

Laredo District PAVEMENT DESIGN REPORT



HWY: FM 133
County: La Salle
CSJ: 0237-01-013
Project Limits: From Dimmit CL
To IH 35 FR
Project Length: 6.902 Miles

Selected Option: STRATEGY 1

Designed by:  Date: 8/12/2013
Robert Moya III, P.E.
Transportation Engineer

Approved By:  Date: 8/30/13
David Salazar, P.E.
Laredo District Director of Maintenance

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 and widening of FM 133 in La Salle County for a length of 6.902 miles from Dimmit CL to IH 35 Frontage Road.

The project location map is shown as Exhibit A.

Facility

The roadway existing layers consist of approximately 1 inch of asphalt, and approximately 9 inches of flexible base material as per the as built set of plans. Texas Transportation Institute (TTI) identified 10 inches of flexible base.

The proposed project will rehabilitate and widen the existing structure from two 11 foot lanes to two 12 foot lanes and 4 foot shoulders.

The typical sections are shown as Exhibit B.

Soil Conditions

The subgrade for this project location consists of several soil types according to the Soil Conservation Service (SCS) soil maps as shown in Exhibit G.

Its Triaxial Classification is estimated to be 4.4 as per the FPS program. The predominant soil types were very fine Sandy Loam and loamy fine sand. The subgrade modulus is averaged at approximately 14.3 ksi as per the Falling Weight Deflectometer data (FWD) "Back Modulus Calculation". However, a subgrade modulus of 8 ksi was utilized for this design due to the various weak spots noted in the FWD data. (Exhibit D).

The subgrade soil types, data and classifications are shown in Exhibit G.

Traffic Data

The Traffic analysis report for pavement design from Transportation Planning and Programming Division (TP&P) is shown as Exhibit C. Traffic data was obtained for the Dimmit County portion of the roadway on March 7, 2013, by Transportation Planning and Development (TP&D). The 20 year traffic was submitted to the Laredo District as summarized below:

From: US 83 To: La Salle County Line:

2014 ADT: 3,000

2034 ADT: 5,400

Flex 18k ESALs: 2,120,000

Percent Trucks in ADT: 21

ATHWLD: 11,100

Percent Tandem Axles in ATHWLD: 30

This data was modified for this design. The percentage of trucks in the energy sector is more closely 31.7%. Also, the ATHWLD was modified to 12,000 because there is evidence of a high percentage of overweight trucks. For this reason, and because of the high number of trucks, the "Percent Tandem Axles in ATHWLD" was changed to 50. The following Traffic Data was generated and utilized for this design.

From: La Salle County Line To: IH 35 Frontage Road:

2014 ADT: 3,000

Percent Trucks in ADT: 31.7

2034 ADT: 5,400

ATHWLD: 12,000

Flex 18k ESALs: 6,248,000

Percent Tandem Axles in ATHWLD: 50

FLEXIBLE PAVEMENT DESIGN

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

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.

The existing base material showed an average strength of 45.8 ksi as per the Falling Weight Deflectometer Data (FWD) "Back Modulus Calculation" (Exhibit D). 45 ksi will be used for the existing base modulus where applicable.

This process resulted in several options for the proposed pavement structure.

STRATEGY I - HMACP over Cement Treated Base

Option 1 - 20yr design: Consists of the following:

- Surface: 3.5" DG-HMACP TY C with GR 4/AC-15P underseal
- Prime: MC-30 or (RC250/GR 5 if placing traffic prior to final surface, underseal not required)
- Base: 10" Cement stabilized base (combined new and existing material)

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

STRATEGY II - HMACP over New flexible base over cement treated base

Option 1 - 20 yr design: Consists of the following:

- Surface: 5" DG-HMACP TY C with GR 4/AC-15P underseal
- Prime: MC-30 or (RC250/GR 5 if placing traffic prior to final surface, underseal not required)
- Base 1: 4" New Flexible base material (TY A GR 2 or TY E GR 4 stabilized)
- Base 2: 6" Cement treat existing base

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

STRATEGY III - HMACP over New base material over existing base

Option 1 - 20yr design: Consists of the following:

- Surface: 5.5" DG-HMACP TY C with GR 4/AC-15P underseal
- Prime: MC-30 or (RC250/GR 5 if placing traffic prior to final surface, underseal not required)
- Base 1: 6" New Flexible base material (TY A GR 2 or TY E GR 4 stabilized)
- Base 2: 6" Existing material (reworked and/or stabilized and compacted)

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

Option 2: Consists of the following:

- Surface: 5" DG-HMACP TY C with GR 4/AC-15P underseal
- Prime: MC-30 or (RC250/GR 5 if placing traffic prior to final surface, underseal not required)
- Base 1: 10" New Flexible base material (TY A GR 2 or TY E GR 4 stabilized)
- Base 2: 6" Existing material (reworked and/or stabilized and compacted)

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

STRATEGY 4 - Engineer's Option:

Option 1: Consists of the following:

- Surface: _____
- Base: _____
- Base: _____

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.

Surface, base, and 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

M I T C O U N T Y

**BEGIN PROJECT
DIMMIT CL**

**END PROJECT
IH 35 WFR**

CHAPARRAL
WILDLIFE
MANAGEMENT
AREA

133

35

ARTESIA
WELLS

35

35

44

44

B35

44

ENCINAL
POP 620

To Laredo

To Freer

99°20'

D I M M I T C O U N T Y

W E B B C O U N T Y

28°20'

28°15'

28°10'

28°05'



NOT TO SCALE

TEXAS DEPARTMENT OF TRANSPORTATION
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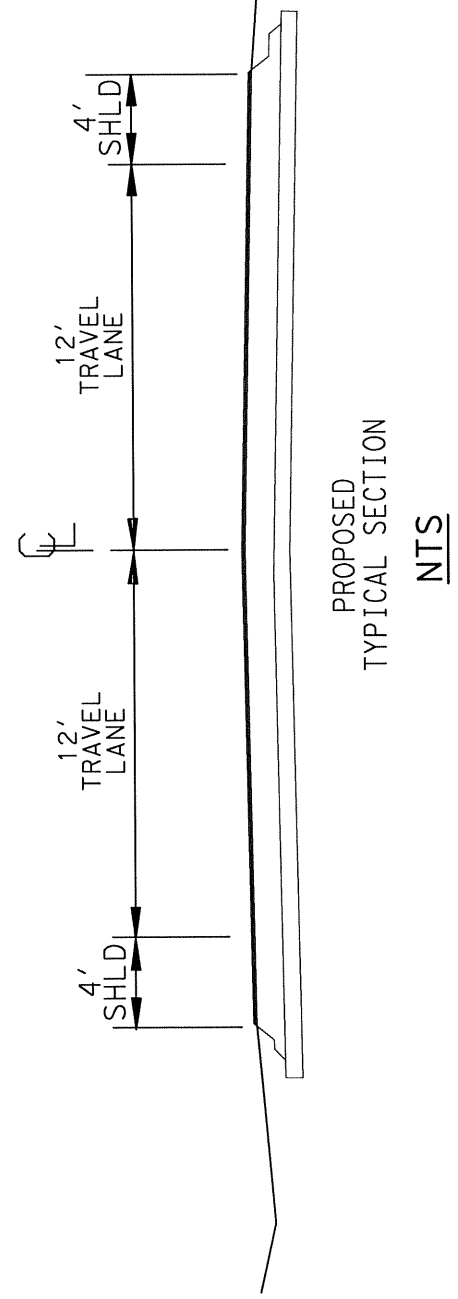
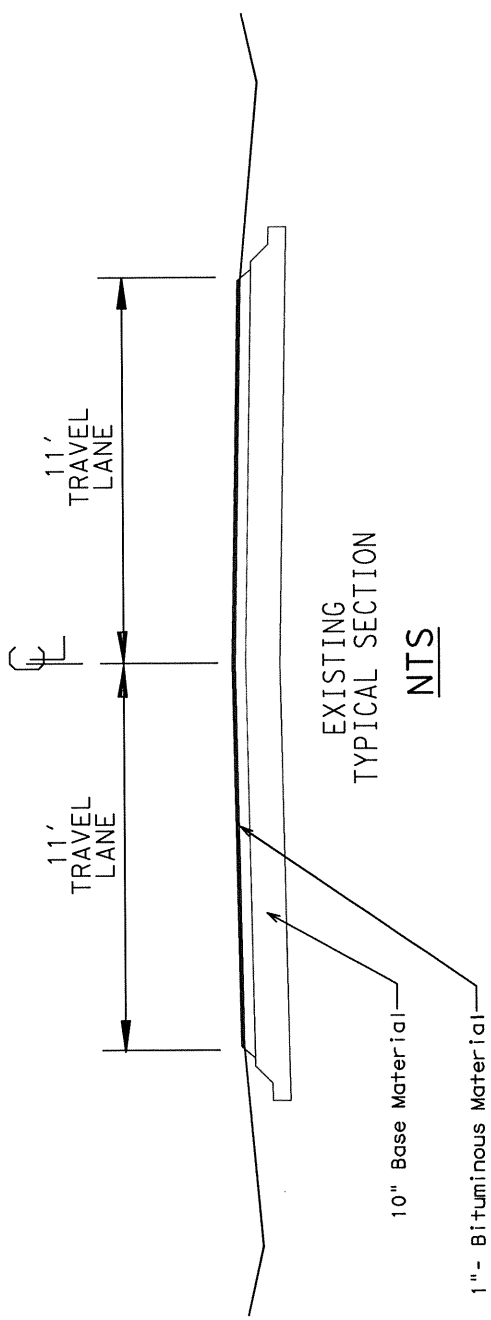
LOCATION MAP

HWY NO: FM 133
FROM: DIMMIT CL
TO: IH 35 WFR

DW: RM3

FED. RD. DIV. NO.		STATE PROJECT NO.				SHEET NO.	
6						SHEET 1 OF 1	
STATE	STATE DIST. NO.	COUNTY	CONTROL	SECTION	JOB	HIGHWAY NO.	
TEXAS	22	LA SALLE	0237	01	013	FM 133	

EXHIBIT B
Typical Sections



TYPICAL SECTIONS

TEXAS DEPARTMENT OF TRANSPORTATION			
©2002 STATE DIST. TEXAS COUNTY LA SALLE	FED. RD. DIV. NO. 22 CONT. 0237	PROJECT NO. STP () SECT. JOB 01	SHEET NO. xx HWY FM 133