret Sherry Library and south to the northern end of the causeway. The existing 2-lane roadway is proposed to be widened to a 4-lane roadway with shoulders and a bike/pedestrian lane.
Alternative E - Bridge
Alternative E proposes to widen and upgrade the existing 2-lane, 35-ft. vertical clearance drawbridge to a 4-lane, 55-ft. vertical clearance drawbridge by constructing a new structure parallel to and east of the existing structure. This would accommodate 4 lanes of traffic and a pedestrian/bike path on the east side. Both ends of the bridge would tie-in at approximately the same location where the existing tie-ins occur. The southernmost bridge tie-in would occur before Anatole Bay Townhomes and will minimize impacts to Causeway Park.
Alternative E □ Southern Section
Follow Center to Old Bay (Atkinson), transition West
Alternative E □ Southern Section begins at the south end of the bridge and south to the Popps Ferry Road/Pass Road intersection. The existing 2- and 4-lane roadway will be widened and upgraded to at least a 4-lane roadway with shoulders and a bike/pedestrian lane.
The Preliminary Environmental Assessment Document will be available for public inspection at the Donal Snyder Community Center, the Margaret Sherry Library, Biloxi City Hall and the Federal Highway Administration, 666 North Street, Suite 105, Jackson, MS.
Any individual who needs auxiliary aids or special accommodations to attend the hearing should advise Brown and Mitchell, Inc. of their needs by calling 228-436-7612, or by email at blxadmin@brownandmitchell.com.
Kreg Overstreet, P.E., Project Manager
Brown and Mitchell, Inc., Biloxi, MS
adv2,12,1WED,1SAT
1343795

STATE OF MISSISSIPPI
COUNTY OF HARRISON

Before me, the undersigned Notary of Harrison County, Mississippi personally appeared CRISTA HAUK who, being by me first duly sworn, did depose and say that she is a clerk of The Sun Herald, a newspaper published in the city Gulfport, in Harrison County, Mississippi, and the publication of the notice, a copy of which is hereto attached, has been made in said paper 2 times in the following numbers and on the following dates of such paper, viz:

Vol. 125 No., 335 dated 2 day of Sept., 20 09
Vol. 125 No., 345 dated 12 day of Sept., 20 09
Vol. _____ No., _____ dated _____ day of _____, 20 _____
Vol. _____ No., _____ dated _____ day of _____, 20 _____
Vol. _____ No., _____ dated _____ day of _____, 20 _____
Vol. _____ No., _____ dated _____ day of _____, 20 _____
Vol. _____ No., _____ dated _____ day of _____, 20 _____

Affiant further states on oath that said newspaper has been established and published continuously in said country for a period of more than twelve months next prior to the first publication of said notice.

SEP 16 2009 Crista Hauk
Clerk

Sworn to and subscribed before me this 15 day of Sept., A.D., 20 09

WENDI A. BERKLEY
Notary Public State of Mississippi
Harrison County
My Commission Expires
April 05, 2010

Wendi A Berkley
Notary Public

Printer's Fee ..... $_____
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City Of BILOXI

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PUBLIC MEETING ANNOUNCEMENT

An Open Forum Public Hearing To Discuss Popp's Ferry Road And Bridge Environmental Assessment

Where: Donal M. Snyder Sr. Community Center, 2520 Pass Road

When: 4 to 7 p.m., Wednesday, Sept. 23, 2009

The City of Biloxi will conduct an Open Forum Public Hearing to present recommendations for the Popp's Ferry Road and Bridge in Biloxi, Harrison County on Wednesday, September 23, 2009, from 4 to 7 p.m. at the Donal Snyder Community Center, 2520 Pass Road., Biloxi, MS 39531-2726. (228) 436-5191.

Citizens are invited to come and go as they please between 4 and 7 p.m. to view recommendations and to speak with project representatives concerning design, right-of-way acquisition, and environmental issues. Although there will be no provisions made for formal presentations by individuals or groups, citizens are invited and encouraged to make written and/or taped comments that will become part of the hearing's permanent record.

The city is proposing to widen and upgrade an existing 2.4-mile section of Popp's Ferry Road, from the Margaret Sherry Library south to Pass Road, including the existing causeway and bridge, consistent with federal roadway and bridge standards.

Any individual who needs auxiliary aids or special accommodations to attend the hearing should advise Brown and Mitchell Inc. of their needs by calling 228-436-7612, or by email at blxadmin@brownandmitchell.com.

Hosting Agencies: City of Biloxi; Brown & Mitchell, Inc.; Neel-Schaffer, Inc.; Pickering, Inc.

CityBiloxi-155917-PC.indd 1 9/15/09 10:44:38 AM

Appendix 16

SIGN-IN SHEET
FOR PUBLIC HEARING

37

PLEASE SIGN IN

Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

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50

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Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

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Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

54

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Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

49

1

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Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

54

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Perry & Kathy Fogleman	2171 Popps Ferry Rd	

54

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Popps Ferry Road and Bridge Environmental Assessment
Public Hearing
September 23, 2009

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Charlene Deaton	769 Whitney Biloxi	
RICHARD DuBEY	2583 RUE PALAFOX BILOXI	
RICK CHATAGNIER	421 JORDAN DR Biloxi, MS 39531	
WILBURN WHATLEY	2135 RUSTWOOD DR BILOXI 39532	WHATRO@YAHOO.COM
Nathan Sullivan	11513 RIOLADO LN 39532	nsullivan@biloxi.ms.us
Judith Monto	2520 S. Shore Dr Biloxi 39532	montojr@yahoo.com
Stanley Felth	2520 S. Shore Dr Biloxi 39532	
James D Hamilton	338 Spratley Ave Biloxi 39531	
Jay Haynes	392 Big Lake Rd	
John Aflague	792 Sharon Hills Drive	Aflague.John@Yahoo.com
Eric D. Cox	1938 I Banville Dr.	edcox2@YAHOO.com
Beth Morris	684 Carolee Cir	OneyetJock@yahoo.com
Ruth Wyatt	151 Briarfield Ave	RUTHWYATT@AOL.COM
Allen Hendrix	546 Bear Creek Rd.	
PETE BURNS	2447 CASTILLE Pl. Biloxi	BURNSP@IPBiloxi.Com
Mary K Vuyovich	2011 Popps Ferry Rd. Biloxi 39532	Sweetstuff2k@bellsouth.net
Mike Miller	875 Rustwood Dr Biloxi 39532	MichaelMI@westmarine.com
BILL BUTLER	807 FORD AVE GPT	
RUSSELL CRAFT	2413 OLD BAYRD BILOXI	RFCR@CHEVRON.com
CARL CHANEY	2028 Tuileries Cir Biloxi	CCHANEY13@aol.com

Appendix 17

COMMENT CARDS SUBMITTED
AT PUBLIC HEARING

other project

Q

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

What are the plans for Popps Ferry Rd & Pass Rd intersection?
A mess now!!

Thank you for your input.
If mailing, please affix postage and drop in the mail.

channel change

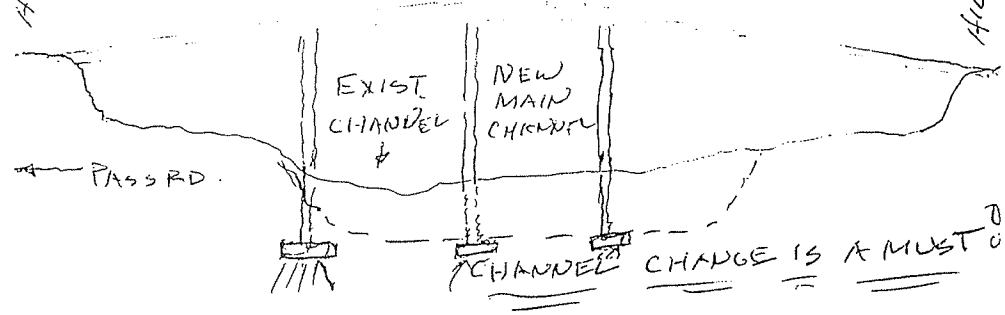
HIGH LEVEL BRIDGE

For

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

LOOKING WEST



ALL BRIDGE
NO FILL
PROTECT MARSH

OLD BRIDGE TO FISH HAVEN @ DEER IS.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

DAVID A. MITCHELL PE/PG RETIRED GA. D.O.T. (OVER)

Keep cc. Road light

COMMENT CARD

For

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

TRAFFIC LIGHT AT SUNKIST
COUNTRY CLUB ROAD
ESSENTIAL!!!

J N NORMAN

Thank you for your input.
If mailing, please affix postage and drop in the mail.

remove homes E+W side

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

We own a house at 2223 Popps Ferry
We prefer the houses on Both side
of the street be removed

Jean and Dan Reagan

Thank you for your input.
If mailing, please affix postage and drop in the mail.

Close Sabrina

COMMENT CARD

Q

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

How are you planning
to handle the extra
traffic on Pass Rd.
Close Sabrina Dr.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FMV

COMMENT CARD

Q

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

How will the home owners
be reimbursed? Will FMV
be the same as appraisal price?

Paul Kendall
2174 Popps Ferry Rd
Biloxi MS 39532

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I think it is the smartest thing we've done in a long time! Let's get it done.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

THINK IT LOOK GOOD,
LIKE THE BIKE PATH.

THANKS,
SEAN MARIE SZYMANSKI

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

Looks good to me!
Let's get started.

2456 Castille Pl
Biloxi

Thank you for your input.
If mailing, please affix postage and drop in the mail.

228-860-7120

Keep light

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

PLEASE KEEP RED LIGHT
AT COUNTRY CLUB & POPS FERRY
THANKS A KENNEDY.
749 IVY HILL DRIVE
BILOXI, MS 39532

Thank you for your input.
If mailing, please affix postage and drop in the mail.

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

For

Good idea
Like it all
WHEN

Tom Harvey Jr

Thank you for your input.
If mailing, please affix postage and drop in the mail.

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

For

Presently surprised. No Elevated Roads. Great.

Ruth Wyatt

Thank you for your input.
If mailing, please affix postage and drop in the mail.

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

For

I strongly support this proposal.

Carl Chaney

Thank you for your input.
If mailing, please affix postage and drop in the mail.

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

For

In favor of the new bridge + road

Jerry Chaney

Thank you for your input.
If mailing, please affix postage and drop in the mail.

prop. value take homes E+W side

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I Live at 335 Popps Ferry Rd. why Did they leave 4 Houses ON the WEST Side. If we stay our Slabs will be damaged when All the Road Work and Half of my Front Property will be Taken. My Property Value will Go WAY down Please Buy All the Houses ON the WEST Side.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I am 100% in support of your planned project. I congratulate you on your detailed and timely planning and wish you complete success. Thank you for keeping us informed and I look forward to receiving further information as it becomes available.

Joan McMahan
422 Babineaux Pl
Biloxi 3953

Thank you for your input.
If mailing, please affix postage and drop in the mail.

Telephone: 228-594-0093

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I am in support of this project - this bridge is much needed, also it probably will take my home.

Genelle Finazzo
418 Babineaux Pl
Biloxi MS 39531

Thank you for your input.
If mailing, please affix postage and drop in the mail.

FOR

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

As a resident of 2a Bonne Terre I am in support of this project.

Kevin Felsher

Thank you for your input.
If mailing, please affix postage and drop in the mail.

route A

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

Please Do Not Vote for
this road Going Through
On this Spot -

Lisa E. Brown

Thank you for your input.
If mailing, please affix postage and drop in the mail.

route A

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

You should never buy all these
houses - use Woolmarket exit &
come over or use Cedar Lake to bead

Regina Border

Thank you for your input.
If mailing, please affix postage and drop in the mail.

route A

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I PREFER THE OLD MDOT
PROPOSAL THAT WENT FROM
HIWAY 90 TO I-10 AT
WOOLMARKET AND THEN UP
HIWAY 67

BILL BUTLER
896-6670

Thank you for your input.
If mailing, please affix postage and drop in the mail.

expense A

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

I am surprised at
how many homes are
going to be taken.
& do not think the traffic
justifies the expense or the
dislocation.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

9/23/09

Please as a priority expedite the Road work + Green Space project start + completion to minimize the negitive temporary impact on adjacent residential quality of life and property values.

Gregory S. Coale
2218 Baywood Dr.
Biloxi, MS 39532

1) Plus have median breaks at all current connecting street for car turning.
2) Install irrigation an dense attractive landscape for beauty + noise reduction
3) Median lighting with restriction projection to road + side walk only to eliminate light pollution to boarder residences.
4) Allow budget for a 8' tall privacy fence - 8' tall architecturally consistant as a back drop along rear right of way.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

---

other project

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

Don't see Popps Fty going to Hwy 90 on these plans. Will that already have been done? If not, why not? Regardless of the "New Bridge" plans Popps Fty NEEDS To Go to 90 Now

Thank you for your input.
If mailing, please affix postage and drop in the mail.

D. Mike Cocoil dmgcoil@datasync.com

---

other

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

After the world wide economic collaspe, will there be any use for the wider road and ~~bri~~ bridge? The collaspe will occur in your working ~~a~~ life.

Thank you for your input.
If mailing, please affix postage and drop in the mail.

---

route A

COMMENT CARD

Popps Ferry Road and Bridge Environmental Assessment
September 23, 2009

No: Against widing Popps Ferry Bridge For Raising Draw Span & Another N-S Bridge From I 10 To Coast Hwy 90

PS Cedar Lake on wool market

Thank you for your input.
If mailing, please affix postage and drop in the mail.

Appendix 18

VERBAL COMMENTS TRANSCRIBED BY COURT REPORTER AT PUBLIC HEARING

POPPS FERRY ROAD AND BRIDGE

ENVIRONMENTAL ASSESSMENT

PUBLIC COMMENT SESSION

SEPTEMBER 23, 2009

Public Comments taken on behalf of Brown & Mitchell, on Wednesday, September 23, 2009, at the Donal Snyder Community Center, in Biloxi, Mississippi, before Pamela Michele Keenlance, Certified Shorthand Reporter.

ORIGINAL

PAMELA MICHELE KEENLANCE, CSR (228) 868-8833
P.O. BOX 1707, GULFPORT, MISSISSIPPI 39502-1707

INDEX OF SPEAKERS

1.) Shirley & Rudy Paoli
816 Rustwood Drive
Biloxi, Mississippi 39532

2.) Mary Larson
1718 Pass Road, Lot #17
Biloxi, Mississippi 39531

3.) Marlene & Albert Pickard
2418 Bonne Terre
Biloxi, Mississippi 39531

4.) Ted & Suzanne Baer
1000 Riverview Drive
Biloxi, Mississippi 39532

5.) Helke Brumm
331 Popps Ferry Road
Biloxi, Mississippi 39531

6.) Gerald Songe
2177 Popps Ferry Road
Biloxi, Mississippi 39532

7.) Elinor Conover
2265 Popps Ferry Road
Biloxi, Mississippi 39532

8.) Rudolph Dean
839 Carolee Circle
Biloxi, Mississippi 39532

9.) Perry Howard
2185 Popps Ferry Road
Biloxi, Mississippi 39532

10.) Rogelio Cordero Orpia
2180 Popps Ferry Road
Biloxi, Mississippi 39532

11.) Vincent Bond
2211 Popps Ferry Road
Biloxi, Mississippi 39532

12.) Charles McReynolds
997 Wildwood Lane
Biloxi, Mississippi 39532

13.) Gwen Mason
2093 Carolwood Drive
Biloxi, Mississippi 39532

14.) Christopher Van Cleave
985 Wildwood Lane
Biloxi, Mississippi 39532

15.) Nita Mullins
2250 Baywood Drive
Biloxi, Mississippi 39532

16.) Clay Bratton
968 Riverview Drive
Biloxi, Mississippi 39532

17.) Richard Dubey
2583 Rue Palafox
Biloxi, Mississippi 39532

18.) Gregory S. Coale
2218 Baywood Drive
Biloxi, Mississippi 39532

19.) Becky Smith-Sanders
2210 Baywood Drive
Biloxi, Mississippi 39532

20.) Curtis Martin
2212 Baywood Drive
Biloxi, Mississippi 39532

21.) Laureen & Hans DeLeeuw
745 Holly Hills Drive
Biloxi, Mississippi 39532

22.) Edward Boyce
2474 Province Place
Biloxi, Mississippi 39531

23.) Perry & Patty Fogleman
2171 Popps Ferry Road
Biloxi, Mississippi 39532

24.) Henry Ownbey
2090 Woodfield Lane
Biloxi, Mississippi 39532

25.) Wallace York
856 Rustwood Drive
Biloxi, Mississippi 39532

26.) Burt Morris
684 Carolee Circle
Biloxi, Mississippi 39531

27.) Linda Nix
2261 Baywood Drive
Biloxi, Mississippi 39532

P R O C E E D I N G S

SHIRLEY PAOLI: We definitely need a higher bridge, and we hope they will go without a draw bridge, because that closing and opening gets old. And if we're going to go through all the expense of putting a new bridge, let's go high enough so we don't have to have the draw bridge.

And, hopefully, we hope they're going to at least three-lane the rest of Popps Ferry Road all the way to D'Iberville and get that completed. So that we don't have to, you know, go from a four-lane to a three-lane to a two-lane, as we're doing now. That's caused a lot of accidents.

And they need to finish all of Popps Ferry, you know, either four lane it all or three lane it all, all the way into D'Iberville to the section where D'Iberville has three-laned Popps Ferry and get that done while we're doing this, instead of having construction every two or three years on that road, because there's so much traffic on there, and so many military that use that road to get to I-10 and, you know, get to

work at Keesler. That's it.

COURT REPORTER: Okay. Is there anything else you would like to add?

SHIRLEY PAOLI: That's it. That would make us happy.

MARY LARSON: Okay. My only comment is it looks lovely. It looks like a nice presentation and should look very well, as long as there's no problem getting in and out of the neighborhoods. I would just like to see the whole thing extended. It seems too bad that it's going to be patch work. But once it's all extended either up to I-10 or straight through to D'Iberville would be very nice. That is my only comment.

MARLENE PICKARD: We're concerned about the value of our home going down. We're concerned about living in the shadow of the overpass. And we're just uncertain about what it's going to mean to us.

COURT REPORTER: Anything else?

MARLENE PICKARD: At some point in our lives, one of us will have to sell the house and we want to know if it's going to be worth half of what it's worth. We have big

concerns.

TED BAER: We support the Mayor's 2004 proposal for increasing and improving Popps Ferry, widening the road and increasing the bridge with the new bridge. But we are opposed to the Super Highway and limited access, and are in favor of a smaller footprint, five-lane bridge that would have the capacity at that size to support the projections for the 2030 Comprehensive Plan.

So if it's widened five lanes, it would have enough capacity to support the 2030 plan, as projected by the City.

SUZANNE BAER: I am in favor of widening Popps Ferry and building a new bridge, but I believe that the footprint that's being proposed is an overreach. It is more capacity than we need. It's moving more people that we need and will have a detrimental impact on the surrounding neighborhoods.

HELKE BRUMM: Well, our house, as it stands, we're the fourth houses on Popps Ferry Road, but they're taking part of our property. They already took all the

easements when they did Popps Ferry Road before. So our house will be sitting right on the highway. And I do not like that. I lose the property value of my house by them doing that. And they can take my whole house or not take none of my property. That's how I feel.

And I made all these improvements on my house right now, and I have all my receipts for everything I pay. So that's how I feel. I mean, they can make the biggest highway and then take my house. I move out of Mississippi. I have lived here over 40 years in my house. And the way they're doing us now, I don't think it's fair.

There's nothing wrong with Popps Ferry Road the way it is. Everywhere you go at five o'clock in the main traffic, they have bumper to bumper traffic everywhere. And, see, now, they have such a nice road and it's so pretty with the grass on the side. It's really a pretty road, and now they want to mess everything up, just like they did Caillavet Street, when they made the road looks nice, but where they took all the

homes, the property on the side looks terrible.

GERALD SONGE: Okay. What I propose is for them to make a two-lane 65 foot high bridge, not the four-lane. Keep the lane like they're going to Sunkist there, because we've already got a speed trap going on now that people are passing, 35 miles an hour is the speed limit, they're going 60, they're going 50, early in the morning, late at night off of work.

They don't care about who gets in their carport. They turn around at midnight and some of the are speeding around the curve because I hear it. My paper boy can't put the paper in the thing no more, because the policeman gave him a ticket because of his lights. Some guy speeding 60 miles an hour almost killed him. So he has to come in the carport.

All right. My suggestion is that they put a two-lane bridge, tied into the two lane that we've got right now, with a two-lane going down. Keep the same lanes you've got for Pass Road. Keep the traffic flowing,

because when the bridge is closed, it's beautiful. When the bridge opens up the traffic is way down miles away. That's the bottle neck. So if you've got a 65-foot two-lane with the same traffic flow, nobody can speed. Everybody's running the same thing, especially with the school zones and the red lights, nobody can get hurt.

And they need to pay attention to the speeders in the Sunkist area. They're coming around Margaret Sherry like they're going to the race cars. I get off of mine and I slow them down by going 35 and they're speeding right up to my tailbone and I'm chewing them out. Looking at the speed limit, they don't care.

This the trouble we've got, regardless of what the Federal Government wants, what the City wants, they've got to think of the people, the kids, the old people living in that area, the danger it is. Because other people don't care about your life. They're in a hurry to go no where.

TED BAER: In the last meetings, we've had meetings where they showed Options A, B

and C or D, and then when they come back they propose Option E, which is a totally new option. In the meeting tonight there was nothing shown as being limited access. Whereas, in previous meetings they had diagrams where they showed where the intersections would be.

I have a concern that we're being shown only a portion of what's being proposed and not being given the full story as they have introduced in the past. So I'm concerned that we're not getting all of the information that's previously been provided. And that the input they get here may be totally different than what's actually done, which has happened in the past.

ELINOR CONOVER: I need to have some idea of time frame since I cannot sell my house. It's definitely going to be used in the preparation for this new road. I am going to be forced to maintain two houses. I would just like to know when you will start acquiring property.

RUDOLPH DEAN: The only comment I'm making is would you please put this

information with the pictures like this out in some kind of something that people can read at home, something like this thing that the Mayor puts out every now and then on the City of Biloxi with some nice photographs and what have you. Because you can't make too much head or tails of it here. And at home, you'd have plenty of time to study it. And maybe some words on what you're going to do or what the plan is. And that's it.

PERRY HOWARD: I would like to express opposition to this. Because my house, I don't think that I would receive the value of my house to relocate and buy a new house. And I'm mortgage free now. And this stuff that they build now, the price is sky high. And I didn't expect to spend my retirement years paying a mortgage. I mean, I did that when I was working. And now that I'm retired and I don't have a mortgage I'm happy, up until today.

And so, I'm just expressing my opposition to this whole project, because I don't think it's going to solve the problem. Because where you widen it out, you're still

going to run back into the same two lanes at Cedar Lake Road and as Popps Ferry Road continues into D'Iberville. So the inconvenience, in my opinion, outweighs, you know, what they say is the solution.

ROGELIO CORDERO ORPIA: Okay. My house, you know, like I built already like $130,000. If we're going to relocate to somewhere do you think that, you know, will value of my house is the same thing or, you know, I don't know. That's why it's -- that's my concern. Because, see, the value of the house now is too high. That's the one thing I am concerned about. So, you know, that's all I can say.

VINCENT BOND: Well, my only thing is, you know, I would like to know what's going to actually happen. That's the main thing. Now, obviously, since it looked like they've got it down to one plan, instead of the four, the do nothing, and the other three that followed, all of which would have taken my house, except for the do nothing, you know. And so, I was just kind of was wanting to know what exactly to do so I'll know where to

go with my house, and whether to go on with what I was going to actually do to finish it out the way I wanted to or not. And that's about it.

So, I guess, it looks to me like it may be sooner than later. But that's my only thing is just knowing what's actually going to happen. Is it going to happen or is it going to not happen, so I can go on with my plans.

CHARLES McREYNOLDS: We are very supportive of the new bridge, the 55-foot height. We're very supportive of the five lanes that would go down to Riverview, and then connect with the existing five lanes that are there. We're opposed to the limited access part of this program. We think that it should be unlimited access. And the reason we're opposed to that is because of the impact it could have on the surrounding neighborhoods.

GWEN MASON: Okay. My comment is, as I have spoken with several of the people that's here, and it gave me another thought because why didn't Popps Ferry Road from, I'd say,

Cedar Lake down by Rite-Aid Drug Store, and then widen the Popps Ferry Bridge and leave that area alone where those houses are, because there's too many senior citizens living in that area and they've been living there for years. And a lot of them are handicap people.

CHRISTOPHER VAN CLEAVE: My objection to this project is the secrecy with which the City is trying to accomplish its real goal. And, unfortunately, the City is intentionally holding vital information back from the citizens in this District. Purportedly, this meeting was scheduled to allow citizens and residents affected by this road to give their opinion about whether or not this is a good idea. And the City has deliberately refused to make the whole story available to the people, to the residents of this District, so that they can make informed opinions about how they feel about this project.

And, specifically, what the City has withheld is the City's intention to turn Popps Ferry Road from the vicinity of the Margaret Sherry Library and/or Jam Lane south

into an Interstate connector, such as I-110. Basically, it would be 210.

The City's Comprehensive Plan was conveniently released on their website this past weekend and a meeting to discuss that Comprehensive Plan has conveniently been scheduled for next week, after this meeting this over.

And if you go to the City's website or to one of the public locations where the Comprehensive Plan is on file and study that plan, you'll see that the City indicates it has abandoned Route H as the North/South connector. Route H was the ill-conceived road that went from Woolmarket, crossed Popps Ferry Road and came into Highway 90 in the vicinity of Rodenberg.

Instead, the City has suggested it would like to see a North/South connector coming with an Interstate bridge from Woolmarket to Popps Ferry Road, connecting in the vicinity, they say in the report, of Jam Lane, which is near the Margaret Sherry Library where they are proposing the limited access road extend to.

The City presents the limited access road as a pretty road with green space, that's going to have bicycle trails and be pedestrian friendly, all the while withholding from the residents and citizens the fact that the real intent of that road is to lay the footprint and foundation for an Interstate connector.

And what the City hopes for is that when it comes time to perform an Environmental Impact Study on a connector from Woolmarket to Popps Ferry across the Tchoutacabouffa River, that Environmental Impact Study will be influenced by the fact that Popps Ferry Road has already been modified to a limited access road to the point that the connector would connect.

They're withholding critical facts, and when I say "they," I mean the City, is withholding critical facts from its citizens from which an informed decision about this project can be made. And I think it's deceitful and I think it's wrong and I hope that the correct information will get out there and this project will be shut down as

it should be.

NITA MULLINS: I am in favor of the new road and the new bridge, but we would request that Sabrina be closed. People fly off the bridge and come flying around the corner, and then they fly around the corner on Baywood and take out the corner of my mother's yard. She's losing the house behind her. She's going to be the one backed up to the road. That would decrease her property value, but if Sabrina closed it might improve her property value.

CLAY BRATTON: My comment is that we are all in favor of the widening of Popps Ferry Bridge. That needs to be done to help improve the traffic. But we are concerned about the size and the nature of this project being proposed, the impact it may have on the surrounding communities, and we all feel that this may be done only because there's an opportunity to create a bridge across the Back Bay to tie into this.

We feel like this is much bigger than any of the surrounding roads. There's not a reason to have it. Our suggestion is to

widen the Popps Ferry Bridge, make it four-lane, redo the traffic studies and see how the impact is at that point, before making a decision to build this big Super Highway through the community.

RICHARD DUBEY: Just a bit disappointed that there was no information of the road continuing from Pass Road to Highway 90. Nothing said about it. Nothing said about that, or if there was any plans for that, or if they're even contemplating anything going down there. It's a bit disappointing. Everything else was clear, but that was kind of left hanging out in the open.

GREGORY COALE: The only comment I'd like to make is I would like to see them prioritize by having the road work versus the bridge work be an expedited priority to minimize the disruption and the quality of life in the neighborhood.

BECKY SMITH-SANDERS: I was wondering what they were going to do about the fence and protection from Popps Ferry for the people that are going to have their houses back up against it now. Because there are a

lot of drunk drivers that hit those houses on Popps Ferry, and now, when they're gone, mine will be in the way. So I was wondering if they were going to put a fence up or a concrete barrier or trees or bushes or something to protect us against the cars.

CURTIS MARTIN: A common fence, once the, I guess, green space is put down, that if we could have a common fence along the whole length of Popps Ferry there, north of the bridge where a fence is appropriate, that where as we wouldn't just a scattering of different types of fence.

LAUREEN DELEEUW: Okay. We would like to request that intersections, when they're placed with lights, one be at Camp Wilkes Road. We have concerns about what our access is going to be for making a left-hand turn onto Popps Ferry and going southbound from the Holly Hills side, which is what side, the east side of Popps Ferry.

We'd like there to be pedestrian lights, as well, included with the traffic lights. And we'd like to know whether there are any plans to extend the bike paths that are now

on the plan all the way down to Cedar Lake.

EDWARD BOYCE: Okay. My only concern is the entrance into and out of La Bonne Terre from Popps Ferry, that if you increase that -- it's bad enough getting out now. If you increase the traffic through there, it's going to be horrible making a left turn either way. If a stop light was there, it could alleviate it, but you don't want too many stops lights along that road. I think if you increase the traffic flow through there, it's going to be a problem without it. That's my only concern.

PERRY FOGLEMAN: I'm ready to sell. Please come in and put the road. Traffic is so bad we can't get and in out of our driveways. From the last little episode of widening the road, now our driveways and yards hold water. So we are ready. And we're also ready for a new bridge.

PATTY FOGLEMAN: I think they need to hurry up and do it, because we have no bus stops, nothing on Popps Ferry Road. They ended that because of the traffic. I have a little car. It takes me forever to get out

because of trucks and everything are going like 100 miles an down the road. I just -- we've got flooding in our driveway. We're holding water. I've already cracked the back of my car coming up. Where the sidewalks are really great. That was a good idea. But they just didn't do it right. So it needs to either be finished or changed. Something has got to change.

PERRY FOGLEMAN: And, also, we have a lot of people passing cars in the turn lane, which is very dangerous for us to get into the turn lane to turn into our houses without getting hit head on.

PATTY FOGLEMAN: And we've had three wrecks in our front yard.

PERRY FOGLEMAN: On busy holidays and stuff, we have to park our cars in the front yard to block our house to keep the cars from coming into the kids' bedrooms in case the drunks get out of control.

PATTY FOGLEMAN: Especially like Christmastime and New Years, we pack them all the way across the front, her bedroom is right there on the front, so nobody comes on

through. They've come as far and hit the palm tree and knocked it all out of place. But if that wasn't there, they would have been in the bedroom.

HENRY OWNBEY: What I was worried about is the height of the bridge. So I talked to the bridge engineer and he said that it would be approximately 55 feet high off the water's edge. At the center, it would be 65 feet off the water's edge. And I didn't know that it was going to be a draw bridge, but it's still going to be a draw bridge there he said. It will eliminate 90 percent of the draw bridge function. In other words, they won't have to raise the bridge so often as they have before.

And I asked them, why have a draw bridge? Why not have a high rise bridge to do without it. He said that it would cause the traffic on the left side to be increased and the cost effective would be exorbitant. I think it's going to be exorbitant anyway to buy all this property out. That's about all I can say.

WALLACE YORK: Okay. I'm against the

limited access highway, because we have bus stops within our neighborhood and we will end up condensing the traffic within the neighborhoods. We have no sidewalks for these children to walk on. Once we condense the traffic, it will be more traffic for them to have to contend with. It will be a more dangerous situation.

Because we'll have limited access to shopping, et cetera, on the south side of the bridge from where I'm located on the north side, I think our property values will go down as a result of a limited access road. I don't think any traffic pattern studies have been done within our neighborhood in order to support this effort.

To get to the traffic lights, the two traffic lights that are in place now, you have to snake through my neighborhood to get to these traffic lights. There are very little use of them as they are right now. One is for the Fire Department. The other one is for access from the other side of Sunkist to go north or south.

I've lived in my house since 1975.

Before the City annexed that area, that area was not designed with City amenities and City influence as to how the streets were designed. Now to put a large boulevard or highway, whatever you want to call it, through that area is going to destroy the scope and the nature of our neighborhood. I will no longer be able to drive directly from my house across to the golf course or vice-versa, or come back. I'll have to go around some which a way in order to do that. That's not the way the original developer intended that neighborhood to work.

In addition, we have North Haven, Holly Hills behind us that use Trailwood Drive down to Rustwood to go north or south and around the City. I just think this whole proposal was ill-conceived. Originally, there was a plan for an access road to go from Cedar Lake across the Bay directly into either Rodenberg or Veterans or one of those streets. That proposal was blocked by RW Development, who wants to build condos down on the beach. Then Mr. Holloway who wants to prevent that from happening. If we would that stayed with

that, or if we go back to that, we'll have a third bridge that we can use to get in and out of Biloxi when this bridge is out of commission because it's going to be hit by barges, again. Even though we go higher, it doesn't change the configuration of the Bay as you go through that bridge.

If we go further on down, we can find a nice straight path for those barges to go through, have a third bridge for access in and out of Biloxi. And that's what we ought to do. We have two school crossings on Popps Ferry Road and we're going to increase the traffic, increase the speed, to deal with those two school crossings. This whole thing is ridiculous.

We do need a bridge. We don't need all this other traffic or provisions for people to come from different areas through our neighborhood to get to Biloxi. I think we should go back to the bridge going across at Cedar Lake directly. Take it away from the schools. Take it away in the neighborhoods. Give us a third bridge for access in and out of Biloxi in case something happens to the

bridge we have now.

PERRY FOGLEMAN: They need to totally ignore people who live blocks away from Popps Ferry Road and have their opinion. I understand the road and the bridge will be affected during the construction, but the homes and everything the people are worried about, it should not both people blocks behind Popps Ferry Road either side. This is a great improvement that needs to be done.

BURT MORRIS: My name is Burt Morris, for the record, 684 Carolee Circle. I've come to voice my opinion in opposition to the present plan of the bridge. In reviewing the bridge, I think the founders who originally created the bridge were quite accurate in their assessment of how a bridge should be built. The bridge is low. It's under the tree line and not 65 feet in the air with a full southerly wind coming straight head on.

There are alternatives today that could be implemented about this bridge, some of which have been voiced and expressed back several years. A third bridge is a possible alternative for one.

The other thing that could be done with $100 million today is certainly building out a mag-lift systems or a transportation system elevated that would facilitate people going up and down the Coast line and around through the local areas of Biloxi, D'Iberville, and possibly Gulfport, to provide a more scenic approach to transportation between hotels and event venues.

The part that's really absent in the process is the circumvention of going to the people and finding out exactly how they feel and how they feel in terms of the bridge being built and the impact to the people that are in the surrounding areas. The forecasts that have been made certainly have been very, very exaggerated in terms of the amount of people that this would facilitate.

There are no traffic studies available for anybody to review. And, certainly, it would be nice today in the Year 2009 to have those traffic studies put on the web, so that the local people and those concerned with the bridge project could review the traffic studies and see its impact and reason for

building.

So, in conclusion, I think the people should be able -- this should be a voting referendum. And although the time frame has now come to a wall whereby plans and implementation proposals have got to be submitted, it might behoove the local authorities to look into getting an extension based on and predicated on the fact that the plans do exist and that those plans may be subject to revision or alternative presented.

So, in conclusion, it would be nice that this project be put on a voter's referendum and the people voted on it. Thank you.

LINDA NIX: I would just like to see them allow left turn access off of Sabrina onto the new road and to the bridge. Right now, they've got it no left turn. You can only turn right if you come off of Sabrina with the new road. So I want them to keep a left turn going south.

Also, if they go look at the toll road, the toll road going into Orange Beach, Alabama. They're talking about they can't make the bridge any higher because they

can't -- they have to have a long way going down it. If they would look at that bridge, it goes straight up and straight down. And if they were to make the bridge that way, they would never have to worry about doing something in 10 or 15 years about raising it higher. They don't have to take as long as they were saying to make the height go on down and go as far south. If they go look at that Orange Beach Bridge, it goes way up and way and way down real fast. And it's a beautiful bridge.

(Comments concluded.)

C E R T I F I C A T E

STATE OF MISSISSIPPI

COUNTY OF HARRISON

I, Pamela Michele Keenlance, CSR and Notary Public, duly commissioned for the County of Harrison, State of Mississippi, do hereby certify:

That on the 23rd day of September, 2009, there appeared before me the foregoing list of people to make comments and suggestions limited to the Popps Ferry Road and Bridge Environmental Assessment meeting, that the thirty (30) pages contain a full, true, and correct copy of my stenotype notes, later reduced to typewritten form by computer-aided transcription of said comments and suggestions;

That I am not related to or in anywise associated with any of the parties to this cause of action, or their counsel, and that I am not financially interested in the same;

IN WITNESS WHEREOF, I have hereunto set my hand, the 7th day of October, 2009.

PAMELA MICHELE KEENLANCE, CSR #1511
My Commission Expires: 08-27-10

PAMELA MICHELE KEENLANCE, NOTARY PUBLIC, HARRISON COUNTY, MS

Appendix 19

CONCEPTUAL STAGE RELOCATION REPORT

Popps Ferry Road and Bridge Environmental Assessment Supplement
Project No.:STPD-9376-00(004)/104384-811

CONCEPTUAL STAGE RELOCATION REPORT

The preferred alternative (Alternative E) requires residential relocations as illustrated in the Final Environmental Assessment (Final EA) (Figure 2.2). This illustration shows the "worst-case scenario" with regards to the number of homes to relocate, currently anticipated at 69 relocations. During the Design Phase of the project, surveys will determine the exact placement of the right-of-way for individual properties, and the number of residential relocations could decrease. We do not anticipate the number of relocations to increase. No businesses will be relocated for this project.

Table 1: Summary of Anticipated Relocations for Preferred Alternative E:

Alternative	Brief Description	Residences affected	Mobile Homes	Businesses	Other
E Northern Section	Center, then east, then center **(preferred)**	36 east 22 west	0	0	0
E Bridge	65 ft., 4-lane Bascule **(preferred)**	0	0	0	0
E Southern Section	Center to Old Bay, trans. west **(preferred)**	0 east 11 west	0	0	0

This project corridor crosses 3 census tracts. A complete review of the various populations is detailed in the Final EA, Chapter 3.

Based on population data acquired for this area, anticipated relocation issues that may occur include, but are not limited to, relocating elderly, minority, low-income and handicapped citizens.

Elderly population estimate: The elderly population (over 70 years of age) makes up approximately 8.5% of the population in the 3 census tracts located along the corridor (see Table 8 in Final EA, p. 42). Using this estimate, approximately 6 of the 69 homes within this corridor could be a relocation needing special consideration for the elderly.

Minority population estimate: The minority population in the 3 census tracts averages 23.8% (see Table 10 in Final EA, p. 44). Using this estimate, approximately 16 of 69 homes could be a relocation needing special consideration for minorities.

Low-income population estimate: The socioeconomic makeup reflects that 12.9% of households within the corridor are below poverty level (see Table 11 in Final EA, p. 45). Based on this percentage, approximately 9 of the 69 homes could be a relocation needing special consideration for low-income populations.

The above information is based on Census 2000 and may have changed.

It is unknown how many households include handicapped citizens or large families. It is also unknown how many homes are owned or rented, although discussions with residents in the area and MLS information indicate that approximately 25% or more of the homes along the corridor are rentals.

The current real estate market in the vicinity of the project area indicates that there is sufficient inventory of decent, safe, and sanitary, and comparable homes available for purchase or rent by displaced residents from single-family dwellings (Table 2). Based on personal knowledge, discussions with realtors, and city officials, homes along the corridor are typically 2, 3, or 4 bedroom homes. A search of the Multiple Listings website revealed that the homes range in value from approximately $75,000 to $180,000, on average. Sixty-three of the 69 homes slated for relocation have driveways that access directly onto Popps Ferry Road. A representative set of photos of the homes along Popps Ferry Road are found in Appendix 1.

There are no multi-family units in the project area. No public facilities will be relocated and no non-profit organizations are known to be located in the affected area.

Table 2: Comparable Housing and Rental Availability

Multiple Listing Service Information

Price Range	Ocean Springs	Biloxi	D'Iberville	Total Ocean Springs, Biloxi, D'Iberville
$50-100k	38	32	0	70
$100-150k	100+	47	0	147+
$140-200k	100+	26	6	132+
$200-300k	80	39	13	132
Totals	**318+**	**144**	**19**	**481+**

Online search conducted 11-3-09 at Gulf Coast Association of Realtors, Inc., http://www.gcarealtors.com/

Table 2 (con'd)

Available Rental Housing Information

Area	Unit Type	Number of Vacancies	Average Rental Rate
Biloxi Area	Studio	0	$ 380.00
	1-Bedroom	90	$ 691.30
	2-Bedroom	180	$ 809.19
	3+Bedroom	27	$ 984.81
	Total	297	
Ocean Springs Area	Studio	0	N/A
	1-Bedroom	32	$ 727.89
	2-Bedroom	108	$ 834.39
	3+Bedroom	28	$ 1,010.86
	Total	168	
All Harrison County	Studio	3	$ 472.27
	1-Bedroom	167	$ 694.22
	2-Bedroom	361	$ 803.71
	3+Bedroom	60	$ 984.17
	Total	591	
All Jackson County	Studio	4	$ 514.29
	1-Bedroom	68	$ 611.41
	2-Bedroom	224	$ 734.81
	3+Bedroom	42	$ 907.66
	Total	338	

Source: W.S. Loper & Associates, Mississippi Gulf Coast Apartment Survey prepared for Gulf Regional Planning Commission, April 2008

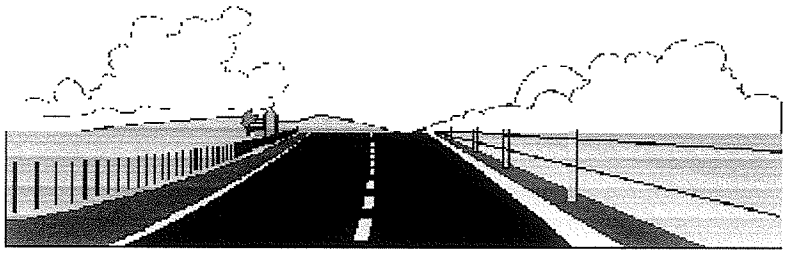
The acquisition and relocation program for this project will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Additionally, relocation resources are available to all residential and business relocates without discrimination.

Appendix 20

BEST MANAGEMENT PRACTICES re: WATER QUALITY
"Planning Considerations for Roads, Highways, and Bridges"
by EPA, Office of Water, 1995

Planning Considerations for Roads, Highways and Bridges

United States Environmental Protection Agency | Office of Water (4503F) | EPA-841-F-95-008b October 1995



The Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 established goals to be achieved for the prevention and control of runoff pollution to our coastal waters. The Environmental Protection Agency (EPA) published *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, which identifies management measures and best management practices for nonpoint source (NPS) pollution control.

Our roads, highways and bridges can be a source of a significant amount of pollution to our nation's water. Pollution is generated during road construction, maintenance, and use. Nonpoint source pollution, or runoff pollution, is created when chemicals, debris, fertilizers, automotive oils, debris from wearing parts, and litter are washed off roadways and bridges during rainstorms and carried as runoff to streams, rivers, lakes and bays.

There are many opportunities available to prevent and control runoff pollution by applying management measures and best management practices during the planning, construction, and operation and maintenance of highway systems. Management measures are achieved by applying best management practices appropriate to the source of runoff, climate, and average daily traffic volume. Planning considerations to help control runoff pollution from roads, highways, and bridges are discussed in this fact sheet.

Road, Highway and Bridge Planning

Poor planning can contribute to pollution problems. Wetlands and vegetated areas near waterbodies can be damaged by construction, decreasing the water quality benefits that they normally provide. Areas susceptible to erosion, such as steep slopes or land with loose soil, can be disturbed, causing increased sedimentation flows into receiving streams.

As plans are developed for new roads, highways and bridges, or for reconstructing existing facilities, best management practices to help reduce the volume and concentration of erosion and sedimentation produced by the project should be incorporated into project design.

The following are some pollution prevention techniques that can be incorporated into highway planning and design:

Evaluate alternatives for incorporating a road system or bridge into the natural characteristics of the site. Analyze environmental features, such as topography, drainage patterns, soils, climate, and existing land use. Natural drainage systems can be taken advantage of, clearing and grading can be minimized, natural vegetation and buffer areas can be preserved, and sensitive land and water areas that provide water quality benefits (e.g., wetlands, spawning waters, etc.) and areas susceptible to erosion and sedimentation can be avoided.
Preserve corridors for highways well in advance of construction to be certain that roads are built where they are most suitably located in terms of environmental and economic considerations. Lack of advance planning can lead to locating roads wherever space is available, or not being able to build a road at all.
Avoid building roads and bridges where they will impact riparian areas adjacent to surface waters and wetland areas. These vegetated areas provide enormous water quality benefits through their ability to filter pollutants out of water passing through them.

Road, Highway and Bridge Construction

Road, highway, and bridge construction and reconstruction generate runoff pollution by virtue of the sheer volume of earth that must be disturbed and topsoil that is removed during these activities. For example, roads built perpendicular to slopes rather than parallel to them cut across natural drainage lines and create excessive earth disturbance.

Planning for pollution prevention and control measures in advance of and during construction can help avoid these and other future problems.

Erosion and Sediment Control

Develop a site-specific erosion and sediment control plan to minimize the impacts of runoff waters on construction activities.

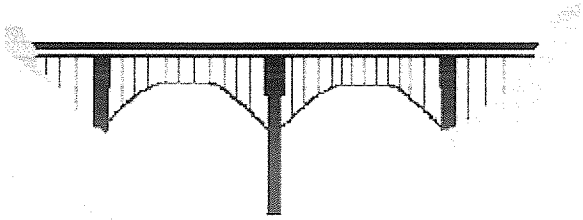
A number of provisions to lessen the environmental impacts of road construction are specified in an erosion and sediment control plan, including measures to ensure that exposed working surfaces are kept to a minimum, silt fences and sediment traps are optimally placed to prevent sediment from reaching drainage systems, vehicles are washed when leaving a construction site to remove excess mud, and temporary exit/entry roads to construction sites are provided with a coarse rock surface to prevent the transfer of soil offsite where it will be washed into nearby drainage channels.

Chemical Use and Control

Store, handle and dispose of construction site chemicals such as herbicides, insecticides, oils, gasoline, degreasers, antifreeze, concrete and asphalt products, sealers, paints, and wash water associated with these products to minimize their entry into runoff. One way to do this is to provide specific areas where these products are frequently used, such as fueling areas and equipment washing areas. This can help prevent dangerous chemicals from entering surface waters. This measure also applies to proper storage of road deicing materials.

Nutrient Use and Control

Fertilizers used to promote the growth of vegetation on disturbed earth can contribute excessive nitrates and phosphates to surface waters if overused. To ensure safety, a person knowledgeable of and certified for soil testing and nutrient application should be involved to determine the proper amount of fertilizer to apply in a given situation and the proper timing of applications to maximize their delivery to growing plants and minimize their entry into runoff.



Road, Highway and Bridge Operation and Maintenance

Road, highway, and bridge operation and maintenance involve inspection, routine and season -specific maintenance, and repair of not only highways and bridges but also the rights-of-way where drainage control facilities are located. The following are examples of some maintenance activities that provide opportunities to prevent and control runoff pollution:

Inspection and General Maintenance

Develop an inspection program and schedule to ensure that general maintenance is performed. Inspect erosion and sediment control devices regularly.
Maintain retaining walls and pavements to minimize cracks and leakage.
Repair potholes.
Maintain energy dissipaters and velocity controls to minimize runoff velocity and erosion.
Properly dispose of accumulated sediment collected from detention ponds, drainage systems, and pollution control structures, and any wastes generated during maintenance operations, in accordance with appropriate local, state and federal regulations.
Use techniques such as suspended tarps, vacuums or booms to prevent paint, solvents and scrapings from becoming pollutants during bridge maintenance.
When blading gravel roads, take care to maintain a structurally sound surface while providing an adequate crown and drainage so that erosion or scattering of gravel are avoided.
Develop an infrastructure safety inspection program in conjunction with general maintenance.
Keep drainage ditches free of debris.

Snow and Ice Control

Cover salt storage piles and other deicing materials to reduce contamination of surface waters. Locate them outside the 100-year floodplain.
Regulate the application of deicing salts to prevent oversalting the pavement.
Use trucks equipped with salt spreading calibration devices.
Use alternative deicing materials, such as sand or salt substitutes, where sensitive ecosystems should be protected.
Prevent dumping of accumulated snow into surface waters or onto frozen water bodies.

Right-of-Way Maintenance

Seed and fertilize, seed and mulch, and/or sod damaged vegetated areas and slopes.
Establish pesticide/herbicide use and nutrient management programs.
Restrict herbicide and pesticide use in highway rights-of-way to applicators certified under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) to ensure safe and effective application.
Limit the use of chemicals such as soil stabilizers, dust palliatives, sterilants, and growth inhibitors to the best estimate of optimum application rates. Try to avoid excess application and consequent intrusion of such chemicals into surface runoff.
Regularly clean, reshape, and revegetate drainage ditches to ensure they perform as desired. Keep ditch slopes covered with vegetation or other material.
Maintain shoulders, slopes and swales to assure their function and operation.

Road Cleaning and Debris Removal

Sweep, vacuum and wash residential streets and parking lots.
Collect and remove road debris.
Encourage litter and debris control management.
Encourage development of Adopt-a-Highway programs.

This fact sheet is the second in a series being produced jointly by EPA and the American Public Works Association (APWA) to improve knowledge about and efforts to control runoff pollution from roadways and road construction activities. Working together, we can maintain and improve our roadway systems and protect our waters.

Sources of Additional Information

United States Environmental Protection Agency Nonpoint Source and NPDES Storm Water Coordinators:

U.S. EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) NPS (617) 565-4426, NPDES Storm Water (617) 565-3610

U.S. EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands) NPS (212) 637-3700, NPDES Storm Water (212) 637-3767

U.S. EPA Region III (Delaware, Maryland, Pennsylvania, Virginia, West Virginia) NPS (215) 597-9077, NPDES Storm Water (215) 597-6511

U.S. EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee) NPS (404) 347-2126, NPDES Storm Water (404) 347-2019

U.S. EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin) NPS (312) 353-2079, NPDES Storm Water (312) 353-2121

U.S. EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas) NPS (214) 665-7135, NPDES Storm Water (214) 665-7170

U.S. EPA Region VII (Iowa, Kansas, Missouri, Nebraska) NPS (913) 551-7030, NPDES Storm Water (913) 551-7034

U.S. EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming) NPS (303) 293-1565, NPDES Storm Water (303) 293-1623

U.S. EPA Region IX (Arizona, California, Hawaii, Nevada) NPS (415) 744-1953, NPDES Storm Water (415) 744-2001

http://www.epa.gov/nps/education/planroad.html
Last updated on Wednesday, January 13, 2010

U.S. EPA Region X (Alaska, Idaho, Oregon, Washington) NPS (206) 553-4013, NPDES Storm Water (206) 553-0966

U.S. EPA Headquarters, Nonpoint Source Control Branch NPS (202) 260-7100, NPDES Storm Water (202) 260-9541

Federal Highway Administration Local Transportation Assistance Program (LTAP) Technology Transfer (T2) Centers:

The LTAP program provides training and technical assistance to local/tribal government transportation agencies on roads and bridges. For the location of the LTAP T2 center in your state, contact the T2 Clearinghouse at (202) 347-7267.

Appendix 21

Emailed Cover Letter requesting Edits to Chapters 3 & 4
April 27, 2010

fromJill High <jillhigh@gmail.com>
to"Thurman, Kim" <kthurman@mdot.state.ms.us>,
claiborne.barnwell@dot.gov,
Mark Thompson <mark.thompson@noaa.gov>,
"Lobred, Anthony R MVK" <Anthony.R.Lobred@usace.army.mil>,
Jan Boyd <jan.boyd@dmr.ms.gov>,
Craig High <craig.high@neel-schaffer.com>,
Rick Ferguson <rferguson@pickeringinc.com>,
Kreg Overstreet <jkoverstreet@brownandmitchell.com>,
Willa Brantley <Willa.Brantley@dmr.ms.gov>,
dtorricelli@biloxi.ms.us,
Sandra_kilpatrick@fws.gov

dateTue, Apr 27, 2010 at 3:32 PM
subjectEdited portion of Popps Ferry EA
mailed-bygmail.com

hide details Apr 27 (9 days ago)

Everyone,

Here is a portion of the edited EA still in progress (and probably always will be...!)

I am only sending Chapters 3 & 4 since that is where the major changes/additions occur.

I am not including Appendicies or Figures in this email, but I have them if they are referenced in the text, and can send them if you want them digitally. Just ask.

All changes and additions are noted in italics. If you notice anything major that is missing from the document, please let me know. I edited everything that was mentioned at the Scoping Meetings March 22-23, and will have all the updated drawings (if you don't ask for them before) at the May 5th, 2pm meeting.

See you May 5!! Tony and Mark - will you be able to attend??

Thanks,
Jill
228-436-7612 ofc
228-861-1489 cell

Appendix 22

BMI's Responses to Mark Thompson's Site Visit on November 18, 2009

Gmail by Google

Jill High <jillhigh@gmail.com>

meeting with Mark Thompson

3 messages

Jill High <jillhigh@gmail.com> **Thu, Nov 19, 2009 at 5:40 PM**
To: "Barnwell, Claiborne" <cbarnwell@mdot.state.ms.us>
Cc: Kreg Overstreet <jkoverstreet@brownandmitchell.com>, Craig High <craig.high@neel-schaffer.com>, Rick Ferguson <rferguson@pickeringinc.com>

Claiborne,

Mark Thompson was in Biloxi yesterday, and we (Kreg Overstreet, Craig High, and me) were able to join him for a site visit at Popps Ferry Bridge. He took some pictures and discussed the project with us, then walked the north portion of the causeway to the drawbridge. He was given a Conceptual Schematic from Rick Ferguson of the comparison of the height of the old and new bridge.

He seemed pleased with the preferred alternative for the project, and mentioned that there would most likely be no "show-stoppers" if we address a few more items. In general, he was glad to see the EA at this point in the planning - so we can address these issues now, before the permitting process when he will submit his comments.

He wants to see discussion in the EA regarding:

1) Removal strategy for bridge - no disturbance to marsh beds
2) Construction strategy of new bridge - no disturbance to marsh beds
3) Shading effects on marsh beds

We are currently working on the discussion in the Final EA and will include these points in our Gold Sheet Commitments.

Regards,

Jill

Jill High <jillhigh@gmail.com> **Tue, Dec 1, 2009 at 3:56 PM**
To: claiborne.barnwell@dot.gov

This was emailed to your incorrect address 2 weeks ago, and the non-response is what made me check it again. Sorry for the delay!

Hope to hear from you soon!

Jill
---------- Forwarded message ----------
From: **Jill High** <jillhigh@gmail.com>
Date: Thu, Nov 19, 2009 at 4:40 PM
Subject: meeting with Mark Thompson
To: "Barnwell, Claiborne" <cbarnwell@mdot.state.ms.us>

Cc: Kreg Overstreet <jkoverstreet@brownandmitchell.com>, Craig High <craig.high@neel-schaffer.com>, Rick Ferguson <rferguson@pickeringinc.com>

Claiborne,

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3) Shading effects on marsh beds

We are currently working on the discussion in the Final EA and will include these points in our Gold Sheet Commitments.

Regards,

Jill

---

claiborne.barnwell@dot.gov <claiborne.barnwell@dot.gov> **Tue, Dec 1, 2009 at 5:18 PM**
To: jillhigh@gmail.com

Thanks for this update; I had run across Mark recently & I am pleased you had this opportunity to visit the project with him.

E. Claiborne Barnwell, PE

Project Development Team Leader

FHWA, Mississippi Division

tele: 601.965.4217

cell: 601.259.9085

claiborne.barnwell@dot.gov

Please don't print this unless absolutely needed.

IN RESPONSE TO MARK'S CONCERN FOR STORMWATER RUNOFF:

4.3 Water Quality

4.3.1 No Build Alternative

Water quality would not be impacted if the No Build Alternative were chosen.

4.3.2 Build Alternatives

Implementation of Best Management Practices set forth by the Mississippi Department of Environmental Quality can minimize impacts to water quality and would be employed fully. Mitigation measures to protect water quality will be in conformance with appropriate water quality permits. However, during the construction phase, the unavoidable disturbance of the existing marsh beds surrounding the causeway and bridge would impact water quality, at least temporarily. Upon completion of the project and sufficient time for any potential marsh bed recovery, siltation and bottom disturbance should stabilize and water quality should improve.

During the construction phase of the roadway improvements, adjacent land use and residential yards are anticipated to mitigate any stormwater runoff, thereby protecting water quality in the immediate area.

Measures to minimize harm to water quality include:

- Preservation of roadside vegetation beyond the limits of construction where possible.
- Early re-vegetation of disturbed areas to hold soil movement to a minimum.
- The use of oversized drain, detention/retention structures, surface, subsurface, and cross drains designed as appropriate or needed so that discharge would occur in

locations and in such a manner that surface and subsurface water quality would not be affected. The outlets may require aprons, bank protection, silt basins, and energy dissipaters.

- Inclusion of features for the control of predicted erosion and water pollution in the construction plans, specifications and contract pay items as specified in MDOT Standard Specification for Road and Bridge Construction

Prohibiting the dumping of chemicals, fuels, lubricants, bitumens, raw sewage, and other harmful waste into or alongside streams or impoundments, or into natural or manmade channels leading thereto.

WE DISCUSSED THE HIERARCHY OF PERMITTING AND I INCLUDE IT HERE TO CONFIRM THAT I UNDERSTAND IT CORRECTLY. I SPOKE WITH JAN BOYD SOME ABOUT THIS ALSO.

4.10 Permitting

4.10.1 No Build Alternative

There will be no permits required if the No Build Alternative is selected.

4.10.2 Build Alternatives

Bridge re-construction will require both State and Federal Water Quality Permits for the bridge crossing and wetland impacts. A Joint Application will be submitted to MDMR after a FONSI is issued, which begins this process. The bridge crossing will require a U.S. Coast Guard Bridge Permit for construction over a navigable waterway. Section

404 permits from the Corps of Engineers, National Pollution Discharge Elimination System (NPDES) permits and Mississippi State Water Quality Permits will also be needed. The City will coordinate mitigation efforts with Federal and State regulatory agencies before preparing final mitigation plans and submitting permit applications. It is during the permitting process phase that the appropriate compensatory mitigation for the unavoidable impacts on this project will be determined.

MARK AND I DISCUSSED AT LENGTH THE DISTURBANCE OF THE UPLAND AREA UNDER THE NORTHERN END OF THE BASCULE. I HAVE DESCRIBED THAT AREA AND HAVE NOTED THAT CONTRACTORS WILL BE INSTRUCTED TO AVOID MARSH HABITAT. SOME PERTINENT POINTS ARE HIGHLIGHTED IN THE TEXT.

4.12 Water Body Modification and Wildlife Impacts

4.12.1 No Build Alternative

There would be no impact to the water body or to the wildlife if the No Build Alternative is selected.

4.12.2 Build Alternatives

There would be no modifications to the existing ship channel or any other water body associated with any of the bridge alternatives. Construction impacts would be temporary and displace wildlife only during the months of construction and reestablishment of habitat.

The upland vegetated area under the northern span of the drawbridge is likely to be impacted, but contractors will be carefully directed to minimize detrimental permanent

effects. This area does not include sensitive species of plants, nor does the area to be impacted include a significant amount of emergent vegetation (only along the edge of the upland, approximately 2 feet in width). One upland vegetated area located under the bridge at the north span of the drawbridge will be disturbed, and possibly partially destroyed (< 1 acre) from construction of the new bridge.

Marsh beds (primarily consisting of *Juncus romerianus* and *Spartina patens*) are located within the project area along both sides of the bridge and causeway. Marsh habitats will be specifically protected from impacts due to construction equipment, barges, etc. and contractors will be instructed to avoid any damage, intrusion, or disturbance of these areas.

IN RESPONSE TO MARK'S CONCERN OF THE SHADING EFFECT:

No submerged vegetation was noted or expected in the areas to be impacted by construction. The potentially detrimental effects of shading from a wider bridge will be offset by the height of the new bridge and causeway as illustrated in Figure 4.1. The new bridge will be at least 13 ft. higher (at lowest chord) and having a steeper incline to the drawbridge than the existing height. Impacts from shading are expected to be minimal.

Insert Fig. 4.1 COMPARISON OF THE HEIGHT OF THE OLD AND NEW BRIDGE

THIS DRAWING IS FOUND IN A SEPARATE FILE INCLUDED WITH THIS EMAIL.

IN RESPONSE TO MARK'S CONCERN REGARDING BRIDGE REMOVAL STRATEGY:

Removal of the bridge will be contracted and handled according to regulations stated in the permits for such activities.

Debris from the demolition of the existing bridge will be removed immediately by cranes, trucks, and/or barges so as not to disturb the marsh beds within or surrounding the project corridor. Placement and operation of demolition and hauling equipment will be limited to roadway or dry ground, previously dredged channels, or the existing dredge-area east of the bridge.

Per a Rubble Acceptance Agreement letter from MDMR, the debris will be placed in open Gulf waters south of Deer Island, MS for beneficial use as artificial reef habitat at the direction of MDMR (see Appendix 5).

The completed bridge will not adversely impact the 30 yards of beach area it crosses (see Secretary of State letter in Appendix 10). Pilings would straddle the beach strip and shading would change only slightly as a result of the higher and wider bridge (see Conceptual elevation schematic in Figure 4.1). Terrestrial wildlife inhabitants and birds should not be greatly affected, as the requirements for survival (i.e., shelter, food and water supply) will not be removed or significantly altered.

I INCLUDED THESE SECTIONS INCASE MARK IS INTERESTED IN HOW IT IS BEING ADDRESSED.

4.14 Coastal Zone

4.14.1 No Build Alternative

Coastal Zone requirements and permits would not be necessary if the No Build Alternative is selected.

4.14.2 Build Alternatives

The project area is in the Coastal Zone limits of Mississippi. The MDMR is the point of contact in Mississippi for wetland permits in the Mississippi Coastal Zone, which includes the counties of Hancock, Harrison and Jackson. Under a Memorandum of Agreement with the Mobile and Vicksburg districts of the U.S. Army Corps of Engineers (USACE), applications for wetland activities in the Mississippi Coastal Zone are to be submitted to the DMR on the Joint Application and Notification form during the Permitting phase of the project. This EA will be included as a requirement of the application.

4.15Threatened or Endangered Species

4.15.1 No Build Alternative

If the No Build Alternative is selected, nothing will change, and there will be no impact to any potential Threatened or Endangered (T&E) species.

IN RESPONSE TO MARK'S CONCERN REGARDING MARSH DISTURBANCE

4.15.2 Build Alternatives

The waters or beach areas are not identified as critical habitat for any of the T&E species, and infrequent, if any, occurrences of these species are expected. The effects the proposed project will have on the T&E species occurring in this vicinity are assumed to be minimal, if any. The construction of the proposed bridge will be done by bringing in all equipment and supplies by barge, and working from the barge rather than filling in the area and working from the ground, thus disturbing the least amount of habitat possible.

As recommended by the Department of Wildlife, Fisheries, and Parks, (Appendix 7) the timing of construction will be scheduled to avoid the time of year in which manatee may be in the area. Additionally, the Alabama Red-Bellied Turtle, currently not found in the project area, would not be attracted to this area during construction due to the barge (no-fill) construction strategy.

3.14.1 Threatened and Endangered Species

According to the list as of January 31, 2008, the State of Mississippi currently has 38 animal and 4 plant species named on the Threatened and Endangered Species (T&E) list maintained by the USFWS (Appendix 6). Sections 7 & 9 of the Endangered Species Act (ESA) of 1973 (as amended) lawfully requires that activity which is likely to affect a federally-protected species be reviewed by the U.S. Fish and Wildlife Service. Similarly,

a Solicitation of Views (SOV) was sent to various other agencies for comments regarding protected species. The SOV and list of agencies is found in Appendix 7. After review of the proposed project, all informed agencies submitted letters of approval for continuation of the project. Response letters are also found in Appendix 7.

The Mississippi Museum of Natural Science had minor concerns regarding possible occurrence of three species within the study area. The species mentioned, along with their recommendation are provided below:

1) Alabama Red-Bellied Turtle (*Pseudemys alabamensis)*: do not use fill-material during construction to avoid disturbance of its habitat. Currently, the Alabama Red-Bellied Turtle is not found within the study area.

2) Gulf Sturgeon (*Acipenser oxyrinchus desotoi*): this is a possible transient species in which the use of explosives for bridge destruction may disrupt its path. The recommendation is to use explosives only during seasons when these species are not likely to occur in the area.

3) Manatee (*Trichechus manatus*): same recommendation as for the Gulf Sturgeon.

Critical habitat is defined by the USFWS as an area "on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection." Critical habitat has not been identified within the study area.

Observation of T&E species found within the study area will be reported to the appropriate agency at the first sight and identification of the species. No further

disturbance of the area where the species is found will occur until the proper authorities provide approval for the project's continuation.

7.1.2.1 Debris Removal Joint Application

The Department of Marine Resources requested a Joint Application for the removal of debris resulting from the demolition of the existing bridge. Rubble will be given to MDMR and used as artificial reef material. The letter from MDMR to accept the rubble for beneficial use is found in Appendix 5. A copy of the Application is on file at BMI and will be filed with MDMR during the permitting/preconstruction phase.

Gmail by Google

Jill High <jillhigh@gmail.com>

meeting with Mark Thompson

3 messages

Jill High <jillhigh@gmail.com> **Thu, Nov 19, 2009 at 5:40 PM**
To: "Barnwell, Claiborne" <cbarnwell@mdot.state.ms.us>
Cc: Kreg Overstreet <jkoverstreet@brownandmitchell.com>, Craig High <craig.high@neel-schaffer.com>, Rick Ferguson <rferguson@pickeringinc.com>

Claiborne,

Mark Thompson was in Biloxi yesterday, and we (Kreg Overstreet, Craig High, and me) were able to join him for a site visit at Popps Ferry Bridge. He took some pictures and discussed the project with us, then walked the north portion of the causeway to the drawbridge. He was given a Conceptual Schematic from Rick Ferguson of the comparison of the height of the old and new bridge.

He seemed pleased with the preferred alternative for the project, and mentioned that there would most likely be no "show-stoppers" if we address a few more items. In general, he was glad to see the EA at this point in the planning - so we can address these issues now, before the permitting process when he will submit his comments.

He wants to see discussion in the EA regarding:

1) Removal strategy for bridge - no disturbance to marsh beds
2) Construction strategy of new bridge - no disturbance to marsh beds
3) Shading effects on marsh beds

We are currently working on the discussion in the Final EA and will include these points in our Gold Sheet Commitments.

Regards,

Jill

Jill High <jillhigh@gmail.com> **Tue, Dec 1, 2009 at 3:56 PM**
To: claiborne.barnwell@dot.gov

This was emailed to your incorrect address 2 weeks ago, and the non-response is what made me check it again. Sorry for the delay!

Hope to hear from you soon!

Jill
[Quoted text hidden]

claiborne.barnwell@dot.gov <claiborne.barnwell@dot.gov> **Tue, Dec 1, 2009 at 5:18 PM**
To: jillhigh@gmail.com

Thanks for this update; I had run across Mark recently & I am pleased you had this opportunity to visit the project with him.

E. Claiborne Barnwell, PE

Project Development Team Leader

FHWA, Mississippi Division

tele: 601.965.4217

cell: 601.259.9085

claiborne.barnwell@dot.gov

Please don't print this unless absolutely needed.

From: Jill High [mailto:jillhigh@gmail.com]
Sent: Tuesday, December 01, 2009 2:57 PM
To: Barnwell, Claiborne (FHWA)
Subject: Fwd: meeting with Mark Thompson

[Quoted text hidden]

Appendix 23

Scoping Meetings with Resource Agencies
Part 1 and Part 2
(March 22 & 23, 2009)

MEMORANDUM

VIA EMAIL

To: Resource Agencies, City of Biloxi, Neel-Schaffer, Pickering, Inc.

From: Brown and Mitchell, Inc., for the City of Biloxi

Subject: SCOPING MEETING INVITATION re: Popps Ferry Bridge EA

Memo Date: May 7, 2010

A "Scoping Meeting" for *Popps Ferry Road and Bridge Environmental Assessment* is being called for all jurisdictional Resource Agencies in order to fulfill requirements for issuance of a Finding of No Significant Impact (FONSI).

The meeting will be held at:

The Bond-Grant House
932 Howard Avenue, Biloxi, MS
March 23, 2010
10:00 am

From U.S. 90 at Beau Rivage, travel north on Caillavet Street. Turn left at first traffic signal, onto Howard Avenue. The Bond-Grant House is one block west on your right, at the corner of Howard Avenue and Bohn Street.

Please park either under the I-110 bridge or in the empty lot on the corner of Bohn Street.

Light snacks will be provided

Kindly respond with the number of people from your agency planning to attend.

One electronic copy/disc of the most recent copy of the EA is being sent to your agency via FedEx delivery for your review. Hardcopies of the document and displays of the Preferred Alternate and Typical Sections of the road and bridge will also be available for viewing at the meeting.

The disc version of the EA being sent to your agency is current as of 12-14-09. Comments received after this date are currently being addressed and will be incorporated after the above-mentioned Scoping Meeting.

The document is currently in review with MDOT and FHWA, awaiting this meeting and any resulting comments, to complete the requirements for issuance of a FONSI.

Invitations for this meeting are being sent to the following persons/agencies:

FHWA - Claiborne Barnwell
MDOT - Kim Thurman
MDAH - Jim Woodrick
USACE - Vicksburg Tony Lobred
MDMR - Jan Boyd, MaryEllen Farmer, Karen Neumann
MDEQ - Florance Watson
USCG - David Frank, Phil Johnson
USFWS - Paul Necaise, Sandy Kilpatrick, David Felder
NMFS - Mark Thompson
City of Biloxi – Damon Toricelli, David Staehling
Neel-Schaffer – Craig High
Pickering, Inc – Rick Ferguson
Brown and Mitchell – Kreg Overstreet, Jill High

Please contact me if you have any questions.

Jill High

SIGN IN

RESOURCE AGENCY SCOPING MEETING
Popps Ferry Road and Bridge Environmental Assessment
March 22, 2010 2:00pm

NAME	AGENCY	PHONE
Anthony Lubred	USACE	(C) 601-529-9222 (W) 601-631-5470
Wes Stafford	MDOT Env. Div.	(W) 601-359-7920
Craig High	Neel-Schaffer, Inc.	(W) 228-374-1211
Rick Ferguson	Pickering	(W) 601-956-3663
Claborne Barnwell	FHWA	601-965-4217
Jill High	BMI	228-436-7612
Mark Thompson (by phone)	NMFS	850-234-5061

AGENDA

Resource Agency Scoping Meeting

Popps Ferry Road and Bridge Environmental Assessment

March 22, 2010 2:00pm

INTRODUCTIONS -

OVERVIEW OF PROJECT – *Jill High, Craig High, Rick Ferguson*

EA document
Discussion of Preferred Alternate E
Maps – Pickering's newest aerial overlay

SPECIFIC COMMENTS - *Claiborne Barnwell, Kim Thurman, Tony Lobred*

Water Quality – what needs to be addressed?
How did Biloxi Bay Bridge address this?

NMFS involvement – Mark Thompson visited site & his comments have been addressed.

Section 10/404 permits...to be handled during Design Phase?

Historic Properties – site under bridge. Kim, have we heard anything on this addendum yet?

Gold Sheet commitments

WHAT NEEDS TO BE DONE TO MOVE FORWARD TO A FONSI? *Kim & Claiborne*

ADJOURN

INVITEES:

City of Biloxi Damon Torricelli, David Staehling
MDOT. Kim Thurman
FHWA: Claiborne Barnwell
NMFS. Mark Thompson
USAH: Jim Woodrick
USACE. Tony Lobred, Kaaren Newmann, Mary Ellen Farmer
MDMR Jan Boyd, Willa Brantley
MDEQ. Florance Watson
USCG: David Frank, Phil Johnson
USFWS: Sandy Kilpatrick, Paul Necaise
Neel-Schaffer, Inc. Craig High
Pickering, Inc. Rick Ferguson
Brown and Mitchell, Inc. Jill High. Kreg Overstreet

SIGN IN

RESOURCE AGENCY SCOPING MEETING

Popps Ferry Road and Bridge Environmental Assessment
March 23, 2010 10:00am

NAME	AGENCY	PHONE
Kreg Overstreet	Brown & Mitchell, Inc.	(228) 436-7612
Willa Brantley	MDMR	228-523-4108
Jan Boyd	MDMR	228.523.4102
Claudine Ramirez	FHWA	601 965 4217
Craig High	Neel-Schaffer, Inc.	228-374-1211
Carrie Barefoot	MDEQ	601-961-5322
DAMON TORRICELLI	CITY OF BILOXI	228-435-6265
Wes Stafford	MDOT Env. Div.	601-359-7920
David Felder	US FWS	601 321 1131
Rick Ferguson	Pickering	601-956-3663
Kim Truman	MDOT Env	601-359-7920
Phil Johnson	USCG Bridge	504-671-2128
Allen Vincent	MDOT Env	601-359-7920

AGENDA

Resource Agency Scoping Meeting

Popps Ferry Road and Bridge Environmental Assessment

March 23, 2010 10:00am

INTRODUCTIONS -

OVERVIEW OF PROJECT – *Jill High, Craig High, Rick Ferguson*

EA document
Discussion of Preferred Alternate E
Maps – Pickering's newest aerial overlay

SPECIFIC COMMENTS FROM AGENCIES

USFWS – water quality issues as related to Essential Fish Habitat
- Manatee and Gulf Sturgeon Guidelines
- T & E issues

USCG – Bridge App process, anything we need to do before FONSI?

WHAT NEEDS TO BE DONE TO MOVE FORWARD TO A FONSI?
ADJOURN

INVITEES:

City of Biloxi. Damon Torricelli, David Staehling
MDOT: Kim Thurman
FHWA: Claiborne Barnwell
NMFS: Mark Thompson
USAH: Jim Woodrick
USACE: Tony Lobred. Kaaren Newmann. Mary Ellen Farmer
MDMR: Jan Boyd, Willa Brantley
MDEQ. Florance Watson
USCG. David Frank, Phil Johnson
USFWS- Sandy Kilpatrick, Paul Necaise
Neel-Schaffer. Inc . Craig High
Pickering, Inc.: Rick Ferguson
Brown and Mitchell, Inc.: Jill High, Kreg Overstreet

SCOPING MEETING – Part 1
Monday, March 22, 2010 2:00pm
Brown and Mitchell Biloxi Office

Attendees:
USACE – Anthony Lobred
MDOT – Wes Stafford
FHWA – Claiborne Barnwell
NMFS – (by phone) Mark Thompson
Neel-Schaffer, Inc. – Craig High
Pickering, Inc. – Rick Ferguson
Brown and Mitchell, Inc. – Jill High

DISCUSSION:

Tony discussed Section 9 Bridge Permit, and Section 10 Navigability Permit

- Section 9 will be issued by USCG and concurred by USACE
- Section 10 will be issued by Corps

1899 Rivers and Harbors Act –
USCG has ongoing dredging permit

Mark Thompson said no need for public interest portion of permitting. Will handle under "46".

We are in a Coastal Zone Management area. Jurisdiction is generally as follows:

- from Spring High Tide up (in air column) and T&E species – USFWS
- from SHT down through water column to water bottom - NMFS, includes Gulf Sturgeon, Marine Mammal Act (dolphin)

FILLS: falls under Clean Water Act (404), Corps – NEPA. Funnels thru FHWA which is acting as lead NEPA agency.

WETLANDS: Marsh beds are under 404 Regulation.

- Shading of wetlands/marsh is considered "functional fill" (if it kills marsh) and must be permitted as Fill. If shading factor is considered as a non-impact, no permitting for the shading will be needed b/c it is not acting as fill.

Bridge Design and Building – falls under USCG with coordination from USACE Mobile River Operations.

Most important for EA: Documentation of agency coordination. Include Sign-Ins, minutes, agendas.

TO DO (Rick): Analysis of bridge height vs. sunlight benefit. Compare % of sunlight access to marsh for new vs. existing bridge.

Tony will get a Hydrograph? condition from previous bridge repair authorization to Rick as a go-by.

TO DO (Jill/Larry Lewis): Delineate marsh wetlands. Use I-110, Tchutacabouffa, E. Pascagoula as examples.

Mark agreed that impacts are minimal for marshes and can be handled under the 46.

Will need to identify impacts in EA and mitigation if necessary.

Water Quality: Look at Lake Ponchartrain as an example.

Additional water not being treated properly (rainwater). Approaches, etc – need to run off to land and into drainage systems.

Also discuss EFH vs. Water Quality (FWS will have insight on this). Consider oil/water separator.

DEQ will sign off on WQ issues.

Mark wants commitment of "Top Down, Bottom Up," (i.e., nothing will be added or taken away from water bottom or water column).

Manatee and Gulf Sturgeon Avoidance and Protection Guidelines are handled by FWS.

Joint Application goes thru DMR who fwds to USACE/Vicksburg for concurrence.

LANGUAGE TO ADD:

Construction Limits – name how much marsh is impacted.

Avoidance and Minimization – by using existing dredge and not touching marshes west of bridge.

Add that Western Expansion was considered and dismissed as an alternative.

In Natural Resources chapter, add info about old platted subdivision – why never developed? Wetlands?

SCOPING MEETING Part 2
Tuesday, March 23, 2010 10am
Bond-Grant House, Biloxi

Attendees:
MDMR – Jan Boyd, Willa Brantley
FHWA – Claiborne Barnwell
MDOT – Kim Thurman, Wes Stafford, Rhea Vincent
MDEQ – Carrie Barefoot
USFWS – David Felder
USCG – Phil Johnson
City of Biloxi – Damon Torricelli
Neel-Schaffer – Craig High
Pickering – Rick Ferguson
Brown and Mitchell – Kreg Overstreet, Jill High

DISCUSSION:

Below Mean High Tide line – owned by State. Public lands.

Dredging will require permitting, and a contractor commitment. Permit should state that dredging will not be deeper than previous channel permitted for emergency repairs. Can apply now, modify if needed.

TO DO (Rick): Estimate quantity of dredging material and final placement of dredged material. Ask Katrina contractor how they accessed causeway/bridge for repairs.

Add commitment: existing spoil will be for beneficial use – possibly additional marsh material. Can just add this to the Rubble Acceptance Letter already signed.

David Felder – need a letter of Effects Determination. Note species, BMP's, and state "not likely to affect."

ADD COMMITMENT: Recommend BMP's, special conditions re: species, timing of construction activities, blasting, scatter charge, etc...

Water Quality – use Joint Application thru DMR. State appropriate BMP's

Land Disturbance will require LCNOI prior to start of construction activities.

Streams – list any on "303D" list and add to gold sheet if any. See if Back Bay is a "sensitive resource." List Tchutacabouffa.

To be included in 46 – 401 Water Quality permit in Bay. Around dredge area, deal with turbidity.

Also, City will be responsible for Application and mitigation.

Discharge stormwater into grass for filtration. ID stormwater collection – i.e., drainage holes 10 ft. apart on bridge (state that this has been discussed!!) ADD COMMITMENT: to consider this in the design process.

USCG – Navigation will be handled by USCG. MDOT will forward EA to USCG for review. Mention consultation with tow pilots in navigation discussion.

Kim delivered letter from Mississippi Archives & History requesting commitment to monitor for Archaeological sites throughout construction.

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