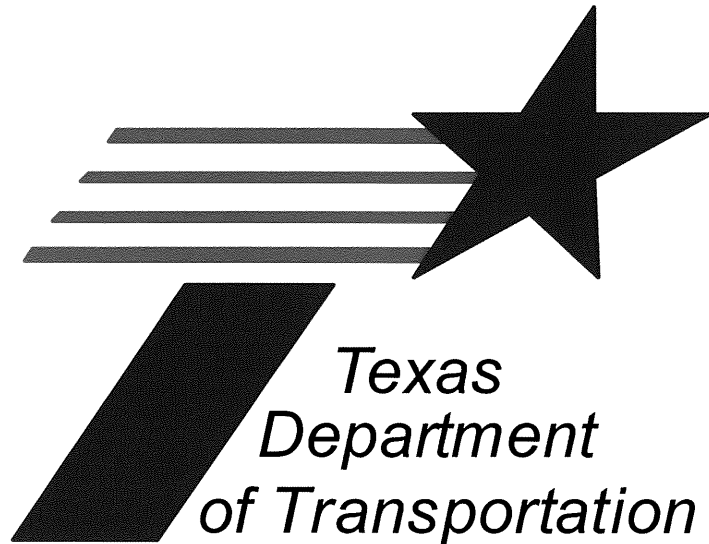


Laredo District PAVEMENT DESIGN REPORT



HWY: FM 117
CSJ: 0236-03-024
County: Zavala
Project Limits:
From FM 1025 To Frio County Line
Project Length: 13.814 Miles

Selected Option: STRATEGY 2 - OPTION 2

Designed by: 
Robert Moya III, P.E.

Date: 8/30/13

Approved By: 
David Salazar, P.E.
Director of Maintenance

Date: 8/30/13

NOTE: This document is released for the purpose of interim review and is not intended for bidding, construction, or permitting purposes.

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GENERAL PROJECT INFORMATION

Location

This pavement design report is for the proposed rehabilitation of FM 117 in Zavala County for a length of 13.814 miles from FM 1867 to Frio County Line.

The project location map is shown as Exhibit A.

Facility

The section was constructed in 1950 and reconstructed in 1977 with 9 inches of flex base and a sealcoat. It was reconstructed to a surface width of 24 feet. It has been sealcoated 4 times since then.

The roadway existing layers in this section consist of approximately 1.5 inches of sealcoat material, and 9 inches of flexible base as per the roadway inventory logs.

The proposed typical section of this roadway is 12' lanes and 4' shoulders.

The typical sections are shown as Exhibit B.

Soil Conditions

The subgrade modulus is assumed to be 8 ksi for the design purposes. Falling Weight Data (FWD) indicates a subgrade modulus average of approximately 10.7 ksi. However, this value was not used for the design due to the many weak spots. This design assumes the weaker spots will not be addressed. Falling Weight data can be seen in Exhibit D "Falling Weight Data". The predominant soil type is fine sandy loam. A Texas Triaxial Classification number of 4.4 was used for this design. This number was obtained through FPS21 based on the predominant soil type. Predominant soil information can be seen in EXHIBIT G "Subgrade Soil Data".

The design was done using an existing base modulus of 30 ksi based on the FWD data.

Traffic Data

The Traffic data was obtained from TP&P on September 7, 2012. The 20 year traffic obtained is summarized below:

From: FM 1025 To: Frio County Line:

2013 ADT: 300

2033 ADT: 800

Flex 18k ESALs: 652,000

Percent Trucks in ADT: 35.9

ATHWLD: 11,000

Percent Tandem Axles in ATHWLD: 80

FLEXIBLE PAVEMENT DESIGN

The design was performed with the Flexible Pavement Design System (FPS-21) program and input values were selected using TxDOT guidelines. All design data and parameters are included as Exhibit E, FPS input and output.

The process used for determining the preferred proposed pavement structure included

incorporating the most efficient pavement structure for the location that would meet or exceed a design life of 20 years with a minimum overlay timeframe of 8 years .

This process resulted in the following pavement design options:

STRATEGY 1 - CEMENT STABILIZE BASE - The widened section needs to match the layer thicknesses noted.

Option 1: Consists of the following:

- Surface: 2 Course surface treatment
 - Prime coat: RC-250 w/GR 5
 - Surface: AC-20-5TR w/GR 3
- Base 1 - 8" Cement Treated Material
- Base 2 - 2" Unstabilized base material to remain
- T(1) - Design Life = 33 Years

This FPS design was checked with Modified Triaxial Design Procedure (Exhibit F) and passed with a factor of 1.0, but did not pass with a factor of 1.5.

** (The Pavement Design Task Force (PDTF, 2009) recommends a factor of 1.0 be used for all designs where traffic loading is below 5 M ESALs.

Option 2: Consists of the following:

- Surface: 2 Course surface treatment
 - Prime coat: RC-250 w/GR 5
 - Surface: AC-20-5TR w/GR 3
- Base - 10" Cement Treated Material
- T(1) - Design Life = 40 Years

This FPS design was checked with Modified Triaxial Design Procedure (Exhibit F) and passed with a factor of 1.0, but did not pass with a factor of 1.5.

** (The Pavement Design Task Force (PDTF, 2009) recommends a factor of 1.0 be used for all designs where traffic loading is below 5 M ESALs.

Option 3: Consists of the following:

- Surface: 2" D-GR TY C
- Base 1 - 3" D-GR TY B
- Base 2 - 6" Cement treated Material
- T(1) - Design life = 40 Years

This FPS design was checked with Modified Triaxial Design Procedure (Exhibit F) and passed with a factor of 1.0, but did not pass with a factor of 1.5.

** (The Pavement Design Task Force (PDTF, 2009) recommends a factor of 1.0 be used for all designs where traffic loading is below 5 M ESALs.

STRATEGY 2 - Overlay and Widen

Option 1: Consists of the following:

- Surface 1: New 2" D-GR TY C
- Surface 2: 1.5" Existing asphalt material to remain
- Base: 9" Unstabilized Flexible base to remain
- T(1) - Design life = 23 Years
- The widened section will need a minimum 4" HMA base to pass the FPS, but fail the Triaxial.
- The widened section will need a minimum 8" HMA base to pass the FPS and the Triaxial.
- The section to be widened can be done with 9" of TY A GR 2 base.

This FPS design was checked with Modified Triaxial Design Procedure (Exhibit F), and passed.

This option would require repairing all the failed locations prior to application.

Option 2: Consists of the following:

- Surface 1: New 2" D-GR TY C
- Surface 2: 1.5" Existing asphalt material to be removed
- Base: 9" Unstabilized Flexible base to remain - widen with TY A GR 1
- T(1) - Time to first overlay = 17 Years
- T(1) - Design life = 34 Years

This FPS design was checked with Modified Triaxial Design Procedure (Exhibit F), and failed. However, because this is not a rehabilitation or reconstruction project, it is not necessary for the triaxial to pass..

This option would require repairing all the failed locations prior to application.

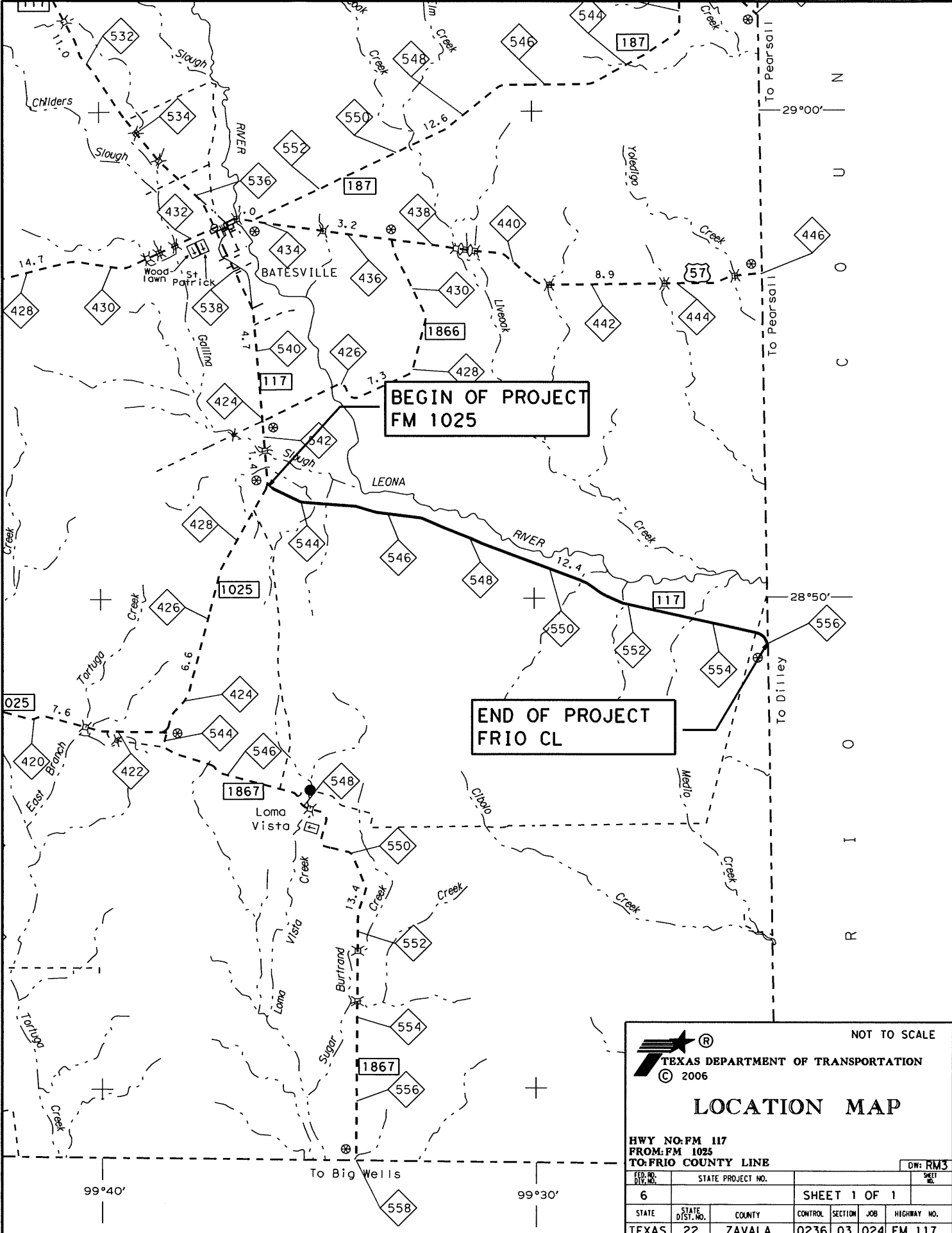
CONCLUSION

The Director of Maintenance will be review the options noted in the previous section "Flexible Pavement Design" and determine the proposed material and types and determine the most viable and cost effective option.

Subgrade "weak spots" should be addressed prior to, or with the construction project.

In reference of the elements considered for the selection of the roadway surface layer aggregate properties, see the information contained in **Appendix A – Surface Aggregate Selection Form**.

EXHIBIT A
Project Location Map




N
U
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C
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R

**BEGIN OF PROJECT
FM 1025**

**END OF PROJECT
FRIO CL**

NOT TO SCALE



TEXAS DEPARTMENT OF TRANSPORTATION
© 2006

LOCATION MAP

**HWY NO: FM 117
FROM: FM 1025
TO: FRIO COUNTY LINE**

DW: RM3

FED. NO. DIV. NO.	STATE PROJECT NO.		SHEET NO.			
6			SHEET 1 OF 1			
STATE	STATE DIST. NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.
TEXAS	22	ZAVALA	0236	03	024	FM 117

99°40'

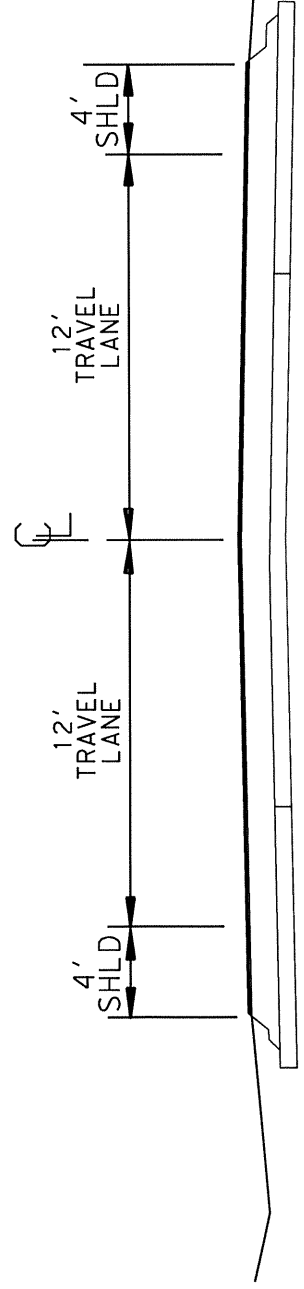
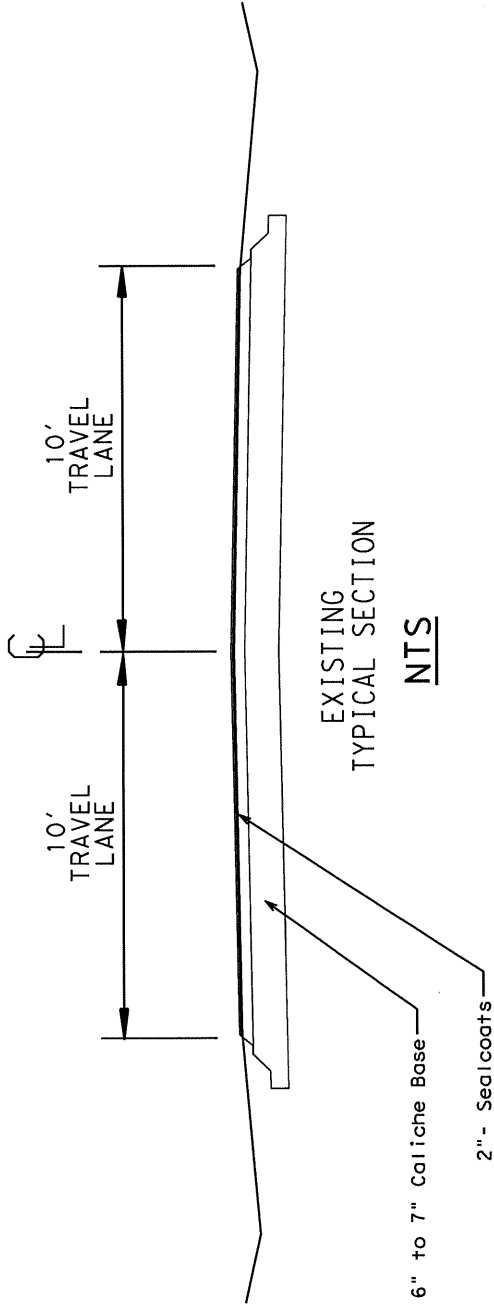
99°30'

To Big Wells

To Dilley

To Pear-sall

EXHIBIT B
Existing and Proposed Typical Sections



TYPICAL SECTIONS

 TEXAS DEPARTMENT OF TRANSPORTATION			
©2002	STATE DIST.	FED. RD. DIV. NO.	PROJECT NO.
TEXAS	22	STP ()	xx
COUNTY	CONT.	SECT.	JOB
ZAVALA	0236	03	024
			FM 117