



September 25, 2026

Laredo Perpetual Pavements

Antonio Reyna Jr. – Laredo Dist. Lab

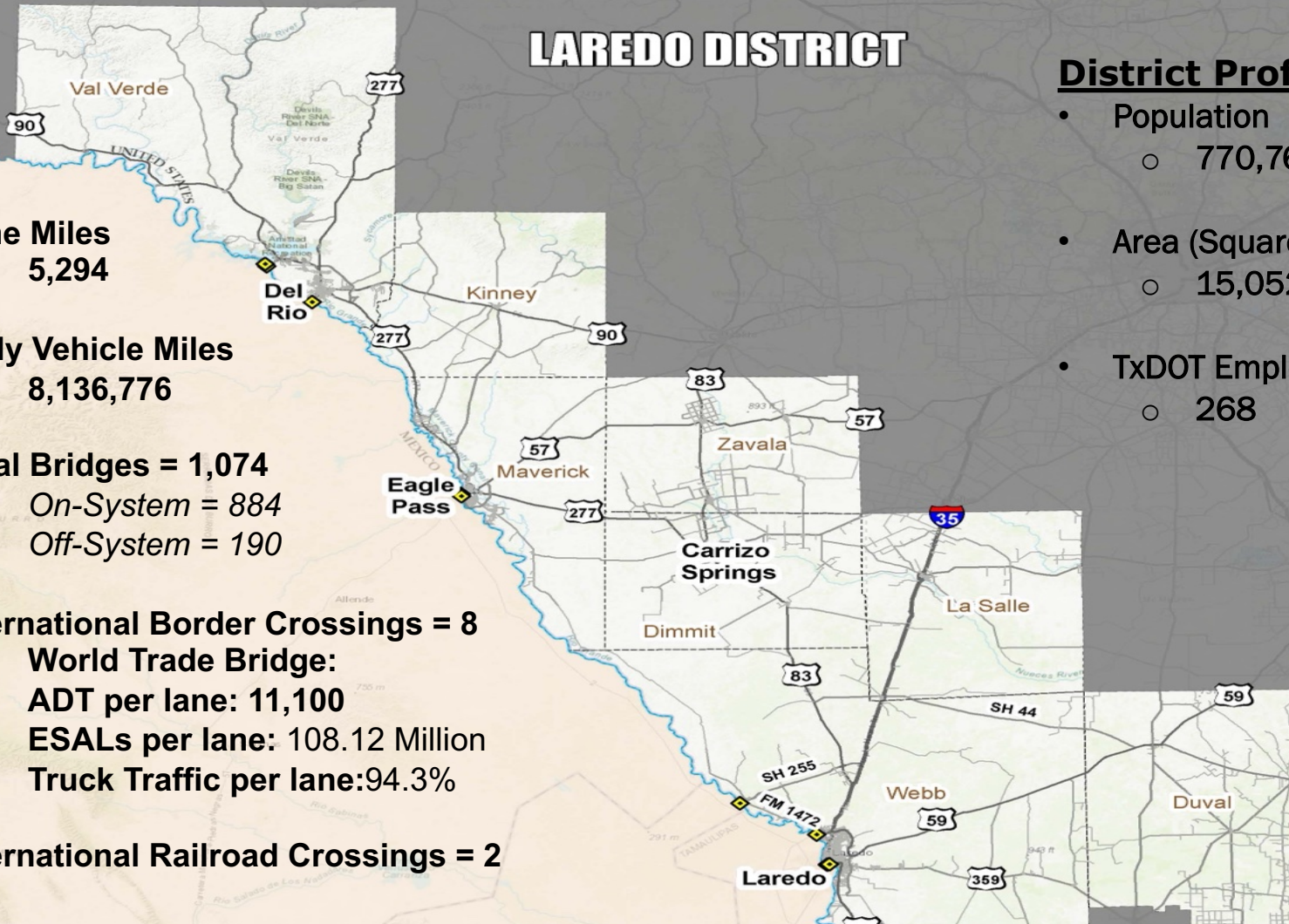
LAREDO DISTRICT



District Profile

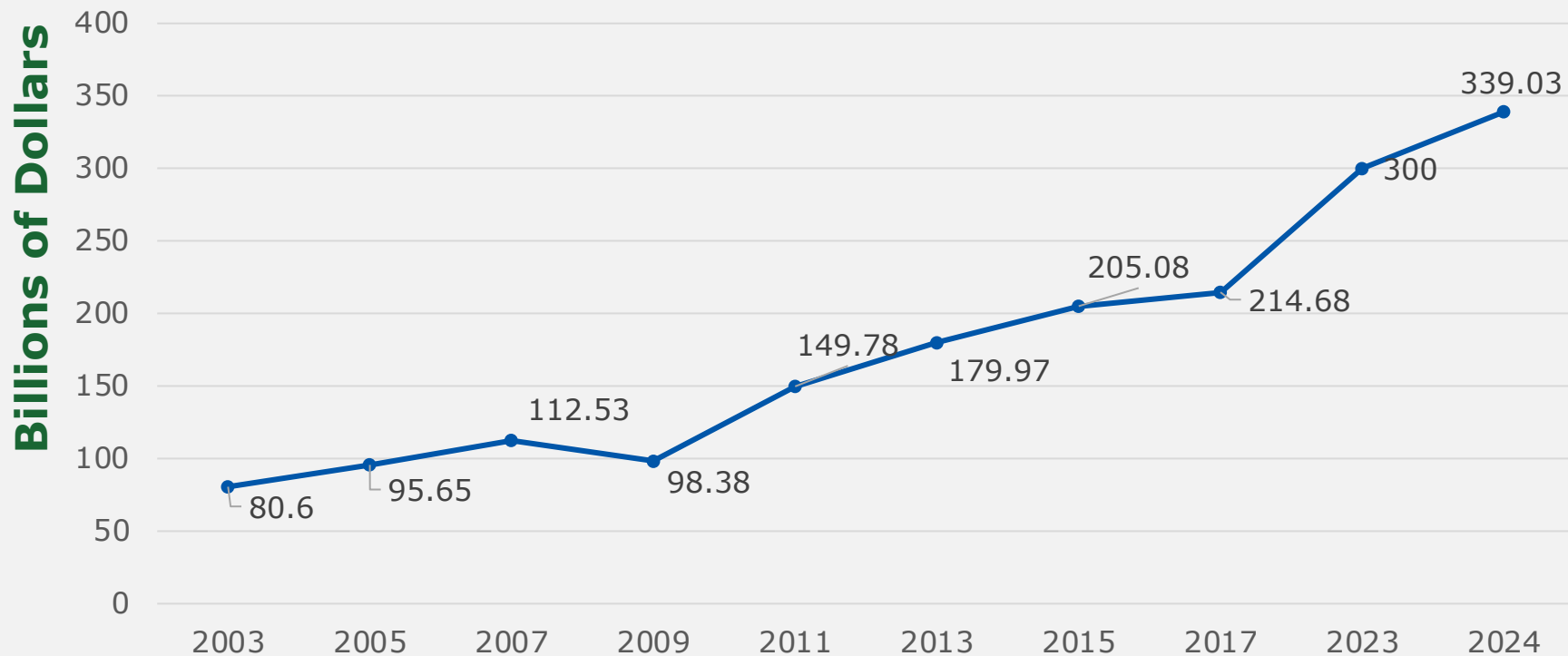
- **Lane Miles**
 - 5,294
- **Daily Vehicle Miles**
 - 8,136,776
- **Total Bridges = 1,074**
 - On-System = 884
 - Off-System = 190
- **International Border Crossings = 8**
 - World Trade Bridge:
 - ADT per lane: 11,100
 - ESALs per lane: 108.12 Million
 - Truck Traffic per lane: 94.3%
- **International Railroad Crossings = 2**

- **Population**
 - 770,767
- **Area (Square Miles)**
 - 15,052
- **TxDOT Employees**
 - 268

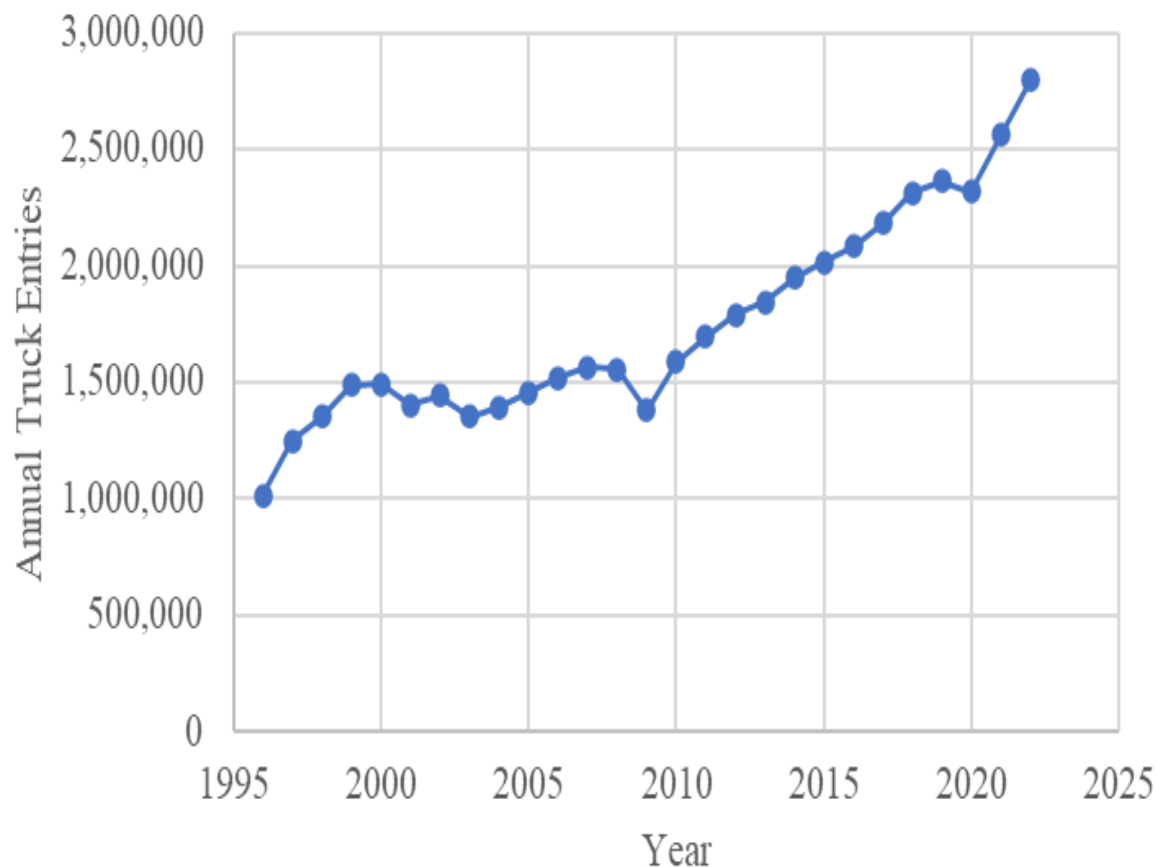


Commercial Trade Impact in Laredo

Laredo Port of Entry all trades



- Along with increasing numbers of trucks and higher axle loads, it appears to be a general trend toward higher summertime temperatures.

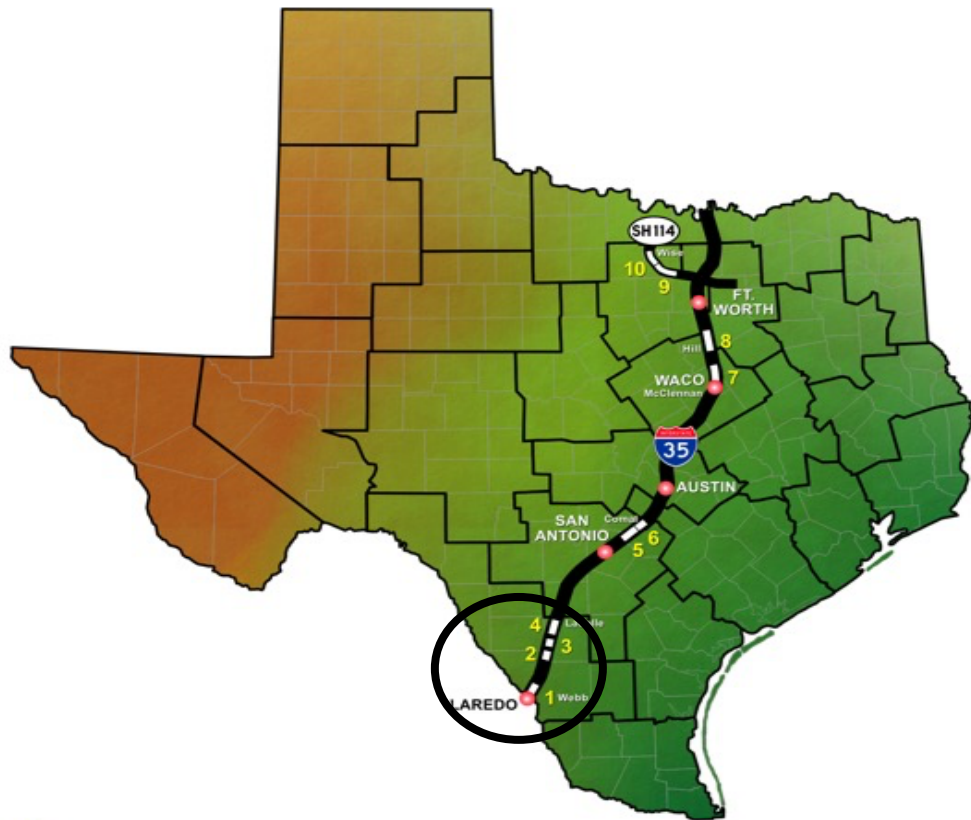


TXDOT Perpetual Pavements

- IH-35 in McLellan County, on the north side of Waco was the first project.
- Perpetual pavements are pavement structures designed to have a virtually infinite fatigue and full-depth rut life, requiring only periodic surface renewal for at least 50 years (Lee et al, 2021).
- Since 2001, Laredo Texas has designed and constructed four perpetual pavements on its most heavily trafficked highway, IH 35.

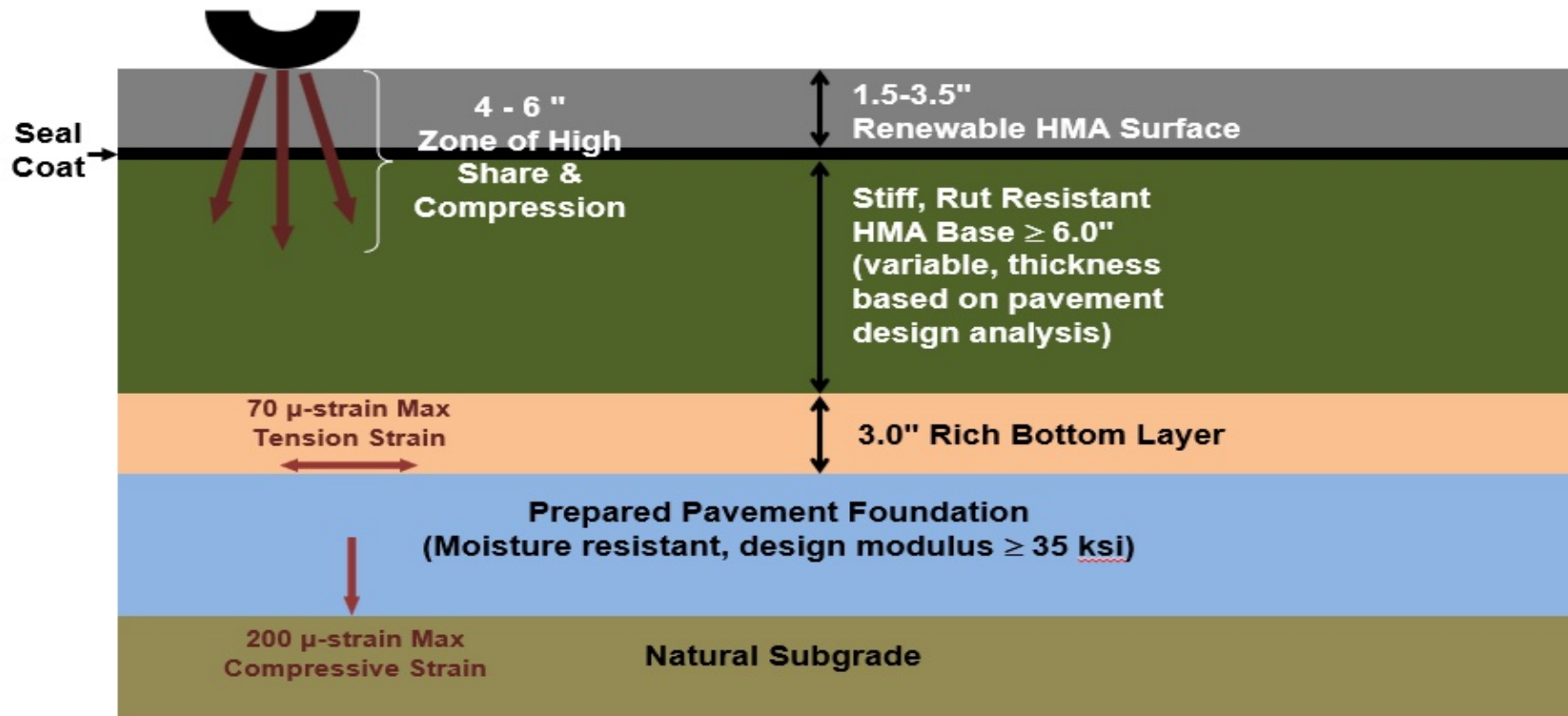


□ Texas In-Service PP Sections



#	HWY	District (County)	Length (mile)	Construction Year	Age (Yrs)
1	IH 35	Laredo (Webb)	6.00	2008	18
2	IH 35	Laredo (La Salle)	4.00	2005	21
3	IH 35		7.36	2003	23
4	IH 35		5.44	2004	22
5	IH 35	San Antonio (Comal)	1.74	2005	21
6	IH 35		1.30	2006	20
7	IH 35	Waco (McLennan)	2.20	2003	23
8	IH 35	Waco (Hill)	3.25	2008	18
9	SH 114	Fort Worth (Wise)	2.20	2006	20
10	SH 114		1.74	2006	20
AVG.			3.50	2005	20.6

□ Generalized PP Design Concept



INDEX OF SHEETS
SEE SHEET NO. 2

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT FEDERAL AID PROJECT

IM 35-2 (297)
CSJ: 0018-01-063

NET LENGTH OF ROADWAY = 38,374.3 ft. (7.268 mi.)
NET LENGTH OF BRIDGES = 590.42 ft. (0.111 mi.)
NET LENGTH OF PROJECT = 38,866.3 ft. (7.365 mi.)

LA SALLE COUNTY
I.H. 35

FROM: 1.971 MILES NORTH OF F.M. 133
TO: 7.365 MILE NORTH

FOR THE CONSTRUCTION OF REHABILITATION OF A FREEWAY FACILITY CONSISTING OF
EXCAVATION, LIME TREAT SUBGRADE, ACP BASE, ACP SURFACE & PAVEMENT MARKINGS.

STATE	STATE	COUNTY
TEXAS	22	LA SALLE
0018	01	063

DESIGN SPEED: 70 MPH

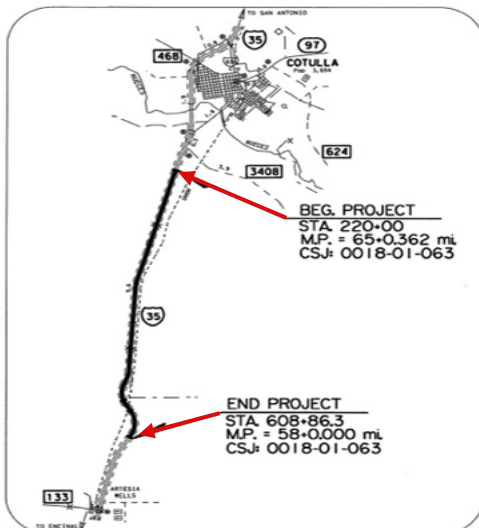
A.D.T. 2001: 12,400

2021: 23,100

FINAL PLANS

Letting Date : _____
Date Contractor Began Work : _____
Date Work was Completed and Accepted : _____
Contractor : _____
TOTAL Contract Cost : _____

Scale = 1" = 2 mile



BEG. PROJECT
STA 220+00
M.P. = 65+0.362 mi.
CSJ: 0018-01-063

END PROJECT
STA 608+86.3
M.P. = 58+0.000 mi.
CSJ: 0018-01-063

EQUATION: 360+23.685 BK + 360+18.359 AND
EXCEPTIONS: IH-35 OVER-CROSSING AT STA 3401 STA. 339+35 TO STA. 340+65 + 130'
IH-35 OVER-CROSSING AT M.P. R.R. STA. 564+05 TO STA. 567+87 + 382'
NO RAILROADS

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SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF
TRANSPORTATION, MARCH 1, 1993 AND SPECIFICATION ITEMS
LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT
CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION
CONTRACTS (FORM FHWA 1273, DECEMBER 1993).

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 3/14/01
RECOMMENDED FOR LETTING: 3/31/01
DIRECTOR OF TRANSPORTATION
PLANNING & DEVELOPMENT
RECOMMENDED FOR LETTING: 3/31/01
DISTRICT ENGINEER

APPROVED FOR LETTING: 3/14/01
DIRECTOR DESIGN DIVISION

INDEX OF SHEETS

SEE SHEET NO. 2

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT FEDERAL AID PROJECT

IM 35-2 (301)
CSJ: 0017-08-067

NET LENGTH OF ROADWAY = 23,450.32 ft. (4.441 mi.)
NET LENGTH OF BRIDGES = 500.00 ft. (0.095 mi.)
NET LENGTH OF PROJECT = 23,950.32 ft. (4.536 mi.)

LA SALLE COUNTY
I.H. 35

FROM: 0.60 MILES NORTH OF GARDENDALE
TO: 1.67 MILES NORTH OF F.M. 468

FOR THE CONSTRUCTION OF REHABILITATION OF A FREEWAY FACILITY CONSISTING OF
EXCAVATION, LIME TREAT SUBGRADE, ACP BASE, PLANNING, ACP SURFACE & PAVEMENT MARKINGS.

STATE	6	IM 35-2 (301)	1
STATE	22	LA SALLE	
COUNTY	0017	08	067

DESIGN SPEED: 70 MPH
A.D.T. 2002: 6,600
2022: 11,200

FINAL PLANS

Letting Date : _____
Date Contractor Began Work : _____
Date Work was Completed and Accepted : _____
Contractor : _____
TOTAL Contract Cost : _____

Scale = 1" = 2 mile



BEG. PROJECT
STA. 446+00.00
M.P. = 74+0.003 mi.
CSJ: 0017-08-067

END PROJECT
STA. 686+34.32
M.P. = 69+0.439 mi.
CSJ: 0017-08-067



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JOSE LUIS FRANCO III,
P.E. 86247, on
1/23, 2002

J.L.F. III, P.E.

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, MARCH 1, 1993 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT:
CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, DECEMBER 1993).

TEXAS DEPARTMENT OF TRANSPORTATION
SUBMITTED FOR LETTING: 1-23-02
RECOMMENDED FOR LETTING: 1-26-02
FOR AREA ENGINEER: *John E. Saraca*
FOR DIRECTOR OF TRANSPORTATION PLANNING & DEVELOPMENT: *John E. Saraca*
RECOMMENDED FOR LETTING: 1-26-02
APPROVED FOR LETTING: 1-25-02
FOR DISTRICT ENGINEER: *John E. Saraca*
FOR DIRECTOR DESIGN DIVISION: *John E. Saraca*

INDEX OF SHEETS
SEE SHEET NO. 2

STATE OF TEXAS DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED STATE HIGHWAY IMPROVEMENT FEDERAL AID PROJECT

IMD 35-1(73)

CSJ: 0018-02-049

NET LENGTH OF ROADWAY = 21,120.00 ft. (4.000 mi.)
NET LENGTH OF BRIDGES = 0.00 ft. (0.000 mi.)
NET LENGTH OF PROJECT = 21,120.00 ft. (4.000 mi.)

LA SALLE COUNTY

I.H. 35

FROM: 2.6 MILES SOUTH OF F.M. 133 AT ARTESIA WELLS
TO: 6.6 MILES SOUTH OF F.M. 133 AT ARTESIA WELLS

FOR THE CONSTRUCTION OF REHABILITATION OF A FREEWAY FACILITY CONSISTING OF
EXCAVATION, CEMENT TREAT EXISTING MATERIAL, ACP BASE, PLANNING, ACP SURFACE & PAVEMENT MARKINGS.

STATE	FED. AID PROJ. NO.	SECTION
6	IMD 35-1 (73)	1
STATE	FED. AID PROJ. NO.	SECTION
TEXAS	22	LA SALLE
DATE	REV.	BY
0018	02	049

DESIGN SPEED: 70 MPH
A. D. T. 2004: 12,830
2024: 22,130

FINAL PLANS

Letting Date : _____
Date Contractor Began Work : _____
Date Work was Completed and Accepted : _____
Contractor : _____
TOTAL Contract Cost : _____



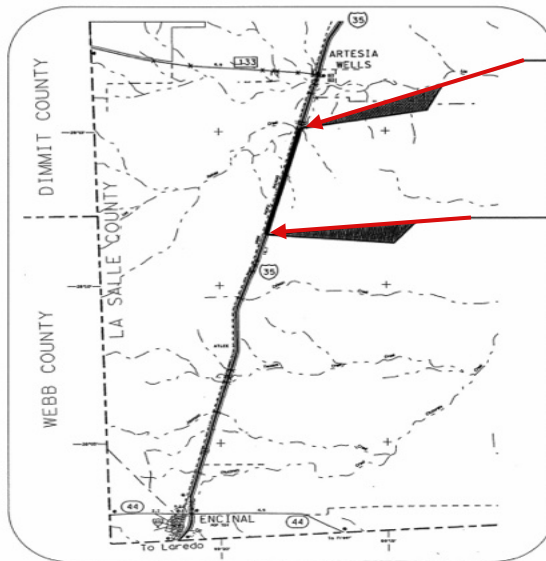
The seal appearing on this document was

EXCEPTIONS: NORTHBOUND LANE ONLY
ROADWAY STA. 977+48 - STA. 924+85 = 5263'
M.P. = 51+0.000 - M.P. = 52+0.000

authorized by
JOSE LUIS FRANCO III,
P.E. 86247, on

2/4 2004
J. L. Franco III, P.E.

Scale = 1" = 4 mile



BEG. PROJECT
STA. 850+00.00
R.M. = 53+0.427 mi.
CSJ: 0018-02-049

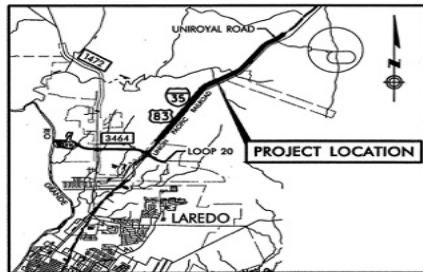
END PROJECT
STA. 1061+20.00
R.M. = 49+0.431 mi.
CSJ: 0018-02-049

TEXAS DEPARTMENT OF TRANSPORTATION

SUBMITTED FOR LETTING: 2-6-2004
RECOMMENDED FOR LETTING: 2-25-2004
John C. Davis, P.E.
DIRECTOR OF TRANSPORTATION
PLANNING & DEVELOPMENT

APPROVED FOR LETTING: [Signature]
DIRECTOR DESIGN DIVISION

STATE OF TEXAS
TEXAS DEPARTMENT OF TRANSPORTATION
PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT



VICINITY MAP
NTS

0018-06-147 IH 35	0018-05-062 IH 35	0018-06-148 TRES EQUIS BLVD	0018-05-063 CARRIER DRIVE	TOTAL
ROADWAY = 16,674.00 FT	10,880.00 FT	2400.00 FT	1700.00 FT	31,854.12 FT = 5.94 MI
BRIDGE = 71.00 FT	176.92 FT	0.00 FT	0.00 FT	247.92 FT = 0.046 MI
TOTAL LENGTH = 16,745.00 FT	10,993.12 FT	2400.00 FT	1700.00 FT	31,838.12 FT = 6.030 MI

WEBB COUNTY

IH 35

FOR THE CONSTRUCTION OF THE WIDENING OF A FREEWAY FACILITY
AND CONSTRUCTION OF INTERCHANGE FACILITIES CONSISTING OF
PAVEMENT, GRADING, DRAINAGE, SIGNING, PAVEMENT MARKING,
ILLUMINATION, SW3P, TRAFFIC MANAGEMENT, AND STRUCTURES.

LIMITS (IH 35) : FROM 0.25 MI NORTH OF THE MILO (LOOP 20/IH 35)
INTERCHANGE TO 0.50 MI NORTH OF UNIROYAL RD

BEGIN PROJECT
STA 144+55.00
CSJ: 0018-06-147 (BEGIN)
REF MARKER: 7+0.868
PROJECT NUM: NH 2002 (79)
X = 662,611.1840
Y = 17,112,792.9210

CSJ: 0018-06-147 (BEGIN EXCEPTION)
STA 186+00.00
CSJ: 0018-06-148 (BEGIN)
REF MARKER: 8+0.5591
PROJECT NUM: NH 2002 (79)

CSJ: 0018-06-148 (END)
STA 210+00.00
CSJ: 0018-06-147 (BEGIN EXCEPTION)
REF MARKER: 9+0.023
PROJECT NUM: NH 2002 (79)

CSJ: 0018-06-147 (END)
STA 336+00.00
CSJ: 0018-05-062 (BEGIN)
REF MARKER: 11+0.403
PROJECT NUM: NH 2002 (79)

CCSJ: 0018-05-062 (BEGIN EXCEPTION)
STA 399+00.00
CSJ: 0018-05-063 (BEGIN)
REF MARKER: 12+0.588
PROJECT NUM: NH 2002 (79)

LAYOUT SCALE: 1"=3000'
RAILROAD CROSSINGS: NONE
WORK EXCEPTIONS:

CSJ: 0018-06-147
STA 186+00 (BEGIN EXCEPTION)
STA 210+00 (END EXCEPTION)

CSJ: 0018-05-062
STA 399+00 (BEGIN EXCEPTION)
STA 416+00 (END EXCEPTION)

EQUATIONS:
NB FRGT RD STA 285+61.08(BACK)=286+11.88(AHEAD)
NB FRGT RD STA 422+31.78(BACK)=421+75.09(AHEAD)
SB FRGT RD STA 286+06.33(BACK)=285+66.70(AHEAD)
SB FRGT RD STA 428+22.60(BACK)=428+57.48(AHEAD)

CSJ: 0018-05-063 (END)
STA 416+00.00
CCSJ: 0018-05-062 (END EXCEPTION)
REF MARKER: 12+0.910
PROJECT NUM: NH 2002 (79)

FINAL PLANS

LETTING DATE :
WORK BEGIN :
DATE ACCEPTED :
CONTRACTOR :
TOTAL COST :

DESIGN SPEED:

MAINLANES
FRONTAGE ROADS
RAMPS
TRES EQUIS BLVD
CARRIER DRIVE

IH 35	YEAR
MAIN LANES	2001
FRONTAGE ROADS	2002
	2022

END PROJECT

STA 462+93.12
CCSJ: 0018-05-062 (END)
REF MARKER: 13+0.828
PROJECT NUM: NH 2002 (79)
X = 673,962.3230
Y = 17,141,919.2930

COUNTY: WEBB PROJ. NO.:
HWY. NO.: IH 35 LETTING DATE:
DATE ACCEPTED:

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SPECIFICATIONS ADOPTED BY THE TEXAS
DEPARTMENT OF TRANSPORTATION MARCH 1, 1993
AND SPECIFICATION ITEMS LISTED AND DATED AS
FOLLOWS, SHALL GOVERN ON THIS PROJECT: REQUIRED
CONTRACT PROVISIONS FOR ALL FEDERAL-AID
CONSTRUCTION CONTRACTS (FORM FHWA 1273).

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SUBMITTED
FOR LETTING
5/1/03
AREA ENGINEER
Rene Garcia, P.E.

RECOMMENDED
FOR LETTING
5/1/03
DIRECTOR OF TRANSPORTATION
PLANNING AND DEVELOPMENT
Rene Garcia, P.E.

RECOMMENDED
FOR LETTING
5/1/03
DIRECTOR OF TRANSPORTATION OPERATIONS
for Rene Garcia, P.E.

RECOMMENDED
FOR LETTING
05-02-03
DISTRICT ENGINEER

APPROVED
FOR LETTING
6-24-03
DIRECTOR OF DESIGN DIVISION
Rene Garcia, P.E.

Traffic Design Data

CSJ	TRM Location		ADT Beginning	ADT End	New ADT	ADT End
	<i>Begin</i>	<i>End</i>				
0018-01-063	58+00	65+0.362	<u>2001</u> 12,400	<u>2021</u> 23,100		
0017-08-067	69+0.439	74+0.0034	<u>2002</u> 6,600	<u>2022</u> 11,200		
0018-02-049	49+0.431	53+0.0427	<u>2004</u> 12,830	<u>2024</u> 22,130		
0018-05-062	8+0.403	13+0.828	<u>2001</u> 18,900	<u>2021</u> 34,800	<u>2022</u> 35,838	<u>2042</u> 94,823

2004 to 2024 20 year 18 kips +/- 30 million

2026 to 2046 20 year 18 kips 81 million (pWIM)

Current sections have carried more than their design traffic



IH-35 Pavement Structure



September 25, 2026



← **3"- ¾ Stone Matrix Asphalt PG 76-22**

← **4"- 1" Stone Filled PG 70-22**

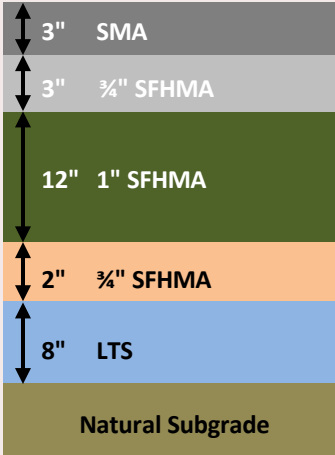
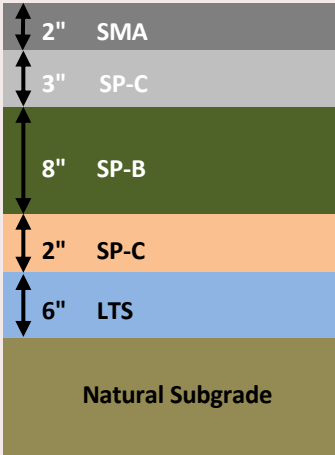
← **4"- 1" Stone Filled PG 70-22**

← **2"- ½" Superpave PG 64-22**

← **8" – Lime Treated Subgrade
(3%)**

FPS 23 TxME Design: Example 1

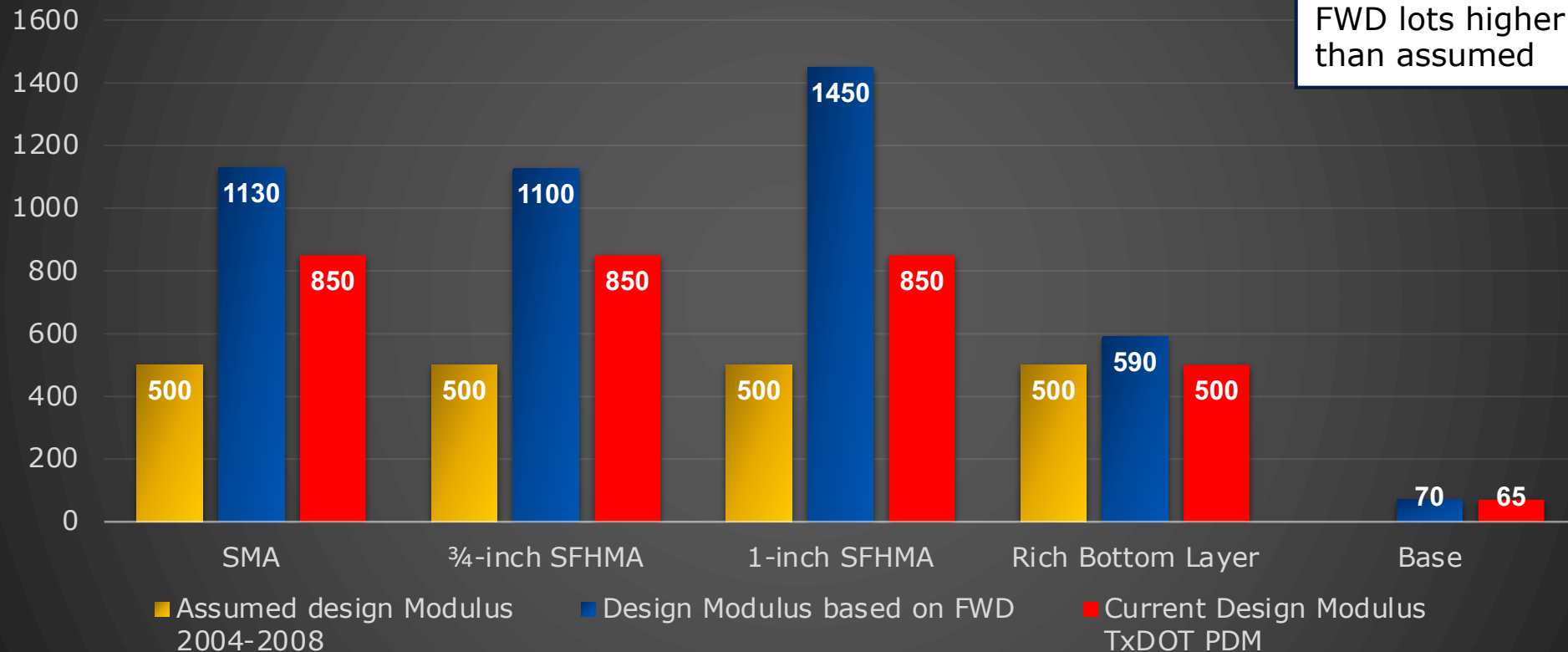
□ IH 35 LRD: Old vs. New Designs

Input	Old Design (Current PVMNT)	New Design (Thinner PVMNT)
Material properties	Obtained from Texas flexible pavement database (0-6856)	
Traffic	Load spectra (Level 1) from TxDOT WIM station (W531): 65 million 20yr ESALs	
Climate	Weather station: Cotulla, TX	
Structure	 3" SMA 3" $\frac{3}{4}$" SFHMA 12" 1" SFHMA 2" $\frac{3}{4}$" SFHMA 8" LTS Natural Subgrade	 2" SMA 3" SP-C 8" SP-B 2" SP-C 6" LTS Natural Subgrade

Hot Mix Asphalt Modulus

HMA Type

Calculated modulus from FWD lots higher than assumed

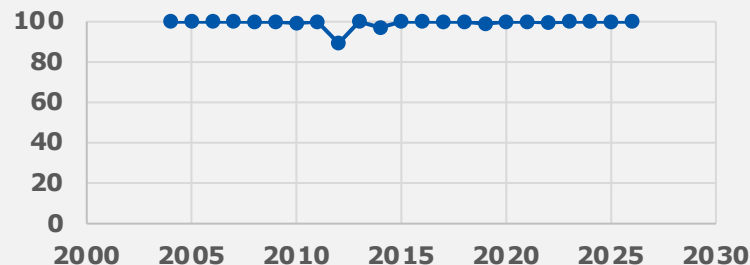


Laredo Perpetual Pavement 1 0018-01-063

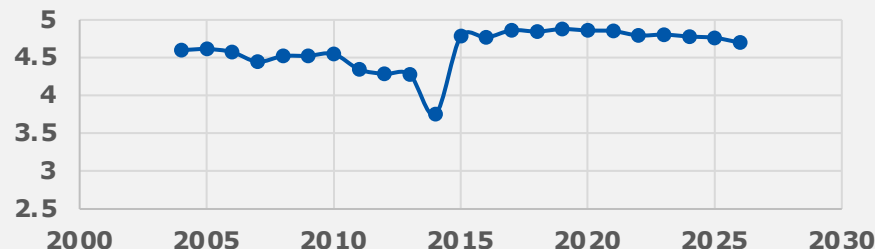


Let Date & Built	2001 -2004
Maintenance CSJ	0018-01-074 (2012)
Type of Mix	2" D-GR Ty-C
Current Score	2026 100 (Range 0-100)
Current Ride	2026 4.7 (Range 0 – 5)

Condition



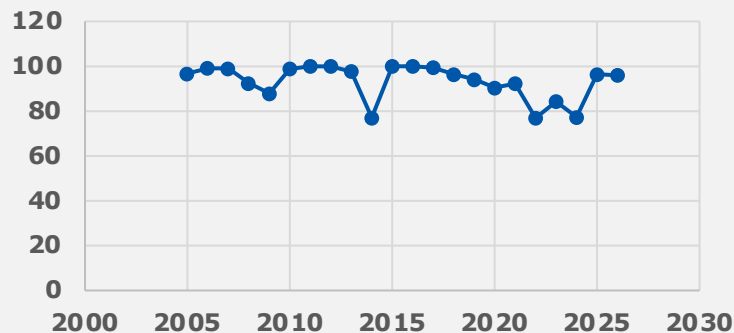
Ride



Laredo Perpetual Pavement 2 CSJ 0017-08-067

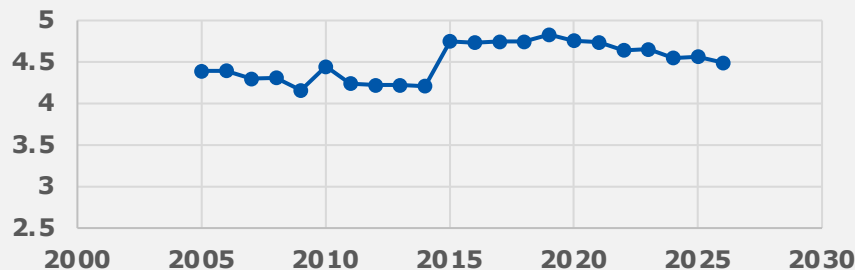


Condition



Let Date & Built	2002 - 2004
Maintenance CSJ	0018-01-074 (2012)
Type of Mix	2" D-GR Ty-C
Current Score	2026 96 (Range 0-100)
Current Ride	2026 4.5 (Range 0 – 5)

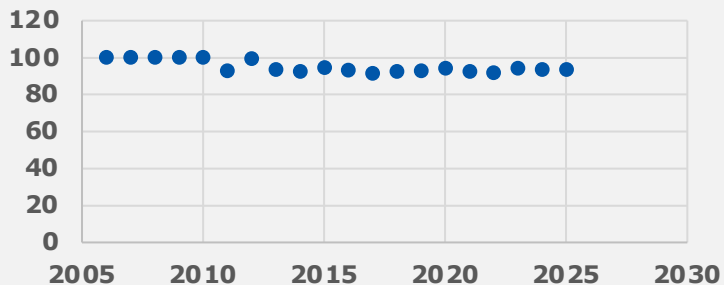
Ride



Laredo Perpetual Pavement 3 CSJ 0018-02-049

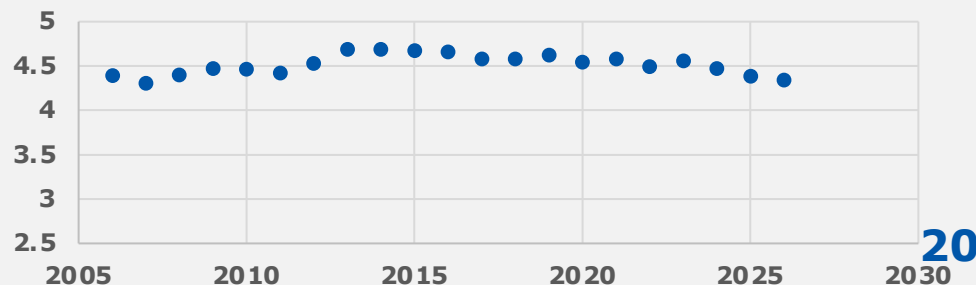


Condition



Let Date & Built	2004 - 2007
Maintenance CSJ	0018-02-077 (2015)
Type of Mix	TOM Ty-C PG 76-22
Current Score	2026 94 (Range 0-100)
Current Ride	2026 4.3 (Range 0 – 5)

Ride



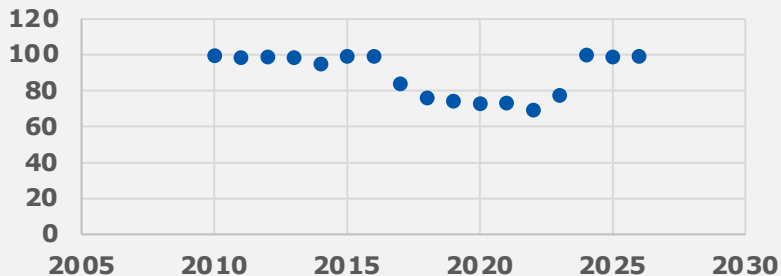
Laredo Perpetual Pavement 4 CSJ 0018-05-062

Current Condition

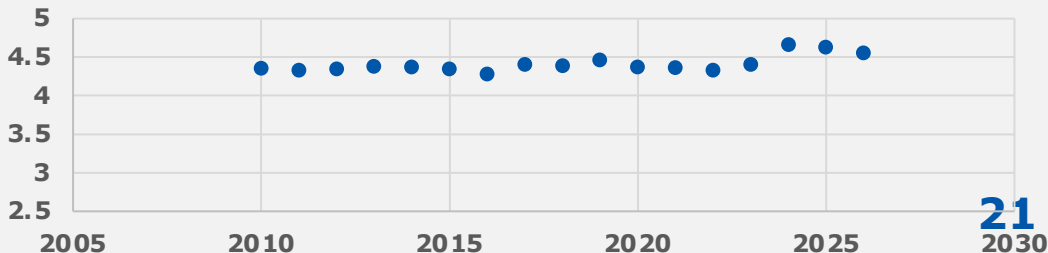


Let Date & Built	2003-2008
Maintenance CSJ	0018-05-105 (2022)
Type of Mix	3 inches of SMA TY-C 76-22
Current Score	2026 99 (Range 0-100)
Current Ride	2026 4.5 (Range 0 – 5)

Condition score

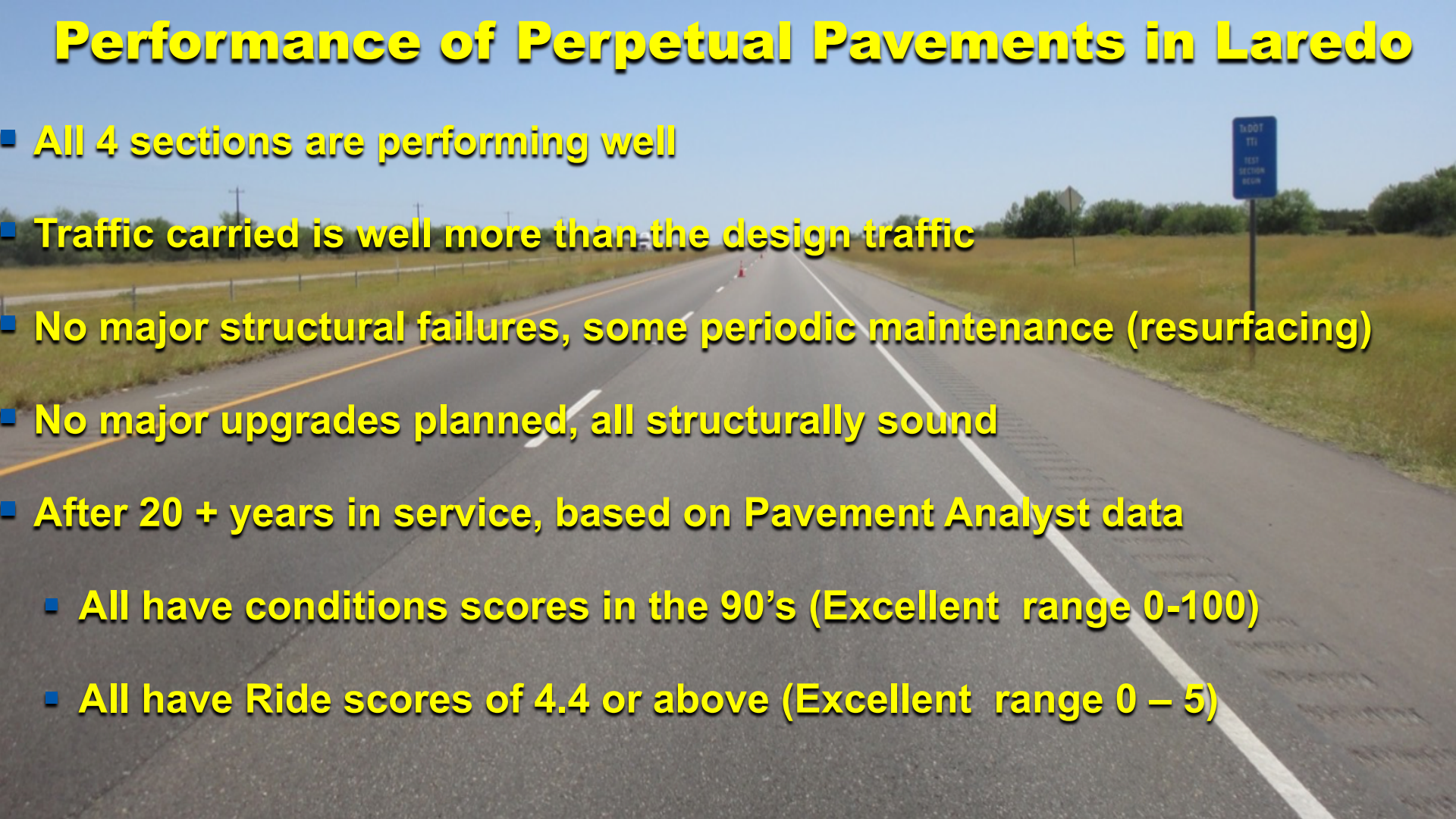


Ride Score

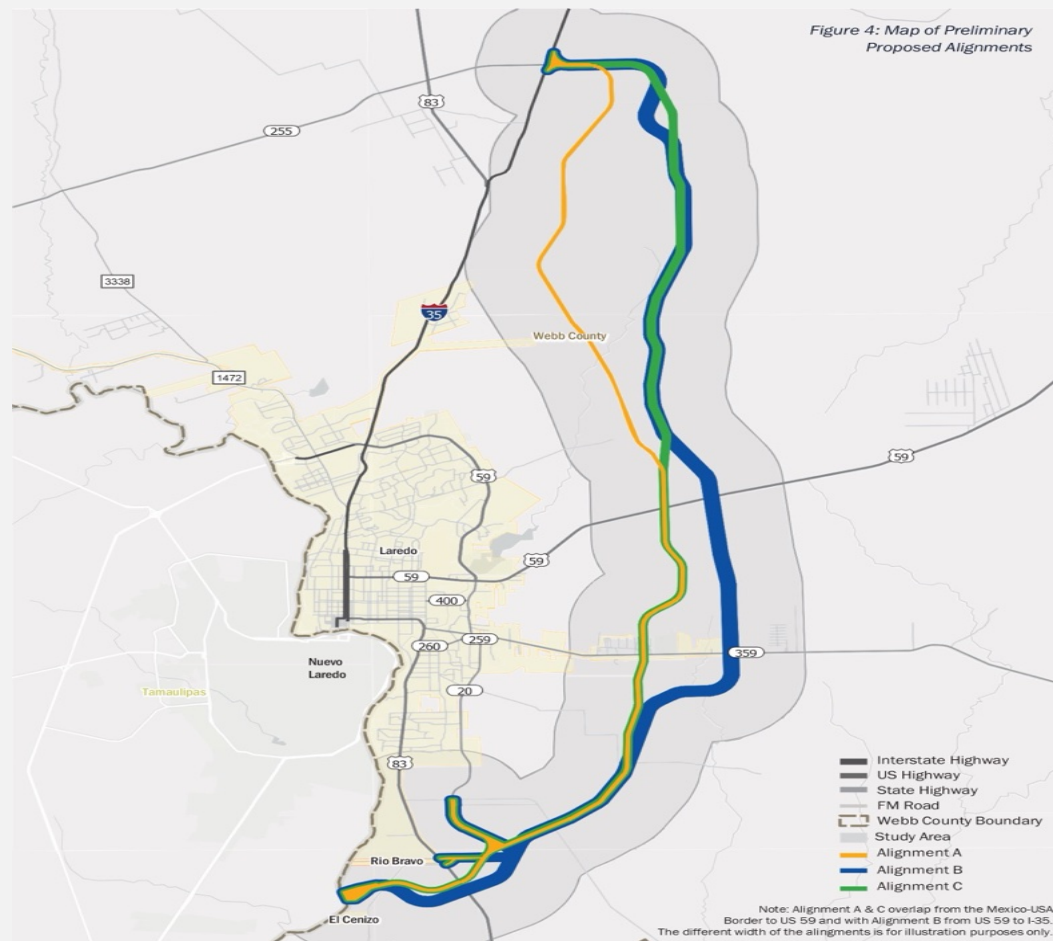


Performance of Perpetual Pavements in Laredo

- All 4 sections are performing well
- Traffic carried is well more than the design traffic
- No major structural failures, some periodic maintenance (resurfacing)
- No major upgrades planned, all structurally sound
- After 20 + years in service, based on Pavement Analyst data
 - All have conditions scores in the 90's (Excellent range 0-100)
 - All have Ride scores of 4.4 or above (Excellent range 0 – 5)



Future Outer Loop



HPG Binder Research

- 2 test sections were placed in Laredo on IH 35
 - Anderson Columbia
 - Texas Materials
- Both sections are performing well, CTR is continuing with testing.
- Proposing HPG for Border Control Station
 - Working with TTI on design to replace top 6 inches

- **Perpetual Pavements** are ideal for scenarios where we have very high functional and structural demands and it's been proven that it has an excellent performance.
- **HPG** provides the same philosophy as the perpetual pavements such as resistance to bottom-up fatigue cracking, durable to heavy traffic and environmental effects and no significant structural rehabilitation.
- This initiative focuses on designing pavements that can withstand heavy structural demands and minimize the need for frequent maintenance closures on critical roadway segments.

Future Flexible Pavement Challenges for the Laredo District

- Application of HPG Binder on Traffic at Border Crossings and Passport Control (IH 35)
- Future Outer Loop – Consider New Perpetual Pavement

Questions?

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