

Change Order #6 Dicker Road

Owner: Hidalgo County Precinct #2

To: Earthworks Enterprise, LLC
PO Box 595
Penitas, Texas 78576

From: B2Z Engineering

Project: Dicker Road
Project #: STP 1902 (383) MM
Contract: C-19-017-11-05
CSJ: 0921-02-312
Limits: Spur 115 (23rd Street) to FM 2061 (Jackson Road)

Change Order #6 has been approved to make the following contract changes:

Description:

Change Order #6 includes two pavement re-evaluations performed by TEDSI to modify the final pavement and the temporary detour pavement design. It includes plan and quantity modifications for missing items and quantity adjustment for errors within the plans. It also includes an item to modify the Item 341 asphalt bonus and penalties.

Hot Mix Asphalt Ty "B"

The project manages the local traffic and heavy-duty semi-truck traffic coming and going from the Hidalgo Port of Entry. To meet the traffic demands, the pavement was designed to use a four layer system; including 3" of Ty "D" asphalt - a smooth riding surface layer, 4 ½" of Ty "B" asphalt - a heavy-duty base layer, 11" of flex base (Ty E Gr 4)(caliche), and 12" of lime treated subgrade.

Hidalgo County Precinct #2 requested that TEDSI reanalyze the design for a possible valued engineering opportunity, to determine if the asphalt thickness was oversized. TEDSI, the Engineer of Record, verified that 4" of Ty "B" asphalt will manage the same loading and life expectancy requirement as the 4 ½" of asphalt. CO #6 will remove 2,227 tons of Ty "B" asphalt, reducing the plan quantity to 21,875 tons. See Attachment A for details.

The first part of the road was constructed as originally designed between Station 11+11 to 46+88. The remaining roadway will be reconstructed according to CO #6 between Sta 46+88 to 144+93, removing the ½" of Ty "B" asphalt. See Table A for details.

Detour Item: replace limestone with caliche

The project was designed with a temporary detour widening the length of the project to reconstruct Dicker Road in three phases. It was unusual that the detour was designed with a flex base (Ty A, Gr1) (limestone), when the final roadway used a different base (Ty E Gr 4) (caliche), which is a locally produced material. Hidalgo County Precinct #2 request for TEDSI to modify the base material and reanalyze the detour design for another valued engineering opportunity. The locally

produced material (caliche) reduces the detour item price from \$44.31/Sy to \$38.34/Sy. See Table A & Attachment B for details.

TEDSI (Engineer of Record): Pavement Re-Evaluations

TEDSI performed the two pavement evaluations above to justify changes in the hot mix thickness and to use a locally produced base material in the detour item. TEDSI used TxDOT's FPS21, a Computerized Flexible Pavement Program to justify the material change. See Attachment C for details.

Plans, Missing Items and Quantity - SGT, MBGF, Wingwalls and Concrete Railing

This change order also includes one missing item for payment and a few quantity error adjustments.

Missing Item: Add 2 each, Single Guardrail Terminals (SGT's):

The plans did not include an item to install two single guardrail terminals (SGT's) at the Floodway Bridge (Sta 131+00) approaches. The contractor provided a price that is reasonable and compares well with the TxDOT's average low bid prices attached. SGT's will be added to the estimate. See attachment D & E for details.

Quantity Error Adjustments:

- Deduct 100 feet, "Metal Beam Guard Fence" (MBGF) - Replaced by the 2 SGT's above.
- Add 4 each, "Remove Structure, Wingwalls" at the same Sta 131+00. Plan sheet #**311a** was modified to include the changes.
- Add 80 feet, "Remove Concrete (Rail)" at Sta 88+00 and Sta 131+00. Plan sheets #**309a** & **311a** were modified to include the changes.

Item 341 - Asphalt Bonus and Penalties

- The County and Contractor have negotiated to exempt the production and placement bonus/penalties for items 341-6008 (Hot Mix Asphalt Ty B) and 341-6047 (Hot Mix Asphalt Ty D). This relieves the Contractor of the production and placement testing requirements and establishes a bonus and penalty pay factor of 1.000 for each. All other specification requirements apply, and acceptance tests will be performed when 100 tons or more are produced per day. The contractor still produces, hauls, places, and compacts the mixture in compliance with the specification, and control the mixture production within $\pm 1.0\%$ of target laboratory-molded density.

Item 305 – Salvage, Haul, Stockpile Reclaimed Asphalt Pavement

- Change Orders 1 - 6 introduced a large cost savings for the County but have subsequently introduced negative impacts to the Contractor's schedule of work and anticipated construction profits. The Contractor's protests were not unreasonable, and both the County and Contractor mutually agreed to negotiate a small amount of asphalt millings to the contractor, (14,539sy) to offset shortfalls.

Purpose:

The Hidalgo County Precinct #2 Office identified several cost saving opportunities, and a few plan errors that require plan and quantity modifications for payment and processing. The work described in this Change Order is active and awaiting approval to incorporate the changes into our plans.

Change Order #6 has been reviewed and signed by the Contractor and AE.

The County has reviewed Change Order #6 and agrees to incorporate all the changes listed herein. Most of these changes were identified during construction, and do not impact the construction progress at this time, except for payment. The changes do not impact the original environmental assessment, do not impact TDLR elements, do not impact wetlands, and do not impact waters of the US, archeological, historical or social issues; endangered species or any other regulated areas within the project. This change order does not cause a disturbance that would require modification to the Construction Site Notice (CSN) or Notice of Intent (NOI).

B2Z has reviewed Change Order #6 with Hidalgo County Precinct #2, explained the breakdown of items and amounts according to the governing Specification 1L-9L. See TxDOT Change Order Form 2146-L used to describe bid item changes and cost changes. Revised plan sheets include 6A, 7A, 8A, 9A, 13a, 28A, 29A, 309a, 311a.

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIME:
Original Contract Price <u>\$16,519,063.02</u>	Original Contract Time <u>460 working Days</u>
Previous Change Orders <u>-\$224,303.84</u>	Previous Change Orders 0 Working Days

Contract Price prior to this Change Order <u>\$16,294,759.18</u>	Contract Time prior to this Change Order <u>460 Working Days</u>
Net increase/decrease of the Change Order <u>-\$202,896.89</u>	Net increase/decrease of the Change Order <u>0 Working Days</u>
Contract Price with all approved Change Orders <u>\$16,091,862.29</u>	Contract Time with all approved Change Orders <u>460 Working Days</u>

CONSTRUCTION CONTRACT CHANGE ORDER NUMBER: 6

1. CONTRACTOR: Earthworks Enterprise, LLC
2. Change Order Work Limits: Sta. 46+88 to Sta. 144+93
3. Type of Change (on federal-aid non-exempt projects): Minor (Major/Minor)
4. Describe the change and the reason for the change order. When necessary, include exceptions to this agreement.

1.) Reduce Ty B asphalt thickness from 4.5" to 4" - using FPS21 flex pavement program to verify changes 2.) Detour item, replace the base material with 11" caliche - using FPS21 to verify changes 3.) Missing Item - Add 2 SGT, single guardrail end treatment - New item & price 4.) Plan error - Remove 100ft MBGF - decrease quantity 5.) Plan Error - Remove Str (Wingwall) - increase quantity, add 4 total 6.) Plan error - Remove Conc (Rail) - increase quantity, add 80Lf

CCSJ: 0921-02-312

Project: STP 1902(383)MM

Highway: Dicker Road

County: Hidalgo

District: Pharr

Contract Number: C-19-017-11-05

5. New or revised plan sheet(s) are attached and numbered: 6A, 7A, 8A, 9A, 13a, 28A, 29A, 309a, 311a

Each signatory hereby warrants that each has the authority to execute this Change Order.

<p>By signing this change order, the contractor agrees to waive any and all claims for additional compensation due to any and all other expenses; additional changes for time, overhead and profit; or loss of compensation as a result of this change. Further, the contractor agrees that this agreement is made in accordance with Item 4 and the Contract. Exceptions should be noted in the response for #5 above.</p>	<p>The following information must be provided</p> <p>Time Ext. #: <u>0</u> Days added on this C.O.: <u>0</u></p> <p>Amt. added by this change order: <u>-\$202,896.89</u></p>
<p>THE CONTRACTOR Date <u>6-9-2020</u></p> <p>By <u>[Signature]</u></p> <p>Typed/Printed Name <u>Humberto Garcia Jr.</u></p> <p>Typed/Printed Title _____</p>	<p>For TxDOT use only:</p> <p>Days participating: _____</p> <p>Amount participating: _____</p> <p>Signature _____ Date _____</p> <p>Name/Title _____</p>

RECOMMENDED FOR EXECUTION:

[Signature] 6/9/2020
Name/Title _____ Date _____

Name/Title _____ Date _____
 APPROVED REQUEST APPROVAL

Name/Title _____ Date _____

Name/Title _____ Date _____
 APPROVED REQUEST APPROVAL

Name/Title _____ Date _____

Name/Title _____ Date _____
 APPROVED REQUEST APPROVAL

Name/Title _____ Date _____

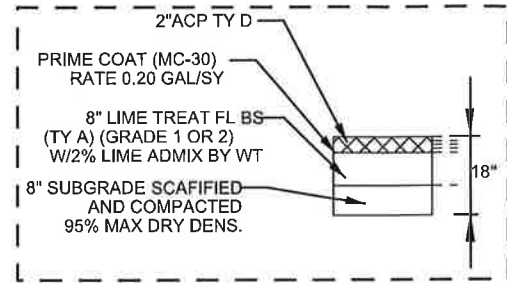
Name/Title _____ Date _____
 APPROVED

Engineer's Seal:



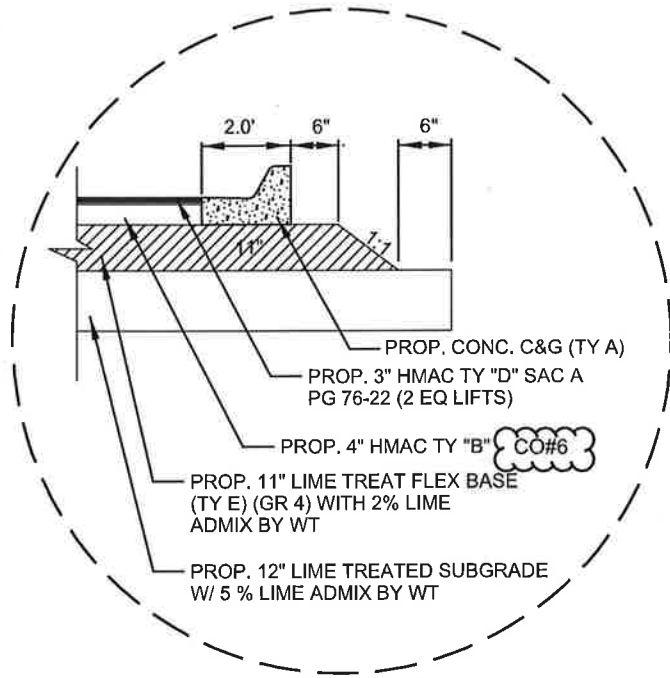
LEGEND:

- ① PROPOSED 1.5" HMAC TY "D" (SURFACE COURSE)
- ② PROPOSED 1.5" HMAC TY "D" (COURSE)
- ③ PROPOSED 4" TY "B" HMAC (BASE COURSE) **CO#6**
- ④ PROPOSED PRIME COAT (MC-30)
- ⑤ PROPOSED 11" LIME TREAT FLEXIBLE BASE (TY "E") (GR 4) W/ 2% LIME ADMIX BY WT (2 EQ LIFTS). TOP 4" SHALL BE NEW BASE.
- ⑥ PROPOSED 12" LIME TREATED SUBGRADE W/ 5% LIME ADMIX BY WT



CUT & RESTORE DETAIL (PAVEM STRUCT)

N.T.S.
(TO BE PAID UNDER ITEM 400 CUT & RESTORE ASPH PAV)

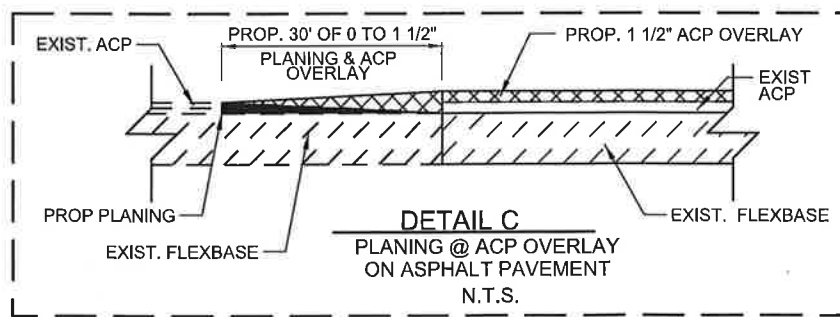


DETAIL A

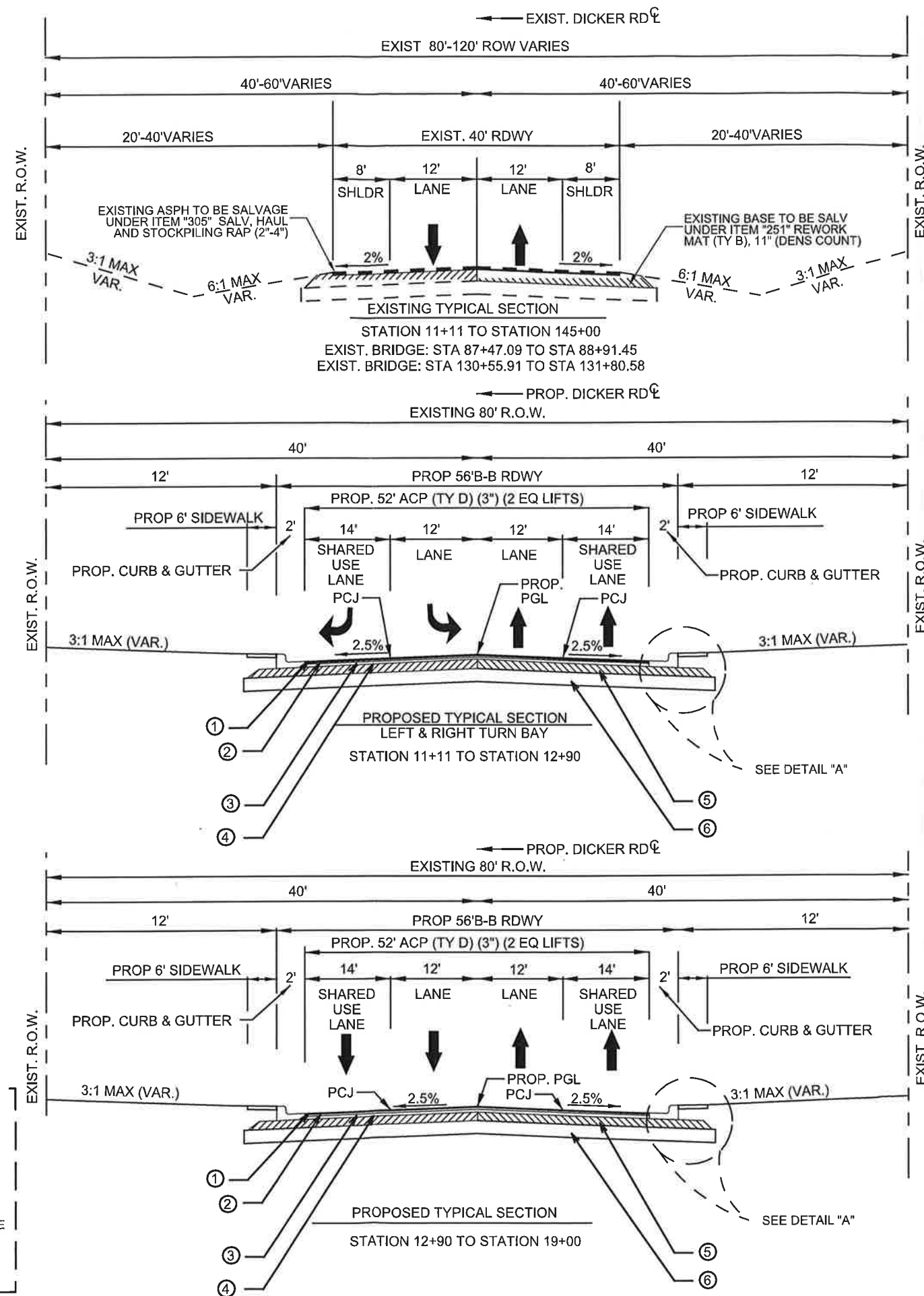
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NOTE:

PAVEMENT DESIGN AS PER GEOTECHNICAL ENGINEERING REPORT PREPARED BY RABA KISTNER CONSULTANT (PROJECT No: AMA12-046-00) DATED 10/02/2014 UNDER DIRECTION OF KATRIN M. LEONARD, P.E. # 95810



DETAIL C
PLANING @ ACP OVERLAY ON ASPHALT PAVEMENT
N.T.S.



GENERAL NOTES

- PCJ - DENOTES PERMISSIBLE CONSTRUCTION JOINT
- PGL - DENOTES PROFILE GRADE LINE
- WHERE POSSIBLE AND UNLESS OTHERWISE DIRECTED BY THE ENGINEER, PERMISSIBLE CONSTRUCTION JOINTS SHALL FALL ON STRIPING LINES AS SHOWN ON STRIPING DETAILS.
- WHERE REQUIRED BY FIXTURES OR UNUSUAL CONDITIONS THE GOVERNING SLOPES MAY BE VARIED WHEN SPECIFICALLY DIRECTED BY THE ENGINEER.
- THE SUBGRADE SHALL BE SHAPED, BLADED, ROLLED AND PROOF ROLLED A MINIMUM DISTANCE OF 24" BEYOND THE EDGE OF THE PROPOSED BASE COURSE.
- CHECK FOR PUMPING OR OTHER IRREGULARITIES IN SUBGRADE. IF UNSUITABLE MATERIAL IS FOUND REMOVE AND FILL WITH SUITABLE MATERIAL AND RECOMPACT.
- A STATION EQUALS 100 FT.
- 114 LBS /SY IS EQUIVALENT TO 1" OF ACP
- PRIME COAT - 0.2 GAL/SY (APPROX)
- FLEXIBLE BASE WT - 3375 Lb/CY (APPROX)
- SUBGRADE WT - 2970 Lb/CY
- ALL GRADING SHALL BE WITHIN THE R.O.W. LIMITS
- ANY DAMAGE TO EXIST. CROSS CULVERTS OR IRRIGATION CROSSING SHALL BE REPAIRED AT THE CONTRACTOR EXPENSE.

**CO#6 - PERMANENT PAVEMENT
MODIFY TY "B" HMAC TO 4" AND LTFB TO 11"**



Eric R. Dietrich

ERIC R. DIETRICH, P.E. 4-24-2020



**The County of Hidalgo
Pct 2**



Texas Department of Transportation



DICKER ROAD

**EXISTING AND PROPOSED
TYPICAL SECTIONS**

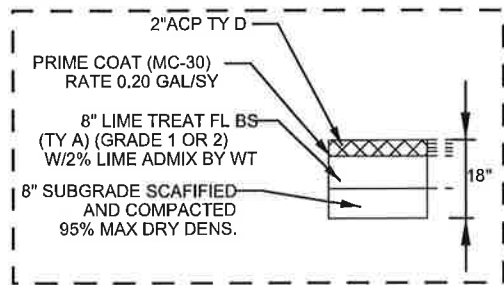
N.T.S. SHEET 1 OF 4

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06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	6-A

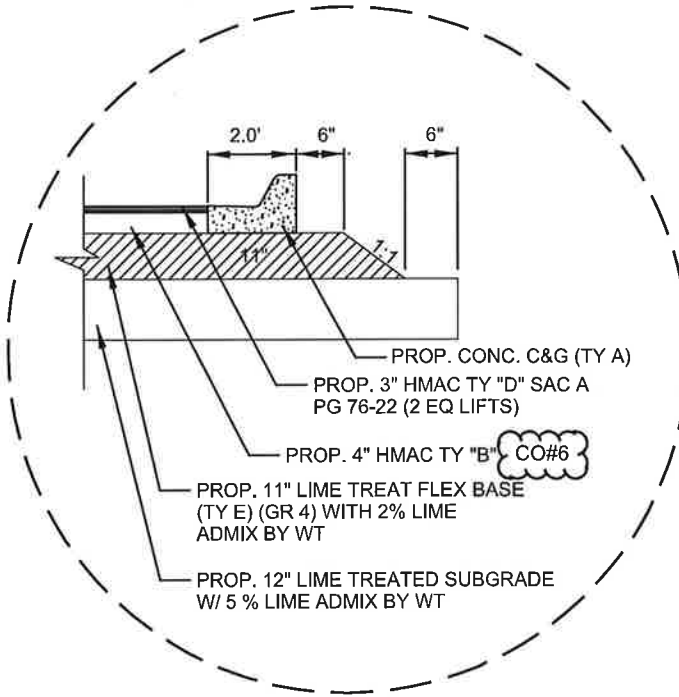
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LEGEND:

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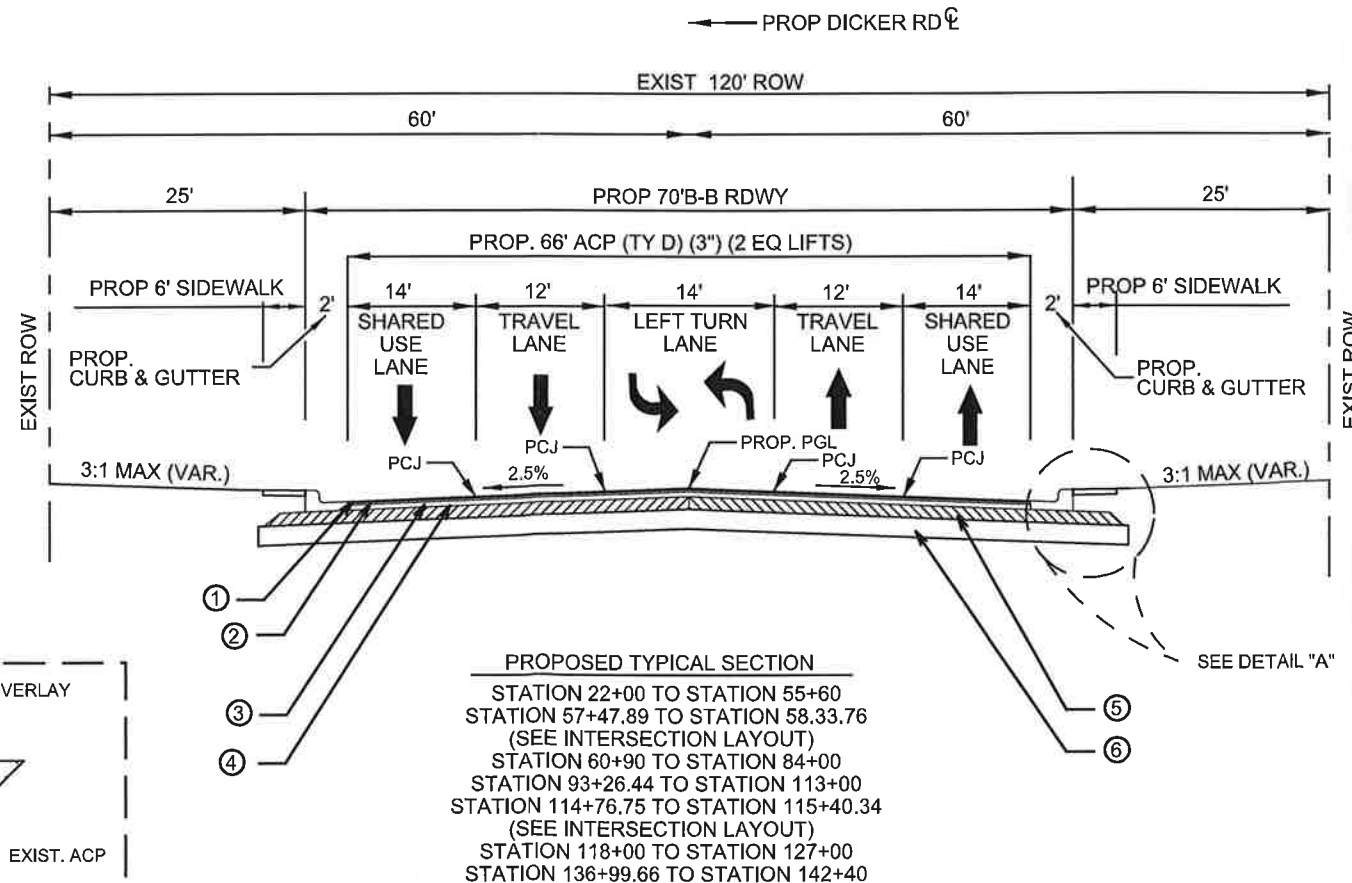
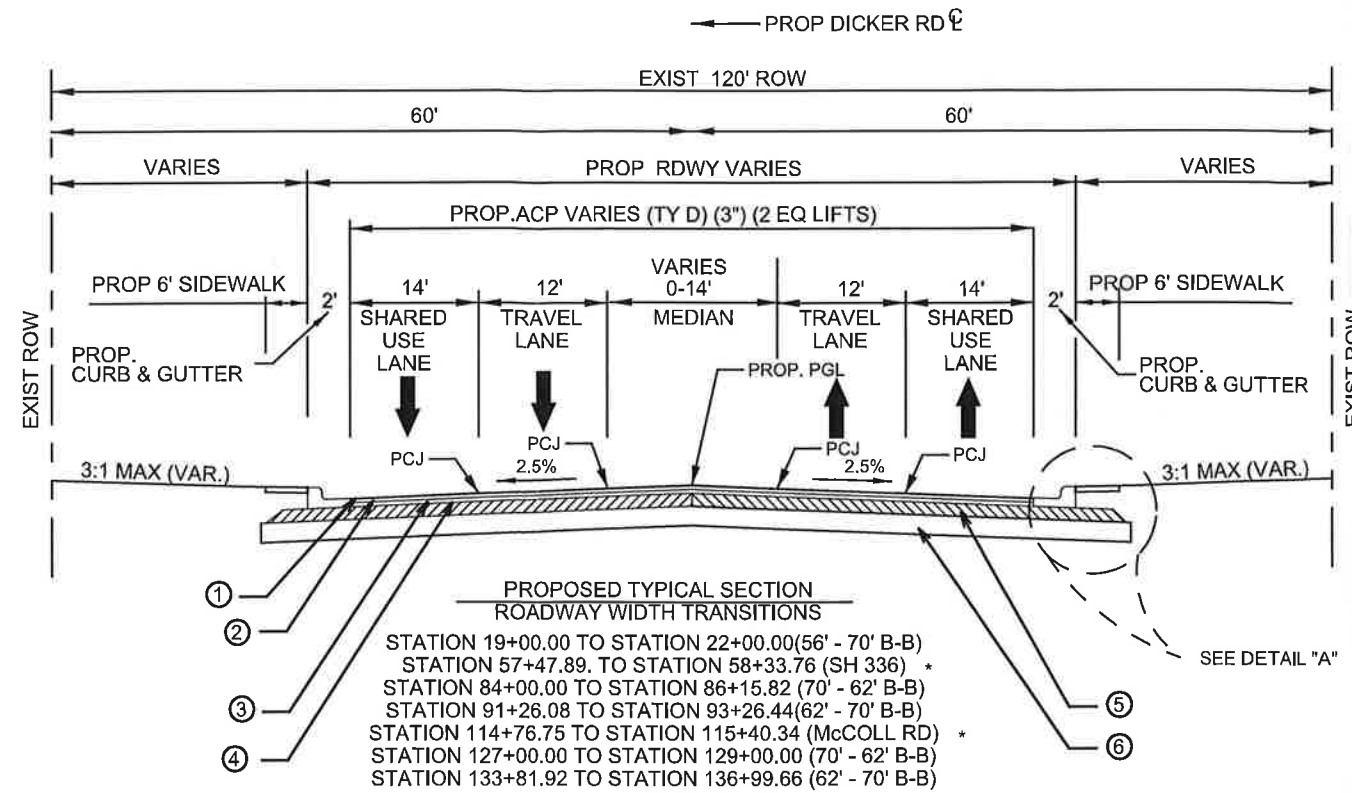
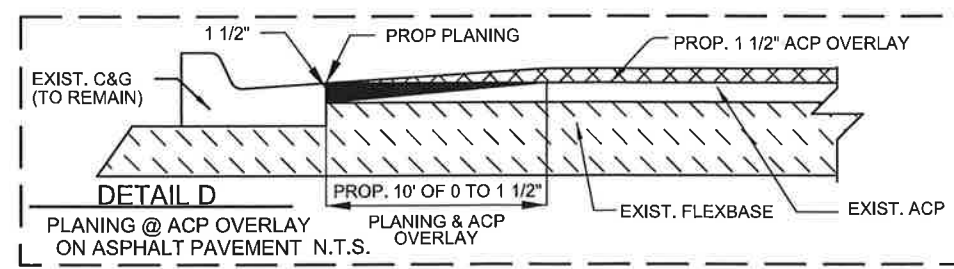
CUT & RESTORE DETAIL (PAVEM STRUCT)
N.T.S.
(TO BE PAID UNDER ITEM 400 CUT & RESTORE ASPH PAV)



DETAIL A
N.T.S.

NOTE:

PAVEMENT DESIGN AS PER GEOTECHNICAL ENGINEERING REPORT PREPARED BY RABA KISTNER CONSULTANT (PROJECT No: AMA12-046-00) DATED 10/02/2014 UNDER DIRECTION OF KATRIN M. LEONARD, P.E. # 95810



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CO#6 - PERMANENT PAVEMENT
MODIFY TY "B" HMAC TO 4" AND LTFB TO 11"



Eric R. Dietrich
ERIC R. DIETRICH, P.E.

4-24-2020



The County of Hidalgo
Pct 2



Texas Department of Transportation



TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83
Mission, Texas 78372
(956) 424-7896

DICKER ROAD
PROPOSED TYPICAL SECTIONS

N.T.S.

SHEET 2 OF 4

FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	7-A

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The County of Hidalgo
Pct 2



Texas Department of Transportation



DICKER ROAD

PROPOSED
TYPICAL SECTIONS

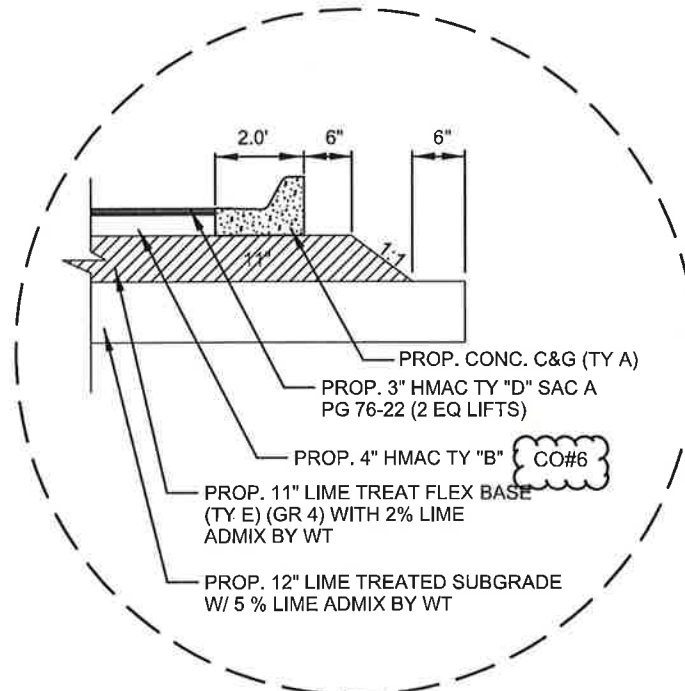
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SHEET 3 OF 4

FED. NO.	CONT.	SECT.	JOB.	HIGHWAY	
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TEXAS	PHR	HIDALGO	No 2	HIDALGO	8-A

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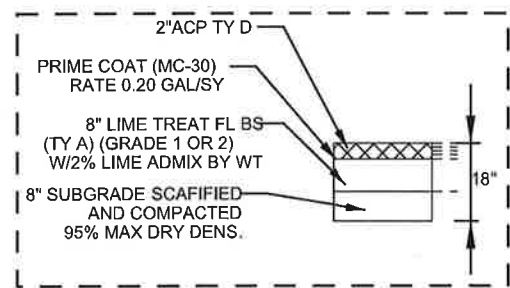
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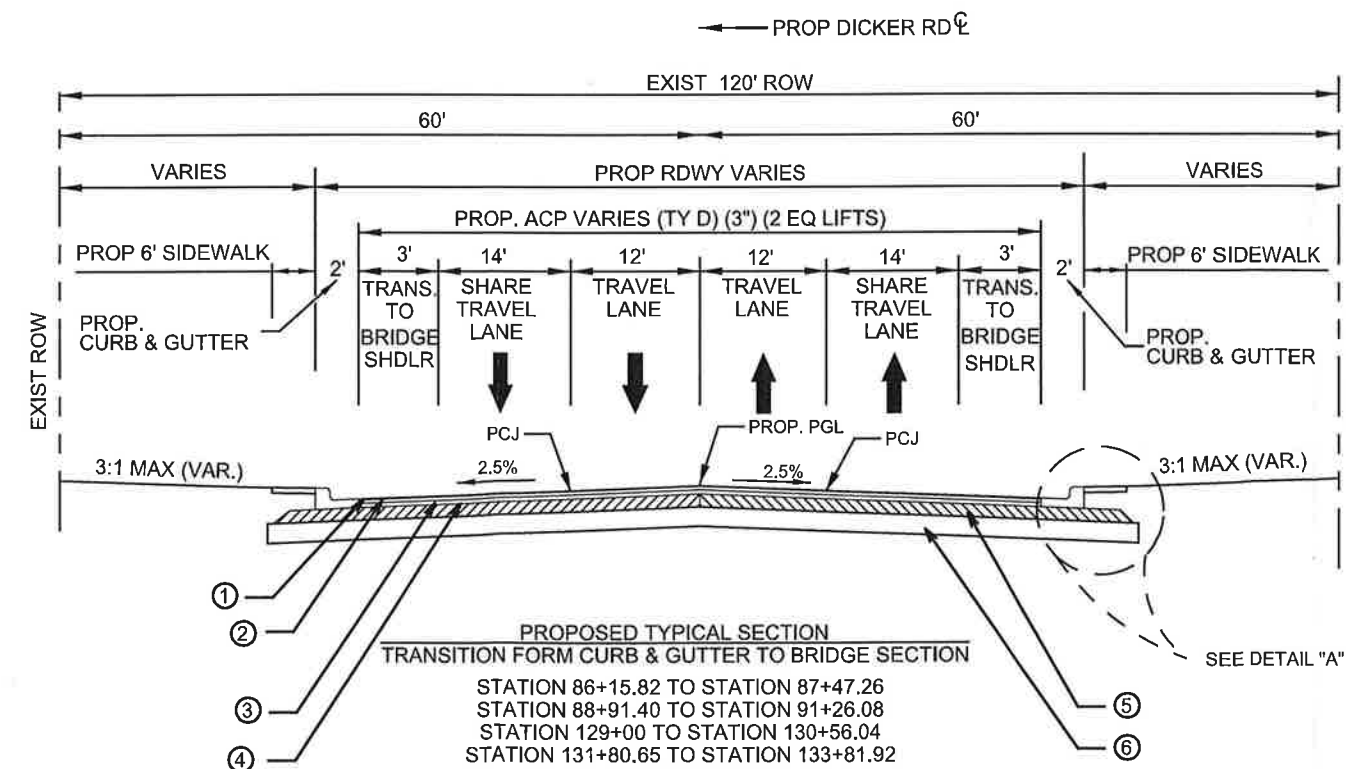
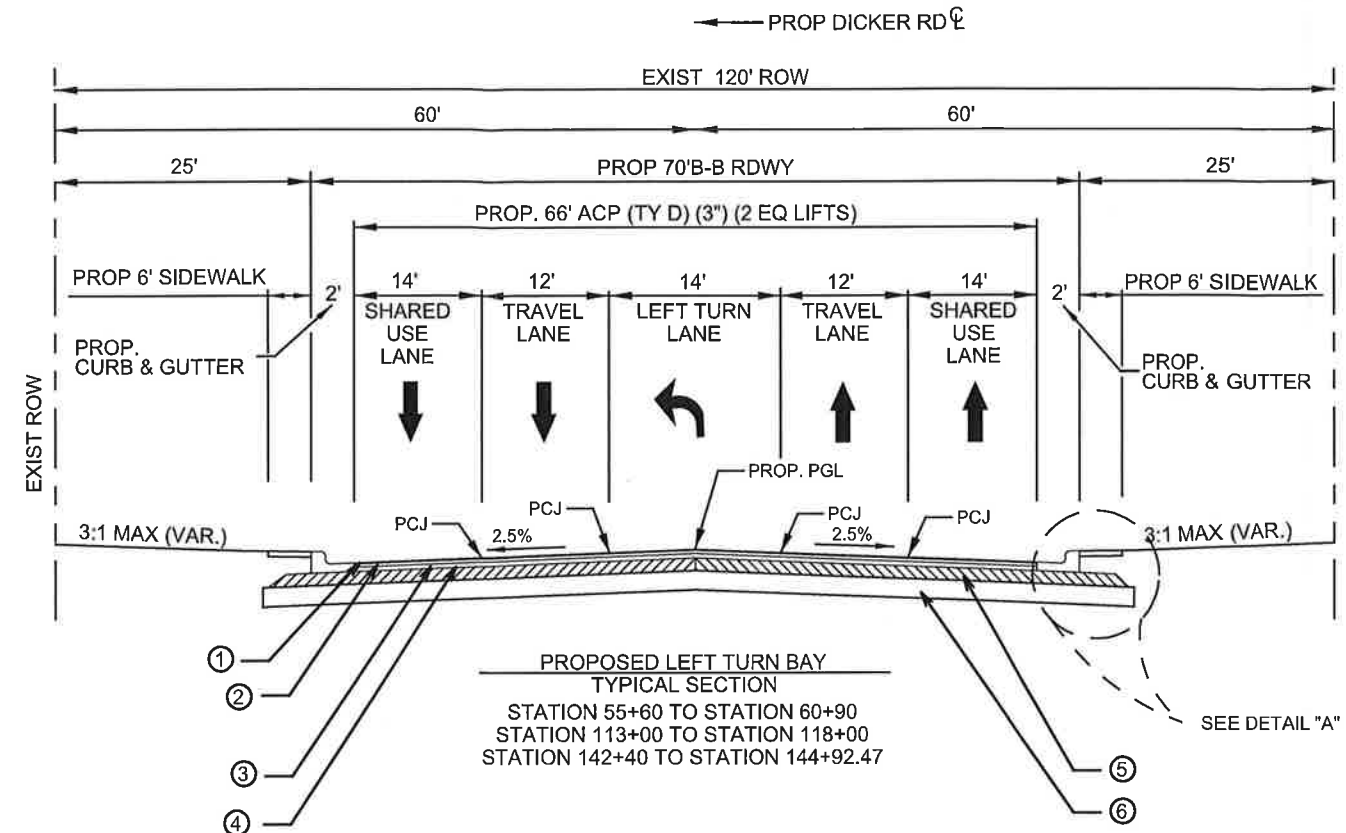
DETAIL A
N.T.S.

NOTE:

PAVEMENT DESIGN AS PER GEOTECHNICAL ENGINEERING REPORT PREPARED BY RABA KISTNER CONSULTANT (PROJECT No: AMA12-046-00) DATED 10/02/2014 UNDER DIRECTION OF KATRIN M. LEONARD, P.E. # 95810



CUT & RESTORE DETAIL (PAVEM STRUCT)
N.T.S.
(TO BE PAID UNDER ITEM 400 CUT & RESTORE ASPH PAV)



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CO#6 - PERMANENT PAVEMENT
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E. Dietrich

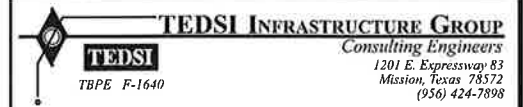
ERIC R. DIETRICH, P. E. 4-24-2020



The County of Hidalgo
 Pct 2



Texas Department of Transportation

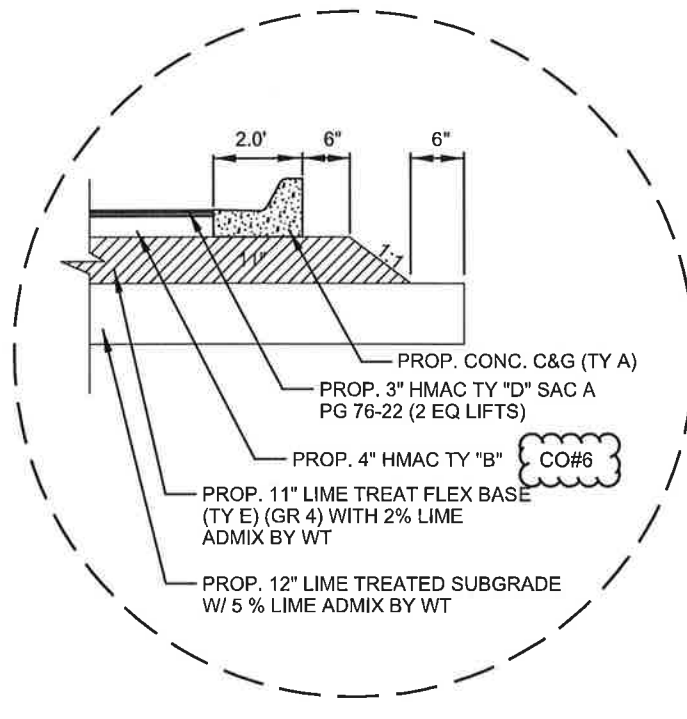


DICKER ROAD
 PROPOSED
 TYPICAL SECTIONS

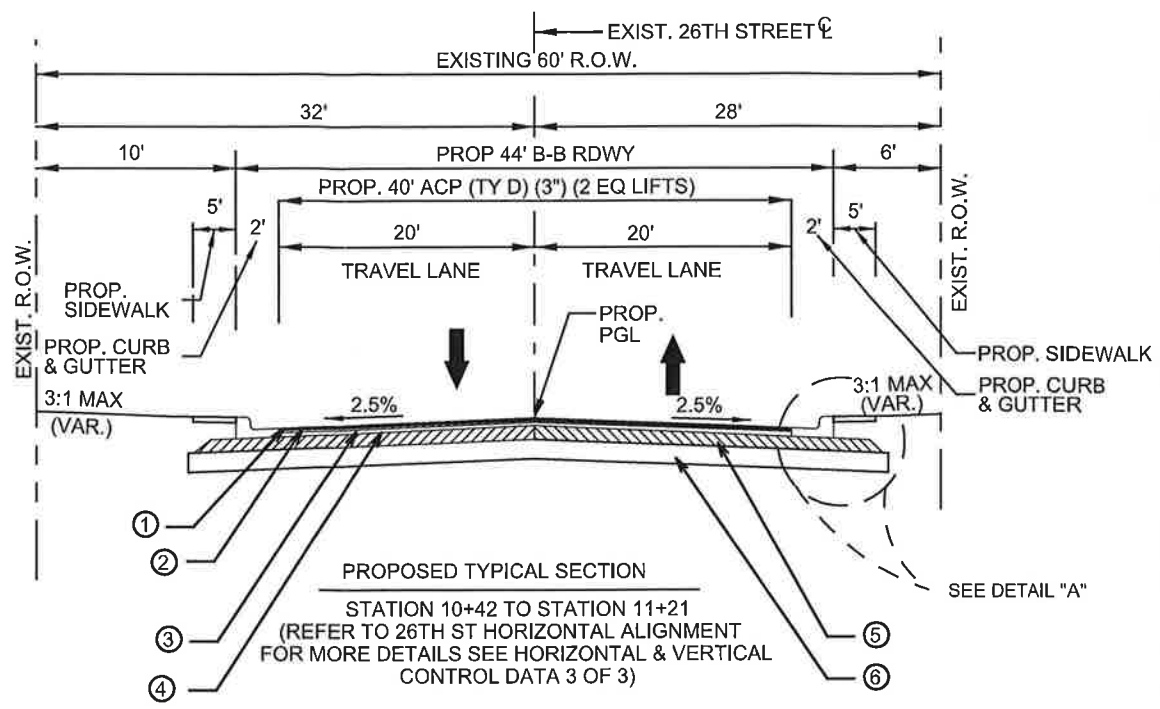
N.T.S. SHEET 4 OF 4

FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY
06	0921	02	312	DICKER ROAD
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TEXAS	PHR	HIDALGO	No 2	HIDALGO
				SHEET NO.
				9-A

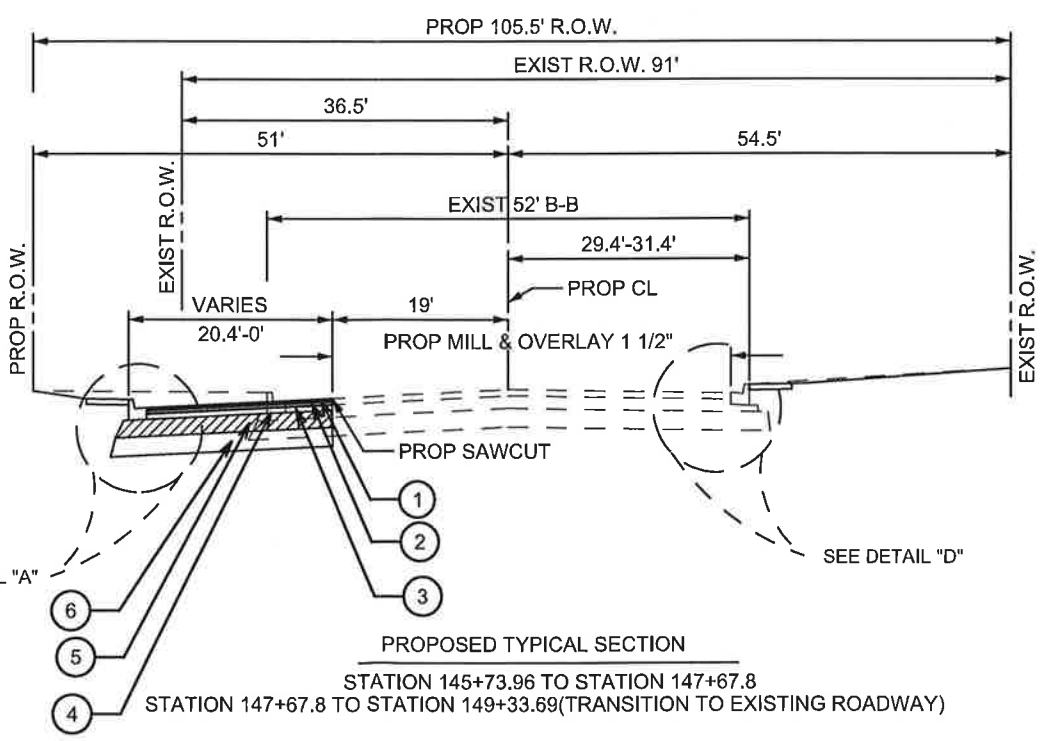
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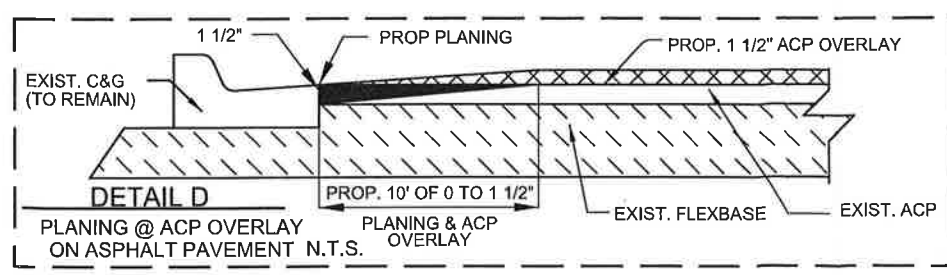
DETAIL A
 N.T.S.



PROPOSED TYPICAL SECTION
 STATION 10+42 TO STATION 11+21
 (REFER TO 26TH ST HORIZONTAL ALIGNMENT FOR MORE DETAILS SEE HORIZONTAL & VERTICAL CONTROL DATA 3 OF 3)



PROPOSED TYPICAL SECTION
 STATION 145+73.96 TO STATION 147+67.8
 STATION 147+67.8 TO STATION 149+33.69 (TRANSITION TO EXISTING ROADWAY)



DETAIL D
 PLANING @ ACP OVERLAY ON ASPHALT PAVEMENT N.T.S.

DATE: 4/24/2020 6:40:46 PM
 FILE: \$FILESS

REMOVAL SUMMARY

CO #6

CO #6

LOCATION	0104 6009 REMOV CONC (RIPRAP) (SY)	0104 6015 REMOVE CONC (SDWLK) (SY)	0104 6017 REMOVE CONC (DRIVEWAYS) (SY)	0104 6022 REMOV CONC (CURB & GUTTER) (LF)	0104 6032 REMOV CONC (WHEELCHAIR RAMP) (SY)	0104 6037 REMOV CONC (RAIL) (LF)	0305 6003 (**) SALV, HAUL & STKPL RCL APH PV (2" TO 4") (SY)	401 6001 FLOWABLE BACKFILL (CY)	0452 2003 REMOVE RAIL (CONC POST & MTL ELEM) (LF)	0496 6003 REMOVE STRUCT (MANHOLE) (EA)	0496 6005 REMOVE STRUC (WINGWALL) (EA)	0496 6007 REMOVE STRUCT (PIPE) (LF)	0542 6001 REMOVING METAL BEAM GUARD FENCE (LF)	0542 6002 REMOVING TERMINAL ANCHOR SECTION (EA)
DICKER ROAD														
REM 1 of 6			303				10164					559		
REM 2 of 6			738				10209	15				438		
REM 3 of 6			188				10512			1		2167		
REM 4 of 6	450					290	9750		330		4	1127	2120	4
REM 5 of 6		35	204	323			11750					453	205	2
REM 6 of 6				1096	122	250	6567		290		4	305	476	2
TOTAL:	450	35	1433	1419	122	540	58952	15	620	1	8	5049	2801	8

* CONTRACTOR INFORMATION ONLY (SUBSIDIARY)

** SURPLUS MATERIAL TO BE HAULED OFF, TO PCT 2 FIELD OPERATIONS OFFICE, 4011 S. VETERANS BLVD, SAN JUAN, TX 78589
ITEM 305 SHOWN ON THIS TABLE FOR INFORMATION ONLY, IT IS QUANTIFY ON ROADWAY SUMMARY

IRRIGATION SUMMARY

LOCATION	* 400 6001 STRUCT EXCAV (CY)	400 6005 CEM STABIL BKFL (CY)	400 6010 STRUCT EXCAV (SPECIAL) (CY)	402 6001 TRENCH EXCAVATION PROTECTION (LF)	432 6001 RIPRAP (CONC) (4") (CY)	464 6025 RC PIPE (CL V) (18 IN) (LF)	496 9001 REMOVE STRUCT (EXIST STANDPIPE) (EA)	496 9002 REMOVE STRUCT (EXIST IRRIG VALVE) (EA)	496 6007 REMOVE STRUCT PIPE (LF)	1007 9001 IRRIG WELL (48") (STANDPIPE) (EA)	1007 9002 IRRIG VALVE (14") ALFALFA (EA)	1008 6006 PRSSR IRRIG PVC PIPE (15") (LF)	7016 6090 CASING STEEL (OPEN TRENCH) (24") (LF)
DICKER ROAD IRRIGATION													
IRRIG. SHEET 1 OF 5	148	38	41	206	2	200			200				
IRRIG. SHEET 2 OF 5	148	38	41	206	2	200			200				
IRRIG. SHEET 3 OF 5	116	23	20	135				1	130		1	117	86
IRRIG. SHEET 4 OF 5	104	25	22	147				1	140		1	140	86
IRRIG. SHEET 5 OF 5	112	23	16	126			1	1	122	1	1	122	86
PROJECT TOTAL	628	147	140	820	4	400	1	3	792	1	3	379	258

REVISED 2/27/2019

**The County of Hidalgo
Pct 2**

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Texas Department of Transportation

TEDSI INFRASTRUCTURE GROUP
Consulting Engineers
1201 E. Expressway 83
Mission, Texas 78572
(956) 424-7898

*** FOR CONTRACTOR INFORMATION ONLY
CUT AND RESTORING PAVEMENT FOR IRRIGATION INCLUDED ON TCP SUMMARY**

CO #6 -
1st - Pavement, Reduce Ty "B" thickness to 4"
2nd-Detour, Replace the (Ty A)(Gr 1) base with (Ty E)(Gr 4) base.
3rd - Remove existing wingwalls, and railing

**DICKER ROAD
REMOVAL & IRRIGATION
SUMMARY**

SHEET 1 OF 1

FED. HD DIV. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	13a

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PHASE II - STEP 1 DICKER ROAD SOUTH SIDE INTERSECTIONS CONSTRUCTION:

UPON COMPLETION OF PHASE I, PROCEED WITH THIS PHASE.

1. PRIOR TO THE BEGINNING OF THIS PHASE, HAVE TRAFFIC CONTROL DEVICES AND SW3P ITEMS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN PLACE. CONSTRUCTION WORK WILL NOT BEGIN UNTIL THE ENGINEER GIVES APPROVAL.
2. PLACE CHANNELIZING DEVICES, AND STRIPING AS SHOWN ON TCP PLANS FOR THIS PHASE.
3. PLACE TRAFFIC ON NORTH SIDE AND DETOURS AS SHOWN IN TCP PLANS.
4. CONSTRUCT SOUTH SIDE OF DICKER ROAD WIDENING PAVEMENT AT PROPOSED INTERSECTIONS AS SHOWN ON PLANS. DURING THIS PHASE PROHIBIT RIGHT TURN MOVEMENT, USE MESSAGE BOARDS WITH RIGHT TURN RESTRICTIONS AND R3-1 SIGN UNTIL THIS PHASE WILL BE COMPLETED.

5. CONSTRUCT PROPOSED PAVEMENT STRUCTURE (~~EXCEPT 1.5" FINAL ACP LIFT SURFACE COURSE~~); ALLOW 2 DAYS MINIMUM CURING TIME PER LIME TREATED SUBGRADE AND FLEXIBLE BASE LAYERS ~~BEFORE PLACEMENT OF THE 4.5" AND 1.5" ACP COURSES~~. CO#6
6. CONTRACTOR SHALL WORK NON-STOP UNTIL WORK HAS BEEN COMPLETED, REOPEN RIGHT TURN MOVEMENTS TO DICKER ROAD AND RESUME PHASE II WORKS.

PHASE II - DICKER ROAD SOUTH SIDE ROADWAY AND BRIDGE WIDENING:

UPON COMPLETION OF PHASE II STEP 1, PROCEED WITH THIS PHASE.

1. PRIOR TO THE BEGINNING OF THIS PHASE, HAVE TRAFFIC CONTROL DEVICES AND SW3P ITEMS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN PLACE. CONSTRUCTION WORK WILL NOT BEGIN UNTIL THE ENGINEER GIVES APPROVAL.
2. PLACE CHANNELIZING DEVICES, AND STRIPING AS SHOWN ON TCP PLANS FOR THIS PHASE.
3. PLACE TRAFFIC ON NORTH SIDE AND DETOURS AS SHOWN IN TCP PLANS.
4. CONSTRUCT SOUTH SIDE WIDENING OF PROPOSED BRIDGES AS SHOWN ON PLANS. SOUTH SIDE BRIDGE JOINT REPLACEMENT (SEJ) TO BE DONE IN THIS PHASE. KEEP (1) TWO-WAY SURFACE ROADWAY LANES (MIN 11 FT LANES) FOR THRU TRAFFIC ALL THE TIME UNLESS OTHERWISE APPROVED BY ENGINEER.
5. BUILD STORM SEWER TRUNKLINE SYSTEM, SOUTH LATERALS AND INLETS AS PER CONSTRUCTION PLANS, CONNECT TO PREVIOUSLY CONSTRUCTED A, B & C OUTFALLS AND LATERALS DURING PHASE I. CONNECT TO STORM SEWER SYSTEM OUTFALLS BUILT IN PHASE I.
6. BUILD STORM SEWER TRUNKLINE CROSSING AT SH 336, WORK TO BE DONE AND COMPLETE ON WEEKENDS, USING OPEN CUT METHOD; THE CONTRACTOR SHALL BACKFILL ALL OPEN CUT SECTIONS AT THE END OF EACH DAY. USE TWO LANE ONE WAY TRAFFIC CONTROL. THE SH 336 INTERSECTION CAN NOT BE COMPLETE CLOSED USED (TCP 2-1 THRU TCP 2-7). STEEL PLATES 1" THICK CAN BE USED TO COVER THE OPEN CUT AREA IF NECESSARY.

7. CONSTRUCT SOUTH SIDE SECTION OF DICKER ROAD AS SHOWN IN THIS PHASE, INCLUDING PAVEMENT (~~EXCEPT 1.5" FINAL LIFT SURFACE COURSE~~), CONCRETE CURB AND GUTTER, SIDEWALK AND DRIVEWAYS. SEE McCOLL RD DETOUR LAYOUT FOR CONSTRUCTION OF STORM DRAIN CROSSING AND REMOVAL OF EXISTING PIPE, THIS WORK NEEDS TO BE DONE AND COMPLETED DURING WEEKEND USING NON-STOP CONSTRUCTION, THE AREA NEEDS TO BE OPEN DURING SCHOOL HOURS, WORKS NEEDS TO BE COORDINATE WITH VALLEY VIEW EARLY COLLEGE PRINCIPAL IN ORDER TO SCHEDULE SCHOOL DRIVEWAYS CLOSURE OPERATIONS FOR STUDENT DROP-OFF AND PICK-UP.

8. START CONSTRUCTION OF TRAFFIC SIGNALS.

9. AT THE END OF THIS PHASE RESHAPE SOUTH SIDE ROADSIDE DITCHES, SLOPE AND START PLACING TEMPORARY AND/OR PERMANENT SODDING.

PHASE III - STEP 1 DICKER ROAD NORTH SIDE INTERSECTIONS CONSTRUCTION:

UPON COMPLETION OF PHASE II, PROCEED WITH THIS PHASE.

1. PRIOR TO THE BEGINNING OF THIS PHASE, HAVE TRAFFIC CONTROL DEVICES AND SW3P ITEMS AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER IN PLACE. CONSTRUCTION WORK WILL NOT BEGIN UNTIL THE ENGINEER GIVES APPROVAL.
2. PLACE CHANNELIZING DEVICES, AND STRIPING AS SHOWN ON TCP PLANS FOR THIS PHASE.
3. PLACE TRAFFIC ON NORTH SIDE AND DETOURS AS SHOWN IN TCP PLANS.
4. CONSTRUCT NORTH SIDE OF DICKER ROAD WIDENING PAVEMENT AT PROPOSED INTERSECTIONS AS SHOWN ON PLANS. DURING THIS PHASE PROHIBIT RIGHT TURN MOVEMENT, USE MESSAGE BOARDS WITH RIGHT TURN RESTRICTIONS AND R3-1 SIGN UNTIL THIS PHASE WILL BE COMPLETED.

1. CONSTRUCT PROPOSED PAVEMENT STRUCTURE (~~EXCEPT 1.5" FINAL ACP LIFT SURFACE COURSE~~); ALLOW 2 DAYS MINIMUM CURING TIME PER LIME TREATED SUBGRADE AND FLEXIBLE BASE ~~BEFORE PLACEMENT OF THE 4.5" AND 1.5" ACP COURSES~~. CO#6

2. CONTRACTOR SHALL WORK NON-STOP UNTIL WORK HAS BEEN COMPLETED, REOPEN RIGHT TURN MOVEMENTS TO DICKER ROAD AND RESUME PHASE III WORKS.

PHASE III - DICKER ROAD NORTH SIDE CONSTRUCTION:

UPON COMPLETION OF PHASE III STEP 1, PROCEED WITH THIS PHASE.

1. PLACE CHANNELIZING DEVICES, AND STRIPING AS SHOWN ON TCP PLANS FOR THIS PHASE.
2. PLACE TRAFFIC ON SOUTH SIDE NEWLY CONSTRUCTED IN PREVIOUS STAGE AS SHOWN IN TCP PLANS.
3. REMOVE AND SALVAGE TEMPORARY ROADWAY DETOUR CONSTRUCTION
4. CONSTRUCT NORTH SIDE SECTION OF DICKER ROAD AS SHOWN IN THIS PHASE, INCLUDING PAVEMENT (~~EXCEPT 1.5" FINAL LIFT SURFACE COURSE~~), CONCRETE CURB AND GUTTER, NORTH INLETS AND STORM SEWER SYSTEM, CONNECT TO PROPOSED STORM SEWER CROSSING PREVIOUSLY CONSTRUCTED. CO#6
5. CONTINUE CONSTRUCTION OF TRAFFIC SIGNALS.

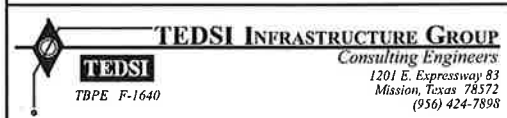
6. AT THE END OF THIS PHASE RESHAPE NORTH SIDE ROADSIDE DITCHES, SLOPE AND START PLACING TEMPORARY AND/OR PERMANENT SODDING.

PHASE IV - FINAL CONSTRUCTION:

UPON COMPLETION OF PHASE III, PROCEED WITH THIS PHASE.

1. PLACE CHANNELIZING DEVICES, AND STRIPING AS SHOWN ON TCP PLANS FOR THIS PHASE. CO#6
2. PROCEED WITH 1.5" MILLING AND OVERLAY AT SH 336 (10th STREET) & McCOLL RD INTERSECTIONS, AS WELL AS FROM STA 145+75.66 TO STA 149+33.69 (END INCIDENTAL WORK) AS SHOWN IN PLANS.
3. CONSTRUCT DRIVEWAYS, SIDEWALKS, AND TURNOUTS TO COMPLETION IF ANY PENDING FROM PREVIOUS PHASES. PLACE FINAL 1.5" LIFT SURFACE COURSE PAVEMENT.
4. FINAL CONSTRUCTION OF TRAFFIC SIGNALS AND LOOPS.
5. PLACE FINAL PAVEMENT MARKING/MARKERS AND SIGNS
6. FINAL SEEDING
7. FINAL CLEAN UP.
6. REMOVE CONSTRUCTION TRAFFIC CONTROL DEVICES AND ADVANCE WARNING SIGNS UPON FINAL ACCEPTANCE OR AS DIRECTED, OPEN ALL TRAVEL LANES TO TRAFFIC.

CO#6 - PERMANENT PAVEMENT
MODIFY TY "B" HMAC TO 4" AND LTFB TO 11"
TEMPORARY PAVEMENT
REPLACE (TY A)(GR 1) BASE WITH (TY E)(GR 4)

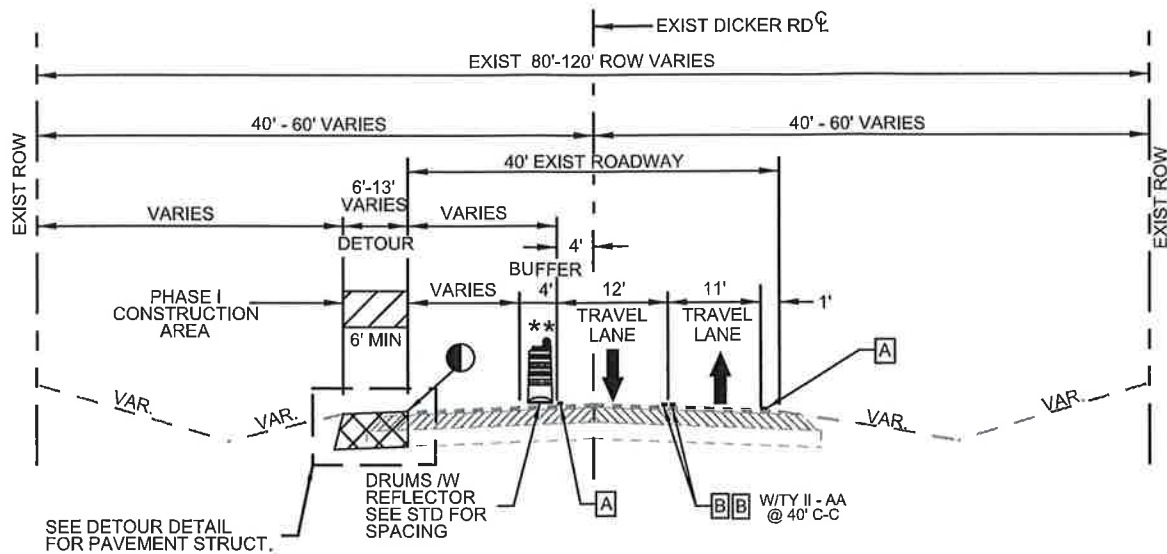


**DICKER ROAD
SEQUENCE OF CONSTRUCTION
(CONT.)**

SHEET 2 OF 2

FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT.	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	28-A

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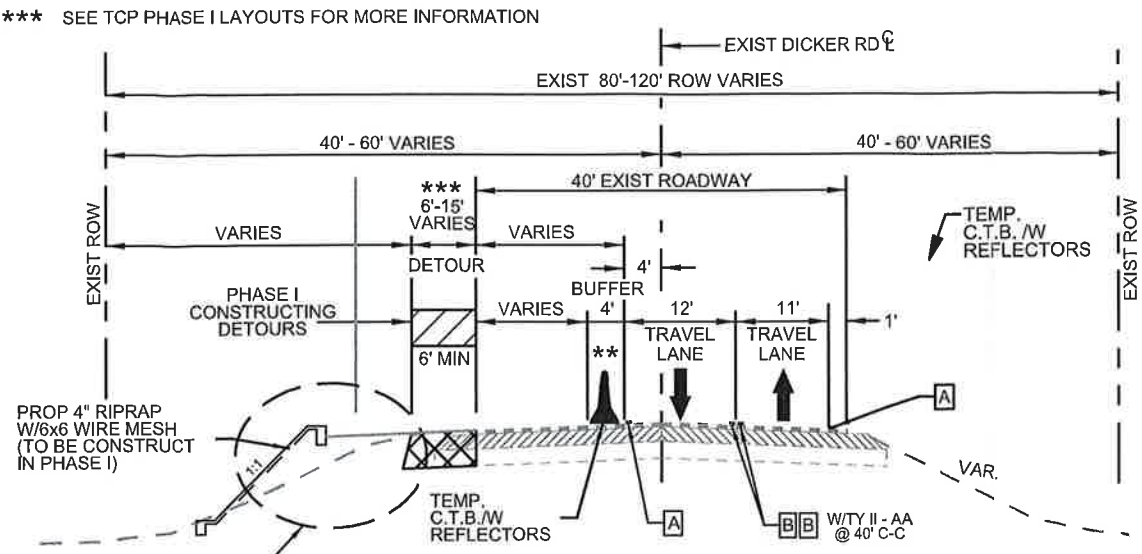


DICKER ROAD
CONSTRUCTING DETOURS
PHASE I TYPICAL SECTION

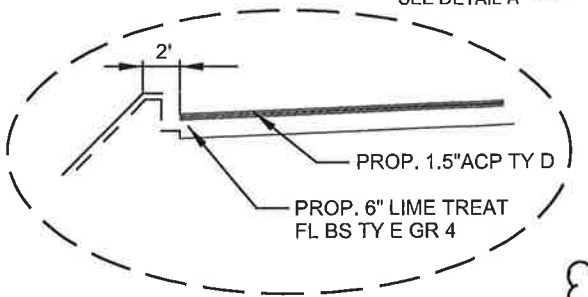
STATIONS LIMITS	OFFSET FROM PGL TO EDGE OF DETOUR
FROM STA 11+11 TO STA 57+17	18 FT (MIN 16')
FROM STA 58+62 TO STA 81+00	18 FT (MIN 16')
FROM STA 95+00 TO STA 114+51	18 FT
FROM STA 115+65 TO STA 133+81	18 FT
FROM STA 140+00 TO STA 144+92	26 FT TO 14 FT

** NOTE: IN PHASE I FROM STA 81+00 TO STA 98+10 AND FROM STA 129+00 TO STA 133+20 PORT C.T.B.(SGL SLP)(TY 1) W/REFLECTORS WILL BE USE IN LIEU OF DRUMS W/ REFLECTORS (SEE TCP PHASE I LAYOUTS FOR MORE DETAILS)

CO#6 - TEMPORARY PAVEMENT REPLACE (TY A)(GR 1) BASE WITH (TY E)(GR 4)

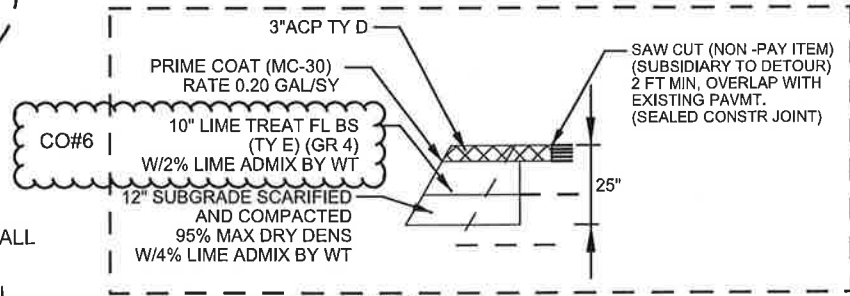


DICKER ROAD
CONSTRUCTING DETOURS
PHASE I TYPICAL SECTION
FROM STA 81+00 TO STA 86+15
FROM STA 90+00 TO STA 95+00



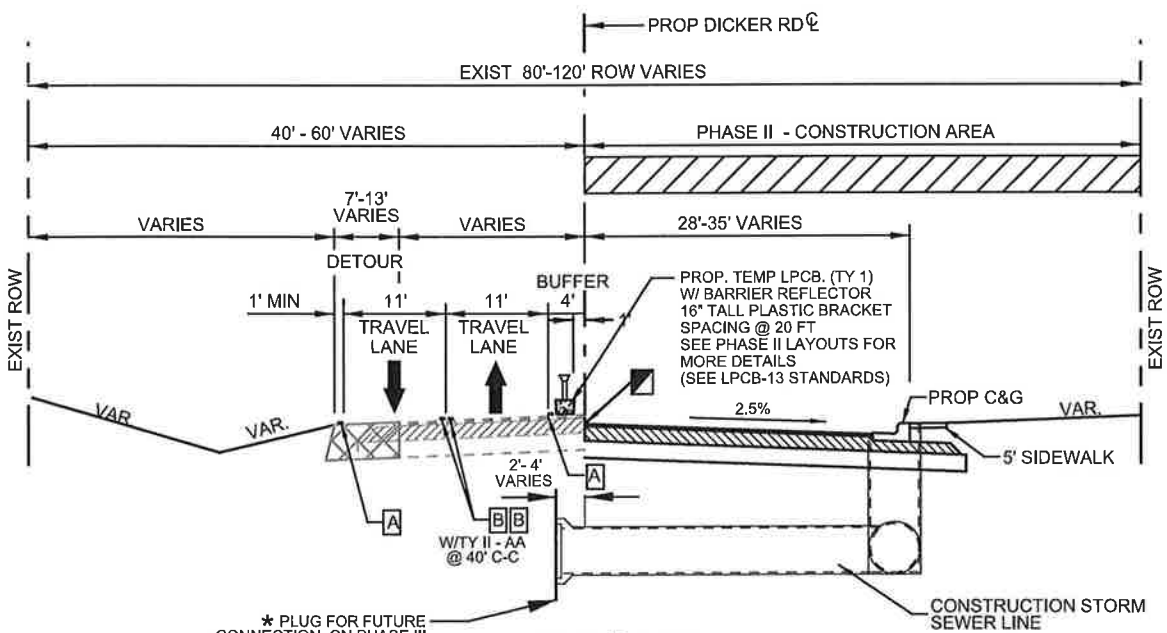
DETAIL A

FROM STA 81+00 TO STA 95+00
N.T.S.
NOTE: PHASE I CONSTRUCT SYSTEM B OUTFALL 6'X5' CB FROM STA 79+32 TO STA 86+60 AS PER PLAN SHEETS IN ORDER TO MAINTAIN POSITIVE DRAINAGE.



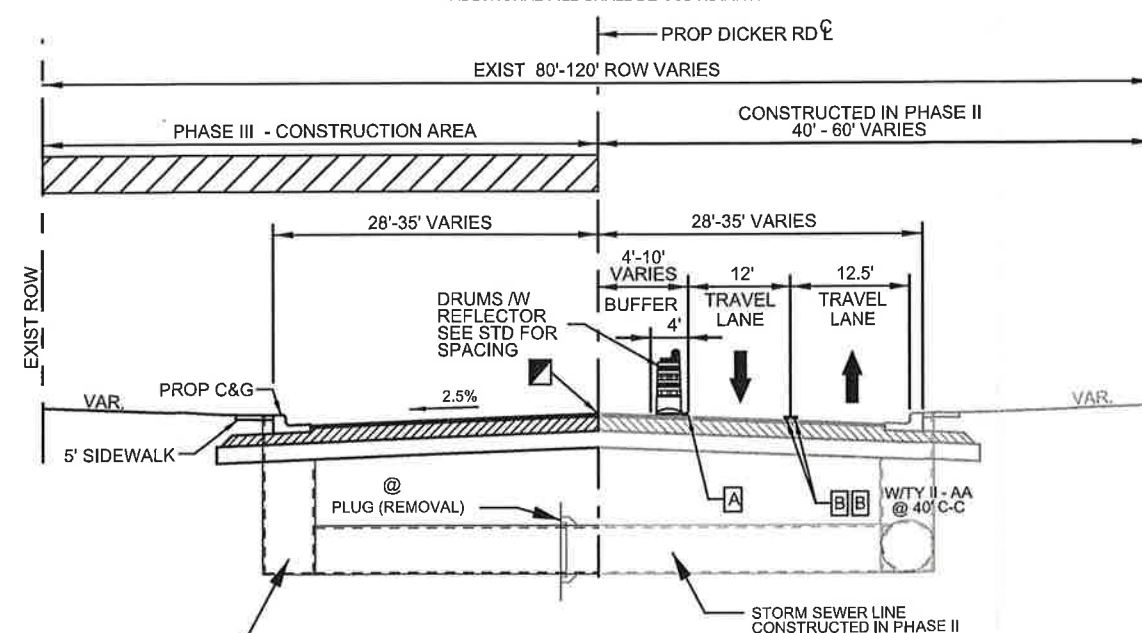
DETOUR DETAIL (PAVEM STRUCT)

N.T.S.
TO BE PAID UNDER CONSTRUCT. DETOUR PAY ITEM 508
ADDITIONAL FILL SHALL BE SUBSIDIARY.



DICKER ROAD
PROPOSED PHASE II TYPICAL SECTION
FROM STA 11+11 TO STA 144+92

(PAVEMENT STRUCTURE TO BE BUILD UP TO 1.5\"/>



DICKER ROAD
PROPOSED PHASE III TYPICAL SECTION
FROM STA 11+11 TO STA 144+92

(PAVEMENT STRUCTURE TO BE BUILD UP TO 1.5\"/>

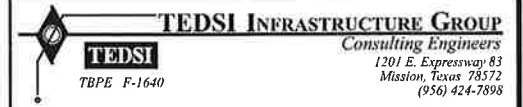
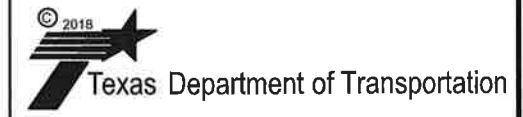
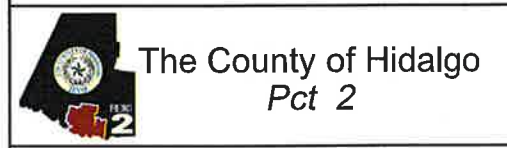
LEGEND	
	CONSTRUCTION AREA
	DETOUR
	WORK ZONE PVMT MARK (NON-REM) 4\"/>
	WORK ZONE PVMT MARK (NON-REM) 4\"/>
	WORK ZONE PVMT MARK (REM) 4\"/>
	WORK ZONE PVMT MARK (REM) WHITE 4\"/>
	WORK ZONE PVMT MARK (REM) 4\"/>
	WORK ZONE PVMT MARK (REM) 4\"/>
	WORK ZONE PVMT MARK (NON-REM) 24\"/>
	WORK ZONE PVMT MARK (NON-REM) 8\"/>
	DROP OFFS GREATER THAN OR EQUAL TO 2\"/>
	DROP OFFS GREATER THAN 24\"/>
	MATCH EXISTING/ADJACENT CROSS SLOPE AND ELEVATION
	EXISTING TRAFFIC DIRECTION
	PROPOSED TRAFFIC DIRECTION

NOTES:

- 1.- STORM SEWER LATERALS SHALL BE INSTALLED AS PER PHASE II LAYOUTS AND PLUGGED AS NECESSARY FOR FUTURE CONNECTION IN PHASE III.
- * 2.- PLUG IS NOT A BID ITEM SHALL BE SUBSIDIARY TO ITEMS 464.
- 3.- STORM LATERALS SHALL BE INSTALLED AS PER PHASE III LAYOUTS, UNPLUG AND COMPLETE LATERALS AS INDICATED.
- @ 4.- REMOVAL OF PLUG IS NOT A BID ITEM SHALL BE SUBSIDIARY TO ITEMS 464.



ERIC R. DIETRICH, P.E. 4-24-2020

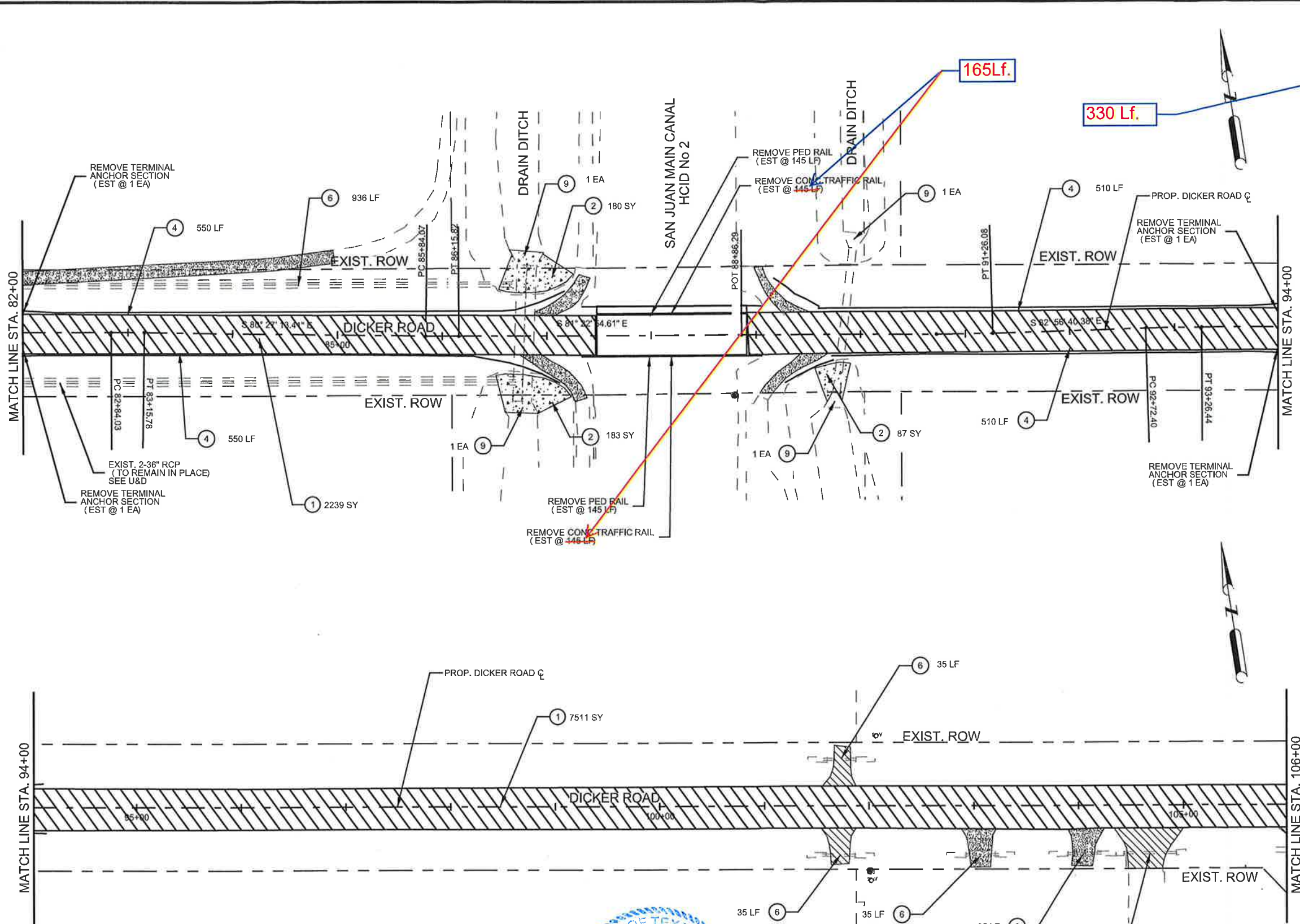


DICKER ROAD
TRAFFIC CONTROL PLAN
PROPOSED TYPICAL SECTION
PHASE I,
PHASE II AND PHASE III

SCALE: 1\"/>

FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT.	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	29-A

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SHEET SUMMARY			
ITEM	DESCRIPTION	UNIT	QUANTITY
0104	REMOVE CONCR (RIPRAP)	SY	450
0104	REMOVE CONCR (SIDEWALKS)	SY	
0104	REMOVE CONCR (DRIVEWAYS)	SY	
0104	REMOVE CONCR (CURB & GUTTER)	LF	
0104	REMOVE CONCR RAIL	LF	290
0104	REMOVE CONCR (WHEELCHAIR RAMP)	SY	
0452	REMOVE RAIL (CONC POST & MTL ELEM)	LF	290
0496	REMOVE STRUCT (INLET)	EA	
0496	REMOVE STRUCT (MANHOLE)	EA	
0496	REMOVE STRUCT (WINGWALL)	LF	4
0496	REMOVE STRUCT (PIPE)	LF	1127
0542	REMOVING METAL BEAM GUARD FENCE	LF	2120
0542	REMOVING TERMINAL ANCHOR SECTION	EA	4
0401	FLOWABLE BACKFILL	CY	
0305	SALV HAUL & STKPL RCL APH PV (2'-4')	SY	9750

LEGEND:		
①	REMOVE STAB BASE & ASPH PAV	
②	REMOVE CONCRETE	
③	REMOVE STR (MANHOLE)	
④	REMOVE METAL BEAM GUARD RAIL	
⑤	REMOVE CONCR (CURB & GUTTER)	
⑥	REMOVE STR (PIPE)	
⑧	REMOVE STR (HEADWALL)	
⑨	REMOVE STR (WINGWALL)	
⑩	REMOVE STR (INLET)	
*	REMOVE ASPHALT (DRIVEWAY)	
*	REMOVE CALICHE (DRIVEWAY)	

NOTE:
 1. FOR UTILITY ADJUSTMENT SEE U & D SHEETS.
 2. RECLAIM EXISTING ASPHALT PAVEMENT IN ACCORDANCE WITH ITEM # 305. IF SPECIFIED IN PLANS.
 5. DRIVEWAY SHALL BE SAW CUT AT R.O.W. LINE OR LIMITS SHOWN IN PLANS.
 6. SAW CUT SHALL BE SUBSIDIARY OF ITEM 104.
 * FOR CONTRACTOR INFORMATION ONLY SUBSIDIARY TO PREP. R.O.W.



ROBERTO FINA CARRAL
 DATE 3/24/2017



The County of Hidalgo
 Pct 2



TEDSI INFRASTRUCTURE GROUP
 Consulting Engineers
 1201 E. Expressway 83
 Mission, Texas 78172
 (956) 424-7898

DICKER ROAD
 REMOVAL LAYOUT
 STA. 82+00 TO STA. 106+00

SCALE: HOR: 1"= 100'					
SHEET 4 OF 6					
FED. RD. DIV. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT.	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	309a

CO #6 -
 1st - Pavement, Reduce Ty "B" thickness to 4"
 2nd-Detour, Replace the (Ty A)(Gr 1) base with (Ty E)(Gr 4) base.
 3rd - Remove existing wingwalls, and railing



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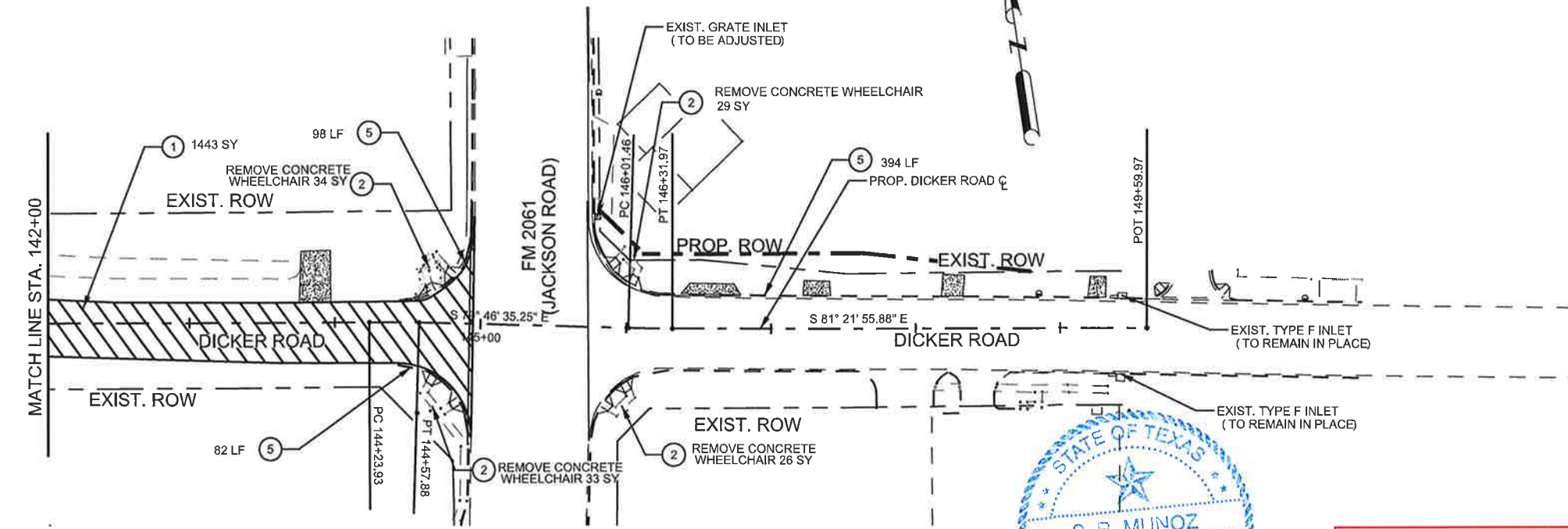
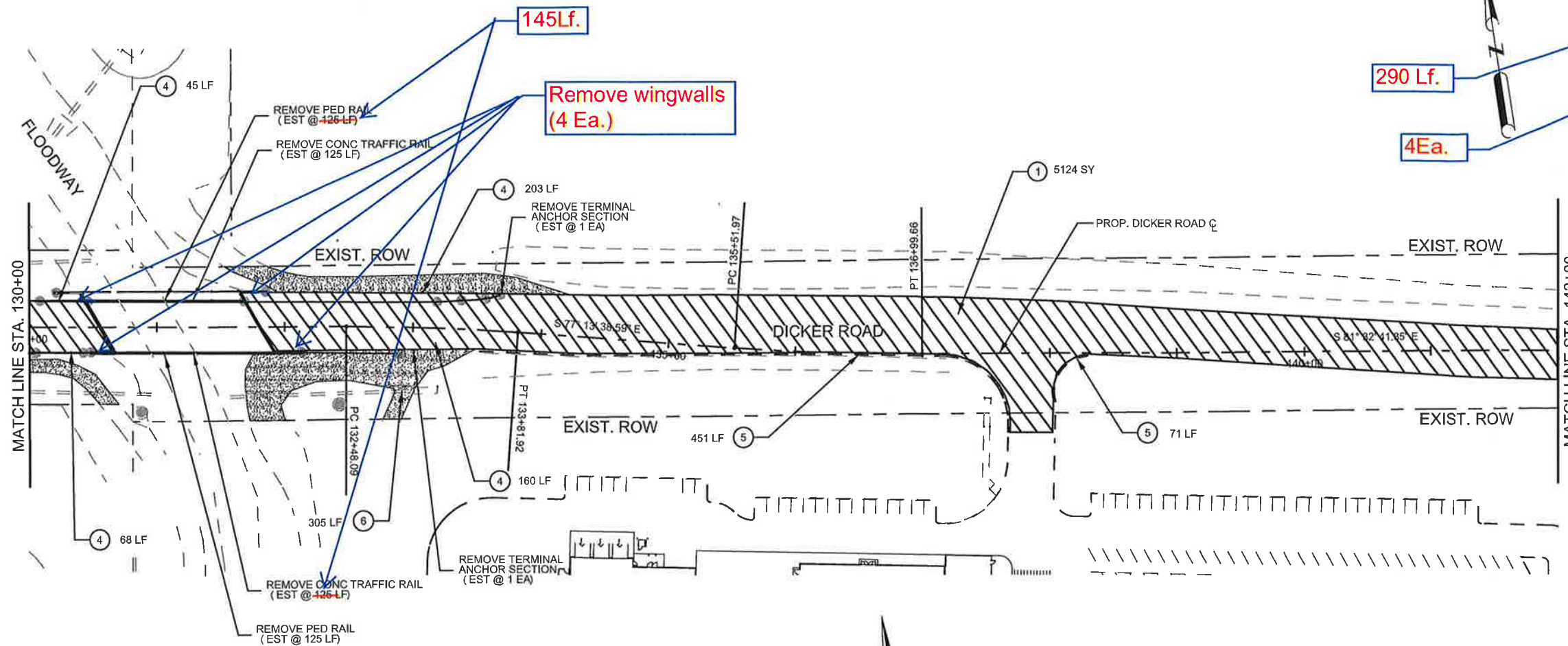
SHEET SUMMARY

ITEM	DESCRIPTION	UNIT	QUANTITY
0104	REMOVE CONCR (RIPRAP)	SY	
0104	REMOVE CONCR (SIDEWALKS)	SY	
0104	REMOVE CONCR (DRIVEWAYS)	SY	
0104	REMOVE CONCR (CURB & GUTTER)	LF	1096
0104	REMOVE CONCR RAIL	LF	250
0104	REMOVE CONCR (WHEELCHAIR RAMP)	SY	122
0452	REMOVE RAIL (CONC POST & MTL ELEM)	LF	250
0496	REMOVE STRUCT (INLET)	EA	
0496	REMOVE STRUCT (MANHOLE)	EA	
0496	REMOVE STRUCT (WINGWALL)	EA	
0496	REMOVE STRUCT (PIPE)	LF	305
0542	REMOVING METAL BEAM GUARD FENCE	LF	476
0542	REMOVING TERMINAL ANCHOR SECTION	EA	2
0401	FLOWABLE BACKFILL	CY	
0305	SALV.HAUL& STKPL RCL APH PV (2'-4")	SY	6567

LEGEND:

- ① REMOVE STAB BASE & ASPH PAV
- ② REMOVE CONCRETE
- ③ REMOVE STR (MANHOLE)
- ④ REMOVE METAL BEAM GUARD RAIL
- ⑤ REMOVE CONC (CURB & GUTTER)
- ⑥ REMOVE STR (PIPE)
- ⑧ REMOVE STR (HEADWALL)
- ⑨ REMOVE STR (WINGWALL)
- ⑩ REMOVE STR (INLET)
- * REMOVE ASPHALT (DRIVEWAY)
- * REMOVE CALICHE (DRIVEWAY)

- NOTE:
- FOR UTILITY ADJUSTMENT SEE U & D SHEETS.
 - RECLAIM EXISTING ASPHALT PAVEMENT IN ACCORDANCE WITH ITEM # 305. IF SPECIFIED IN PLANS.
 - DRIVEWAY SHALL BE SAW CUT AT R.O.W. LINE OR LIMITS SHOWN IN PLANS.
 - SAW CUT SHALL BE SUBSIDIARY OF ITEM 104.
 - FOR CONTRACTOR INFORMATION ONLY SUBSIDIARY TO PREP. R.O.W.



CO #6 -
1st - Pavement, Reduce Ty "B" thickness to 4"
2nd-Detour, Replace the (Ty A)(Gr 1) base with (Ty E)(Gr 4) base.
3rd - Remove existing wingwalls, and railing

STATE OF TEXAS
 ROBERTO FINA CARRAL
 116857
 LICENSED PROFESSIONAL ENGINEER
 DATE 3/24/2017

The County of Hidalgo
 Pct 2

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 Texas Department of Transportation

TEDSI INFRASTRUCTURE GROUP
 Consulting Engineers
 1201 E. Expressway 83
 Mission, Texas 78572
 (956) 424-7898

DICKER ROAD
 REMOVAL LAYOUT
 STA. 130+00 TO STA. 149+60.07

SCALE:
 HOR: 1"= 100'

FED. RD. DIST. NO.	CONT.	SECT.	JOB	HIGHWAY	
06	0921	02	312	DICKER ROAD	
STATE	DIST.	COUNTY	PCT	CITY	SHEET NO.
TEXAS	PHR	HIDALGO	No 2	HIDALGO	311a

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Attachment A

Dicker Road

Change Order #6

Final Pavement Changes

Plans	RE-EVALUATE ACP(TY B)(64-22)			
	Original	vs	Evaluate	Changes
	Thickness, In.		Thickness, In.	
ACP(Ty D)(SAC A)(76-22)	3		3	ACP(Ty D)(SAC A)(76-22)
ACP(B)(64-22)	4.5		4	ACP(B)(64-22)
MC-30	0.2		0.2	MC-30
LT CALICHE w/ 2% Lime	11		11	LT CALICHE w/ 2% Lime
LT SUBGRADE w/ 5% Lime	12		12	LT SUBGRADE w/ 5% Lime

Pavement Re-Evaluation: Value Engineer final ACP thickness, Type B from 4.5" to 4"
 Program TEDSI used TxDOT FPS21 program to evaluate the design

Detour Pavement Change

Plans	RE-EVALUATE LIMESTONE			
	Original	vs	Evaluate	Changes
	Thickness, In.		Thickness, In.	
ACP(Ty D)(SAC A)(76-22)	3		3	ACP(Ty D)(SAC A)(76-22)
MC-30	0.2		0.2	MC-30
LT LIMESTONE w/ 2% Lime	10		10	LT CALICHE w/ 2% Lime
LT SUBGRADE w/ 4% Lime	12		12	LT SUBGRADE w/ 4% Lime

Pavement Re-Evaluation: Value Engineer the detour to replace limestone with caliche(10" w/ 2% lime)
 Program TEDSI used TxDOT FPS21 program to evaluate the design

Table A

Hot Mix Asphalt Ty "B"

Constructed According to Plans, 4, 688 Ft

Sta 11+11 to 46+88

<u>Ty "B"</u>		<u>@ 4 1/2"</u>					<u>Ty B</u>
Sta	Width	Avg Width	Length	SqFt	SqYds		#/Sy
1111	52	52					
1900	52	52	789	41028	4558.66667		
2200	66	59	300	17700	1966.66667		
4688	66	66	2488	164208	18245.33333		
				222936	24770.6667		57

705.96 Tons

Sta 11+11 to 46+88 Round up 706.00 Tons

Ty "B" Reduction

Project	102900	SY
1/2" of Ty "B" Project	2933	Tons
Sta 11+11 to 46+88 Construct at 4 1/2"	706	Tons
Deduct Ty B, CO Adjustment	2227	Tons

CO #6 Ty "B" Revised Plan Quantity

Sta 46+88 to 144+93

Original PQ @ 4 1/2"	24102	Tons
Deduct 1/2" Sta 46+88 to End Proj	2227	Tons
Revised PQ @ 4"	21875	Sta 46+88 to 144+92

Ty B, CO Adjustment

Detour: Replace Flex Base (TY A Gr1) Limestone with (Ty E Gr 4) Caliche

Revised Price

	PQ	Contractor Prices	
Constructing Detour	6661	\$44.31	\$295,148.91
Revised Price & Total	6661	\$38.34	\$255,382.74
CO Adjustment	6661	\$5.97	\$39,766.17 Savings

Plans: Missing Items - SGT & MBGF

MBGF Errors, Two locations

		MBGF	SGT	
MBGF	Plan Length	175		
MBGF	Deduct	50	Add 2 SGT	Deduct 25Ft & 25Ft MBGF(50Lf), Add 2 SGT to replace
MBGF	Required	125		Revised Quantity

Attachment B



Order No.	#
Date:	May 13, 2020

P.O. BOX 595
 PEÑITAS, TX 78576

PH: (956) 424-3414
 FAX: (956) 683-6149

CONTRACT CHANGE ORDER REQUEST

Project Name: Dicker Rd - CSJ 0921-02-312

Owner: Hidalgo County Pct 2

Item #	Description of Changes	Unit	Qty	Price	Decrease		Increase	
					in contract price		in contract price	
Detour Construction Phase 2								
508-6001	Construction Detour (TY A) Limestone Base	SY	-6661	12.77	-\$85,060.97			
508-6001	Construction Detour (TY E) GR 4 Base	SY	6661	6.8			45,294.8	
Totals					-\$85,060.97		45,294.8	
Net Change In Contract Price					(\$39,766.17)			

Reasons:



Raba Kistner, Inc.
800 East Hackberry
McAllen, TX 78501
www.rkci.com

Project No. AMA20-008-00
Dicker Road Improvement Project
April 21, 2020

P 956.682.5332
F 956.682.5487
TBPE Firm F-3257
TBAE Firm BR 3427

Mr. Eric R. Dietrich, P.E., PTOE
Project Manager
TEDSI Infrastructure Group, Inc.
1201 E. Expressway 83
Mission, Texas 78572

**RE: Supplemental Recommendations to Geotechnical Engineering Study
Proposed Dicker Road Improvements Project
Between Its Intersections with South 23rd Street (State Highway [S.H.] 115) and
South Jackson Road (Farm-to-Market [F.M.] Road 2061)
Hidalgo County, Texas
Work Authorization No. 3
Supplemental Agreement No. 3**

Dear Mr. Dietrich:

RABA KISTNER Consultants, Inc. (RKCI) is pleased to submit this document providing supplemental recommendations to our original geotechnical engineering study (**RKCI** Project No. AMA12-046-00 - October 2, 2014 Revision) pertaining to alternative pavement design guidelines using the Texas Department of Transportation (TxDOT) Flexible Pavement System (FPS) 21 software for the above-referenced project. Please note that at the time our original geotechnical engineering study (**RKCI** Project No. AMA12-046-00 - October 2, 2014 Revision), our office was not provided with the design traffic information required to perform analyses utilizing the FPS21 design software. These supplemental services were performed in accordance with the contract agreement titled "Subconsultant Agreement for Professional Services – Work Authorization 3," dated March 30, 2020 between the TEDSI Infrastructure Group, Inc. (CLIENT) and **RKCI**. Written authorization to proceed with these services was received by our office on Monday, March 30, 2020.

PROJECT DESCRIPTION

The proposed project consists of the design and reconstruction of an approximately 2.56-mile long section of the existing Dicker Road, between its intersections with South 23rd Street (S.H. 115) and South Jackson Road (F.M. Road 2061) in Hidalgo County, Texas. The pavement structures are anticipated to consist of flexible (asphalt) pavement systems.

O:\Active Projects\McAllen\2020\AMA20\AMA20-008-00 Dicker Road Lime Treatment Evaluation\Reporting\AMA20-008-00 Supplemental.doc



FLEXIBLE (ASPHALT) PAVEMENT DESIGN – DETOUR PAVEMENT

The flexible pavement design was performed considering a 3-year design period. The design traffic loading was determined based on traffic information provided by the CLIENT on Friday, April 17, 2020. The following pavement design parameters were used to design the flexible pavement for this project using the FPS21 design software:

- 3-year design period;
- Input parameters for FPS 21 computer software program:
 - o Basic Design Criteria
 - Length of the Analysis Period = 3 years
 - Minimum Time to First Overlay = 1 year
 - Minimum Time Between Overlays = 1 year
 - Design Confidence Level = C (95 %)
 - Serviceability Index of the Initial Structure = 4.8
 - Final Serviceability Index = 3.0
 - Serviceability Index after an Overlay = 4.0
 - District Temperature Constant = 31.0
 - Subgrade Elastic Modulus = 5.0 ksi
 - Interest Rate of Time Value of Money = 7 %
 - o Program Controls and Constraints
 - Number of Summary Output Pages = 3
 - Maximum Funds Available Per Square Yard for Initial Design = \$ 99.00
 - Maximum Allowed Thickness of Initial Construction = 69 in.
 - Accumulated Maximum Depth of All Overlays = 3 in.
 - o Traffic Data
 - Annual Daily Traffic (ADT) at Beginning of Analysis Period = 13,693 vehicles/day
 - ADT at End of Twenty Years = 20,347 vehicles/day
 - One-Direction 20-year 18 kip ESAL = 6.629 millions
 - Average Approach Speed to the Overlay Zone = 45 mph
 - Average Speed Through Overlay Zone = 35 mph (overlay direction)
 - Average Speed Through Overlay Zone = 45 mph (non-overlay direction)
 - Proportion of ADT Arriving Each Hour of Construction = 6 %
 - Percent Trucks in ADT = 26 %
 - o Construction and Maintenance Data
 - Minimum Overlay Thickness = 1.5 in.
 - Overlay Construction Time = 10 hours/day
 - Asphaltic-Concrete Compacted Density = 2.05 tons/c.y.
 - Asphaltic-Concrete Production Rate = 200 tons/hour
 - Width of Each Lane = 12 ft
 - First Year Cost of Routine Maintenance = \$80.00/lane-mile
 - Annual Incremental Increase in Maintenance Cost = \$40.00/lane-mile

- Detour Design for Overlays
 - Traffic Model Used During Overlaying = 3
 - Total Number of Lanes of the Facility = 4
 - Number of Open Lanes in Restricted Zone = 1 (overlay direction)
 - Number of Open Lanes in Restricted Zone = 2 (non-overlay direction)
 - Distance Traffic is Slowed = 0.5 miles (overlay direction)
 - Distance Traffic is Slowed = 0.6 miles (non-overlay direction)
 - Detour Distance Around the Overlay Zone = 0.0 miles

The resulting flexible pavement design, consisting of a 25-inch thick flexible pavement section (from surface to subgrade) is summarized below:

- 3 inches of hot-mix asphaltic concrete (HMA), Type D, PG76-22, SAC A
- 10 inches of flexible base material (FBM)
- 12 inches of Lime-Treated Subgrade (LTS)

FLEXIBLE (ASPHALT) PAVEMENT DESIGN – MAIN ROAD ALIGNMENT

The flexible pavement design was performed considering a 20-year design period. This is consistent with the pavement design criteria stated in the TxDOT Pavement Design Guide (January 2011 Revision). The design traffic loading was determined based on traffic information provided by the CLIENT on Friday, April 17, 2020. The following pavement design parameters were used to design the flexible pavement for this project using the FPS21 design software:

- 20-year design period;
- Input parameters for FPS 21 computer software program:
 - Basic Design Criteria
 - Length of the Analysis Period = 20 years
 - Minimum Time to First Overlay = 8 years
 - Minimum Time Between Overlays = 8 years
 - Design Confidence Level = C (95 %)
 - Serviceability Index of the Initial Structure = 4.8
 - Final Serviceability Index = 3.0
 - Serviceability Index after an Overlay = 4.0
 - District Temperature Constant = 31.0
 - Subgrade Elastic Modulus = 5.0 ksi
 - Interest Rate of Time Value of Money = 7 %
 - Program Controls and Constraints
 - Number of Summary Output Pages = 3
 - Maximum Funds Available Per Square Yard for Initial Design = \$ 99.00
 - Maximum Allowed Thickness of Initial Construction = 69 in.
 - Accumulated Maximum Depth of All Overlays = 3 in.
 - Traffic Data
 - Annual Daily Traffic (ADT) at Beginning of Analysis Period = 13,693 vehicles/day

- ADT at End of Twenty Years = 20,347 vehicles/day
- One-Direction 20-year 18 kip ESAL = 6.629 millions
- Average Approach Speed to the Overlay Zone = 45 mph
- Average Speed Through Overlay Zone = 35 mph (overlay direction)
- Average Speed Through Overlay Zone = 45 mph (non-overlay direction)
- Proportion of ADT Arriving Each Hour of Construction = 6 %
- Percent Trucks in ADT = 26.0 %
- Construction and Maintenance Data
 - Minimum Overlay Thickness = 1.5 in.
 - Overlay Construction Time = 10 hours/day
 - Asphaltic-Concrete Compacted Density = 2.05 tons/c.y.
 - Asphaltic-Concrete Production Rate = 200 tons/hour
 - Width of Each Lane = 12 ft
 - First Year Cost of Routine Maintenance = \$80.00/lane-mile
 - Annual Incremental Increase in Maintenance Cost = \$40.00/lane-mile
- Detour Design for Overlays
 - Traffic Model Used During Overlaying = 3
 - Total Number of Lanes of the Facility = 4
 - Number of Open Lanes in Restricted Zone = 1 (overlay direction)
 - Number of Open Lanes in Restricted Zone = 2 (non-overlay direction)
 - Distance Traffic is Slowed = 0.5 miles (overlay direction)
 - Distance Traffic is Slowed = 0.6 miles (non-overlay direction)
 - Detour Distance Around the Overlay Zone = 0.0 miles

Our scope of services also included the evaluation of an alternative permanent pavement design section to eliminate the specified 1/2-inch step on the flexible base material located between the asphaltic flexible pavement section and the concrete curb and gutter structure (please refer to the Figure 1 for the curb and gutter detail).

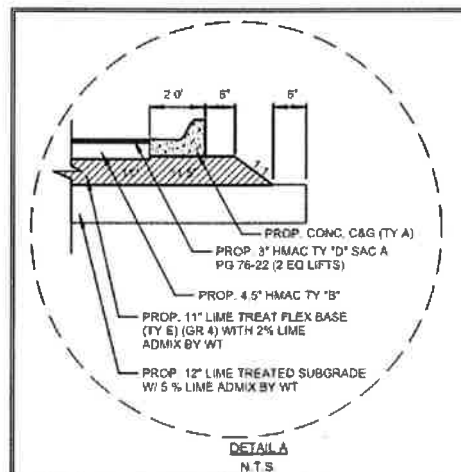


Figure 1 – Proposed Typical Section Including the Specified 1/2-Inch Step

For a 20-year design period and in order to eliminate the specified 1/2-inch step between the asphalt pavement section and the concrete curb, the resulting flexible pavement design, consisting of a 30-inch thick flexible pavement section (from surface to subgrade) is summarized below:

- 3 inches of hot-mix asphaltic concrete (HMA), Type D, PG76-22, SAC A
- 4 inches of hot-mix asphaltic concrete (HMA), Type B
- 11 inches of flexible base material (FBM)
- 12 inches of Lime-Treated Subgrade (LTS)

Please note that the thickness of the FBM layer beneath the concrete curb must match the thickness of the FBM layer of the selected asphalt pavement section in order to eliminate the step included in the specified typical section. Also, it is our judgment that a credit should be given to the County of Hidalgo, Precinct 2, in response to the reduction of 1/2 inch hot-mix asphaltic concrete and the elimination of lime-treated flexible base material consisting of Item 247, Type A, Grade 1 or 2 (treated with 2% lime by weight), and replacing it with 11 inches of lime-treated caliche flexible base material meeting the TxDOT Item 247, Flexible Base, Type E, Grade 4 specifications. Further, we understand that the TxDOT's Pharr District has been treating the flexible base material with cement instead of lime. It may be beneficial to conduct a cost analysis and confirm if the cost savings are sufficient to replace treatment of the flexible base material with cement instead of lime.

All other limitations and recommendations and limitations remain as stated in our original Geotechnical Engineering Study (RKCI Project No. AMA12-046-00, dated Revised October 2, 2014).

* * * * *

We trust that this supplemental information will be helpful to the project team. If you should have any questions pertaining to this matter or if we may be of additional assistance, please do not hesitate to call.

Very truly yours,

RABA KISTNER CONSULTANTS, INC.



Saul Cruz, EIT
Graduate Engineer

SC/IA/KML

Copies Submitted: Above (1)

Enclosures: Results of the Flexible Pavement Design Check



Katrin M. Leonard, P.E.
Associate



April 21, 2020





Texas Department of Transportation

TEXAS DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT SYSTEM

FP S21-1.5

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

PROB	DIST.-21	COUNTY-109	CONT.	SECT.	JOB	HIGHWAY	DATE	PAGE
002	Pharr	HILDAGO	0921	02	312	Dicker	4/20/2020	1

COMMENTS ABOUT THIS PROBLEM



TEXAS DEPARTMENT OF TRANSPORTATION

FP S21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

BASIC DESIGN CRITERIA

LENGTH OF THE ANALYSIS PERIOD (YEARS)	3.0
MINIMUM TIME TO FIRST OVERLAY (YEARS)	1.0
MINIMUM TIME BETWEEN OVERLAYS (YEARS)	1.0
DESIGN CONFIDENCE LEVEL (95.0%)	C
SERVICEABILITY INDEX OF THE INITIAL STRUCTURE	4.8
FINAL SERVICEABILITY INDEX P2	3.0
SERVICEABILITY INDEX P1 AFTER AN OVERLAY	4.0
DISTRICT TEMPERATURE CONSTANT	31.0
SUBGRADE ELASTIC MODULUS by COUNTY (ksi)	5.00
INTEREST RATE OR TIME VALUE OF MONEY (PERCENT)	7.0

PROGRAM CONTROLS AND CONSTRAINTS

NUMBER OF SUMMARY OUTPUT PAGES DESIRED (8 DESIGNS/PAGE)	3
MAX FUNDS AVAILABLE PER SQ.YD. FOR INITIAL DESIGN (DOLLARS)	99.00
MAXIMUM ALLOWED THICKNESS OF INITIAL CONSTRUCTION (INCHES)	69.0
ACCUMULATED MAX DEPTH OF ALL OVERLAYS (INCHES) (EXCLUDING LEVEL-UP)	3.0

TRAFFIC DATA

ADT AT BEGINNING OF ANALYSIS PERIOD (VEHICLES/DAY)	13693.
ADT AT END OF TWENTY YEARS (VEHICLES/DAY)	20347.
ONE-DIRECTION 20YEAR 18 kip ESAL (millions)	6.629
AVERAGE APPROACH SPEED TO THE OVERLAY ZONE (MPH)	45.0
AVERAGE SPEED THROUGH OVERLAY ZONE (OVERLAY DIRECTION) (MPH)	35.0
AVERAGE SPEED THROUGH OVERLAY ZONE (NON-OVERLAY DIRECTION) (MPH)	45.0
PROPORTION OF ADT ARRIVING EACH HOUR OF CONSTRUCTION (PERCENT)	6.0
PERCENT TRUCKS IN ADT	26.0



Texas Department of Transportation

TEXAS DEPARTMENT OF TRANSPORTATION

FPS21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

PROB	DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY	DATE	PAGE
002	Pharr	HILDAGO	0921	02	312	Dicker	4/20/2020	2

INPUT DATA CONTINUED

CONSTRUCTION AND MAINTENANCE DATA

MINIMUM OVERLAY THICKNESS (INCHES)	1.5
OVERLAY CONSTRUCTION TIME (HOURS/DAY)	10.0
ASPHALTIC CONCRETE COMPACTED DENSITY (TONS/C.Y.)	2.05
ASPHALTIC CONCRETE PRODUCTION RATE (TONS/HOUR)	200.0
WIDTH OF EACH LANE (FEET)	12.0
FIRST YEAR COST OF ROUTINE MAINTENANCE (DOLLARS/LANE-MILE)	80.00
ANNUAL INCREMENTAL INCREASE IN MAINTENANCE COST (DOLLARS/LANE-MILE)	40.00

DETOUR DESIGN FOR OVERLAYS

TRAFFIC MODEL USED DURING OVERLAYING	3
TOTAL NUMBER OF LANES OF THE FACILITY	4
NUMBER OF OPEN LANES IN RESTRICTED ZONE (OVERLAY DIRECTION)	1
NUMBER OF OPEN LANES IN RESTRICTED ZONE (NON-OVERLAY DIRECTION)	2
DISTANCE TRAFFIC IS SLOWED (OVERLAY DIRECTION) (MILES)	0.50
DISTANCE TRAFFIC IS SLOWED (NON-OVERLAY DIRECTION) (MILES)	0.60
DETOUR DISTANCE AROUND THE OVERLAY ZONE (MILES)	0.00

PAVING MATERIALS INFORMATION

LAYER CODE	MATERIALS NAME	COST PER CY	E MODULUS	POISSON RATIO	MIN. DEPTH	MAX. DEPTH	SALVAGE PCT.
1	A ASPH CONC PVMT	150.00	500000.	0.35	3.00	3.00	90.00
2	B FLEXIBLE BASE	54.00	45000.	0.35	10.00	10.00	75.00
3	C STABILIZED SUBGR	15.00	25000.	0.35	12.00	12.00	70.00
4	D SUBGRADE(200)	2.00	5000.	0.40	200.00	200.00	90.00



Texas Department of Transportation

TEXAS DEPARTMENT OF TRANSPORTATION
FLEXIBLE PAVEMENT SYSTEM

FPS21-1.5

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

Table with 8 columns: PROB, DIST., COUNTY, CONT., SECT., JOB, HIGHWAY, DATE, PAGE. Row 1: 002, Pharr, HILDAGO, 0921, 02, 312, Dicker, 4/20/2020, 3

C. LEVEL C SUMMARY OF THE BEST DESIGN STRATEGIES
IN ORDER OF INCREASING TOTAL COST
1

Table with 2 columns: MATERIAL ARRANGEMENT, COST. Rows: INIT. CONST. COST (32.50), OVERLAY CONST. COST (6.80), USER COST (0.01), ROUTINE MAINT. COST (0.05), SALVAGE VALUE (-25.82)

TOTAL COST 13.54

NUMBER OF LAYERS 3

Table with 2 columns: LAYER DEPTH (INCHES), COST. Rows: D(1) (3.00), D(2) (10.00), D(3) (12.00)

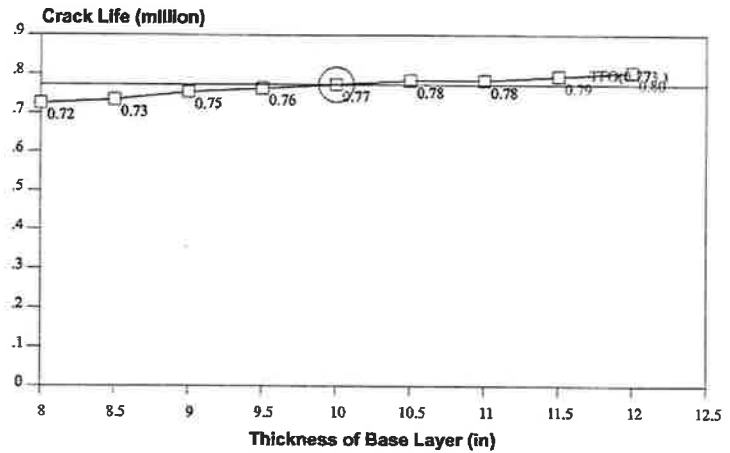
NO. OF PERF. PERIODS 2

Table with 2 columns: PERF. TIME (YEARS), COST. Rows: T(1) (3.), T(2) (5.)

Table with 2 columns: OVERLAY POLICY (INCH), COST. Row: O(1) (2.0)

THE TOTAL NUMBER OF FEASIBLE DESIGNS CONSIDERED WAS 1

	Thickness (Inches)	Modulus (ksi)	Poisson's Ratio	Material Name
AC	3.00	500.00	0.35	ASPH CONC PVMT
Base	10.00	45.00	0.35	FLEXIBLE BASE
Subbase	12.00	25.00	0.35	STABILIZED SUBGR
Subgrade	200.00	5.00	0.40	SUBGRADE(200)



Fatigue Crack Model:

$$N_f = f_1 (\epsilon_t)^{f_2} (E_t)^{f_3}$$

$f_1 = 7.96E-02$

$f_2 = 3.291$

Rutting Model:

$f_3 = .854$

$$N_d = f_4 (\epsilon_v)^{f_5}$$

$f_4 = 1.37E-09$

$f_5 = 4.477$

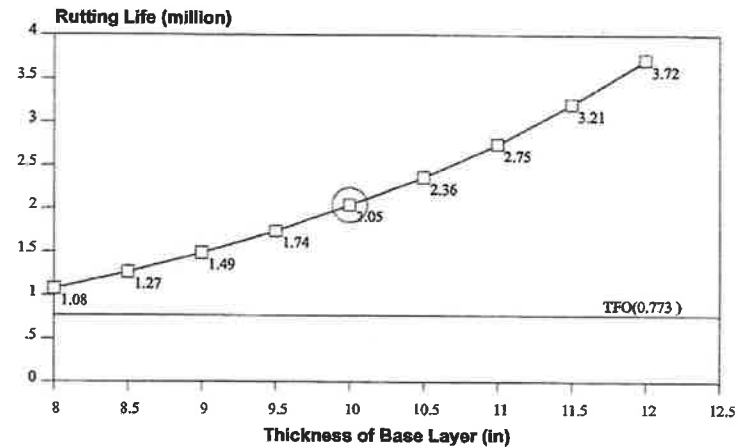
TFO(Traffic to 1st Overlay): 0.77 (million)

Crack Life: 0.77 (million) $\epsilon_t = 250.00 (\mu\epsilon)$

Rut Life: 2.05 (million) $\epsilon_v = -408.00 (\mu\epsilon)$

Traffic to 1st Overlay is calculated by analysis period: 3years and 18 kips:6.63millions.

Also the start ADT:13693.0 and ending ADT:20347.0

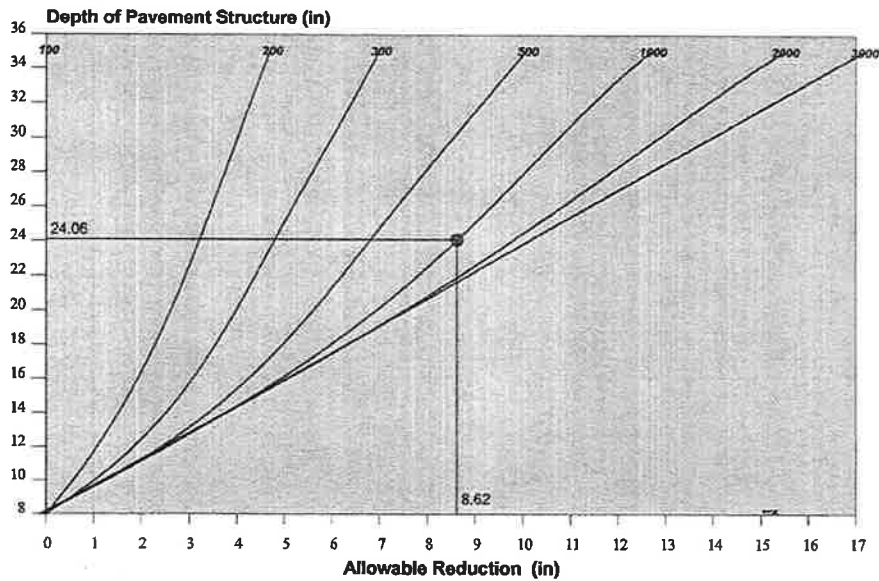


Mechanistic Check Conclusion:

The design is OK !

FPS 21 Mechanistic Design Check Output (FPS21-1.5Release:12-12-2018)			
Highway	Dicker	Problem	002
C-S-J	0921 - 02 - 312	Date	4/20/2020
District	Pharr	County	HILDAGO
Design Type:Asphalt concrete + Flexible Base + Stabilized Subgrade over Subgrade			

	Thickness (Inches)	Modulus (ksi)	Poisson's Ratio	Material Name
ASPH CONC PVMT	3.00	500.00	0.35	ASPH CONC PVMT
FLEXIBLE BASE	10.00	45.00	0.35	FLEXIBLE BASE
STABILIZED SUBGR	12.00	25.00	0.35	STABILIZED SUBGR
SUBGRADE(200)	200.00	5.00	0.40	SUBGRADE(200)
Bed Rock		500.00	0.15	Bed Rock



Thickness Reduction Chart for Stabilized Layers

INPUT PARAMETERS:

The Heaviest Wheel Loads Daily (ATHWLD)	12000.0 (lb)
Percentage of TandemAxles	26.0 (%)
Modified Cohesionmeter Value	1000.0
Design Wheel Load	12000.0 (lb)
Subgrade Texas Triaxial Class Number (TTC)	5.72
User Input TTC based on historical TEX-117-E	

RESULT:

Triaxial Thickness Required	24.1 (in)
The FPS Design Thickness	25.0 (in)
Allowable Thickness Reduction	8.6 (in)
Modified Triaxial Thickness	15.4 (in)

TRIAxIAL CHECK CONCLUSION:

The Design OK !

FPS 21 Triaxial Design Check Output (FPS21-1.5Release:12-12-2018)			
Highway	Dicker	Problem	002
C-S-J	0921 - 02 - 312	Date	4/20/2020
District	Pharr	County	HILDAGO
Design Type: Asphalt concrete + Flexible Base + Stabilized Subgrade over Subgrade			



Texas Department of Transportation

TEXAS DEPARTMENT OF TRANSPORTATION

FP S21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

PROB	DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY	DATE	PAGE
001	Pharr	HILDAGO	0921	02	312	Dicker	4/20/2020	1

COMMENTS ABOUT THIS PROBLEM



TEXAS DEPARTMENT OF TRANSPORTATION

FPS21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

BASIC DESIGN CRITERIA

LENGTH OF THE ANALYSIS PERIOD (YEARS)	20.0
MINIMUM TIME TO FIRST OVERLAY (YEARS)	8.0
MINIMUM TIME BETWEEN OVERLAYS (YEARS)	8.0
DESIGN CONFIDENCE LEVEL (95.0%)	C
SERVICEABILITY INDEX OF THE INITIAL STRUCTURE	4.8
FINAL SERVICEABILITY INDEX P2	3.0
SERVICEABILITY INDEX P1 AFTER AN OVERLAY	4.0
DISTRICT TEMPERATURE CONSTANT	31.0
SUBGRADE ELASTIC MODULUS by COUNTY (ksi)	5.00
INTEREST RATE OR TIME VALUE OF MONEY (PERCENT)	7.0

PROGRAM CONTROLS AND CONSTRAINTS

NUMBER OF SUMMARY OUTPUT PAGES DESIRED (8 DESIGNS/PAGE)	3
MAX FUNDS AVAILABLE PER SQ.YD. FOR INITIAL DESIGN (DOLLARS)	99.00
MAXIMUM ALLOWED THICKNESS OF INITIAL CONSTRUCTION (INCHES)	69.0
ACCUMULATED MAX DEPTH OF ALL OVERLAYS (INCHES) (EXCLUDING LEVEL-UP)	3.0

TRAFFIC DATA

ADT AT BEGINNING OF ANALYSIS PERIOD (VEHICLES/DAY)	13693.
ADT AT END OF TWENTY YEARS (VEHICLES/DAY)	20347.
ONE-DIRECTION 20YEAR 18 kip ESAL (millions)	6.629
AVERAGE APPROACH SPEED TO THE OVERLAY ZONE (MPH)	45.0
AVERAGE SPEED THROUGH OVERLAY ZONE (OVERLAY DIRECTION) (MPH)	35.0
AVERAGE SPEED THROUGH OVERLAY ZONE (NON-OVERLAY DIRECTION) (MPH)	45.0
PROPORTION OF ADT ARRIVING EACH HOUR OF CONSTRUCTION (PERCENT)	6.0
PERCENT TRUCKS IN ADT	26.0



Texas Department of Transportation

TEXAS DEPARTMENT OF TRANSPORTATION

FPS21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

PROB	DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY	DATE	PAGE
001	Pharr	HILDAGO	0921	02	312	Dicker	4/20/2020	2

INPUT DATA CONTINUED

CONSTRUCTION AND MAINTENANCE DATA

MINIMUM OVERLAY THICKNESS (INCHES)	1.5
OVERLAY CONSTRUCTION TIME (HOURS/DAY)	10.0
ASPHALTIC CONCRETE COMPACTED DENSITY (TONS/C.Y.)	2.05
ASPHALTIC CONCRETE PRODUCTION RATE (TONS/HOUR)	200.0
WIDTH OF EACH LANE (FEET)	12.0
FIRST YEAR COST OF ROUTINE MAINTENANCE (DOLLARS/LANE-MILE)	80.00
ANNUAL INCREMENTAL INCREASE IN MAINTENANCE COST (DOLLARS/LANE-MILE)	40.00

DETOUR DESIGN FOR OVERLAYS

TRAFFIC MODEL USED DURING OVERLAYING	3
TOTAL NUMBER OF LANES OF THE FACILITY	4
NUMBER OF OPEN LANES IN RESTRICTED ZONE (OVERLAY DIRECTION)	1
NUMBER OF OPEN LANES IN RESTRICTED ZONE (NON-OVERLAY DIRECTION)	2
DISTANCE TRAFFIC IS SLOWED (OVERLAY DIRECTION) (MILES)	0.50
DISTANCE TRAFFIC IS SLOWED (NON-OVERLAY DIRECTION) (MILES)	0.60
DETOUR DISTANCE AROUND THE OVERLAY ZONE (MILES)	0.00

PAVING MATERIALS INFORMATION

LAYER CODE	MATERIALS NAME	COST PER CY	E MODULUS	POISSON RATIO	MIN. DEPTH	MAX. DEPTH	SALVAGE PCT.
1	A ASPH CONC PVMT	150.00	650000.	0.35	7.00	7.00	90.00
2	B FLEXIBLE BASE	54.00	45000.	0.35	11.00	11.00	75.00
3	C STABILIZED SUBGR	15.00	25000.	0.35	12.00	12.00	70.00
4	D SUBGRADE(200)	2.00	5000.	0.40	200.00	200.00	90.00



TEXAS DEPARTMENT OF TRANSPORTATION

FPS21-1.5

FLEXIBLE PAVEMENT SYSTEM

Release:12-12-2018

PAVEMENT DESIGN TYPE # 5 -- ACP + FLEX BASE + STAB SBGR OVER SUBGRADE

PROB	DIST.	COUNTY	CONT.	SECT.	JOB	HIGHWAY	DATE	PAGE
001	Pharr	HILDAGO	0921	02	312	Dicker	4/20/2020	3

C. LEVEL C SUMMARY OF THE BEST DESIGN STRATEGIES
 IN ORDER OF INCREASING TOTAL COST
 1

MATERIAL ARRANGEMENT	ABC
INIT. CONST. COST	50.67
OVERLAY CONST. COST	3.23
USER COST	0.00
ROUTINE MAINT. COST	0.44
SALVAGE VALUE	-12.34

TOTAL COST 42.01

NUMBER OF LAYERS 3

LAYER DEPTH (INCHES)	
D(1)	7.00
D(2)	11.00
D(3)	12.00

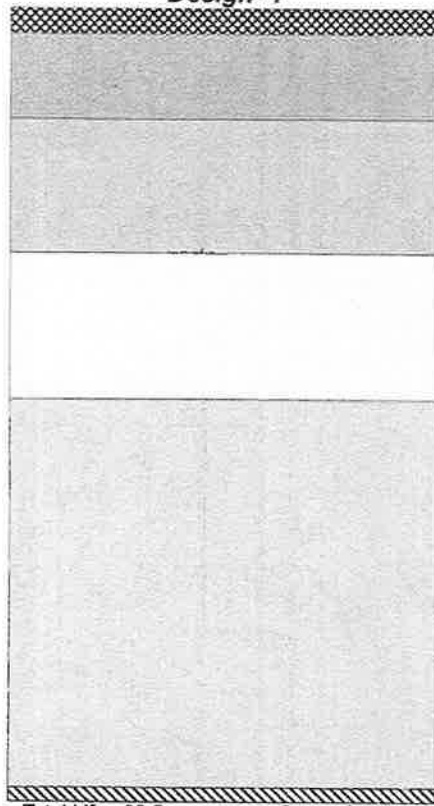
NO. OF PERF. PERIODS 2

PERF. TIME (YEARS)	
T(1)	14.
T(2)	22.

OVERLAY POLICY (INCH)	
(INCLUDING LEVEL-UP)	
O(1)	2.0

THE TOTAL NUMBER OF FEASIBLE DESIGNS CONSIDERED WAS 1

Design- 1



Thick (in)	Modulus (ksi)	Poisson's Ratio	Mat.Type
2.00			Overlay
7.00	650.0	0.35	ASPH CONC PVMT
11.00	45.0	0.35	FLEXIBLE BASE
12.00	25.0	0.35	STABILIZED SUBGR
200.00	5.0	0.40	SUBGRADE(200)

Performance:

- No. of Perf. Period 2
- Perf. Time (year) 14.1,22.5
- Overlay Policy (in) 2.00

Cost:

- Initial Construction Cost 50.667
- Overlay Construction Cost 3.232
- User Cost 0.005
- Routine Maintain Cost 0.443
- Salvage Value -12.340
- Total Cost of Pavement 42.006

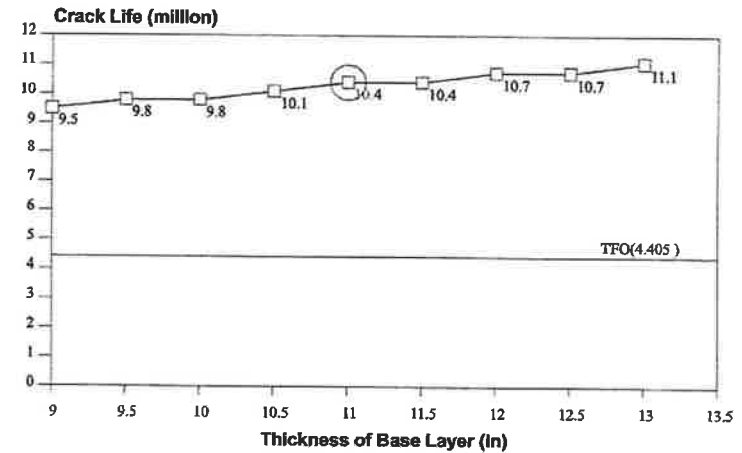
Total Life: 22.5 years Cost: \$42.01

FPS 21 Feasible Design Plotting Output (FPS21-1.5Release:12-12-2018)

Highway	Dicker	Problem	001
C-S-J	0921 - 02 - 312	Date	4/20/2020
District	Pharr	County	HILDAGO

Design Type: Asphalt concrete + Flexible Base + Stabilized Subgrade over Subgrade

	Thickness (inches)	Modulus (ksi)	Poisson's Ratio	Material Name
AC	7.00	650.00	0.35	ASPH CONC PVMT
Base	11.00	45.00	0.35	FLEXIBLE BASE
Subbase	12.00	25.00	0.35	STABILIZED SUBGR
Subgrade	200.00	5.00	0.40	SUBGRADE(200)



Fatigue Crack Model:

$$N_f = f_1 (\epsilon_t)^{f_2} (E_t)^{f_3}$$

$f_1 = 7.96E-02$

$f_2 = 3.291$

Rutting Model:

$f_3 = .854$

$$N_d = f_4 (\epsilon_v)^{f_5}$$

$f_4 = 1.37E-09$

$f_5 = 4.477$

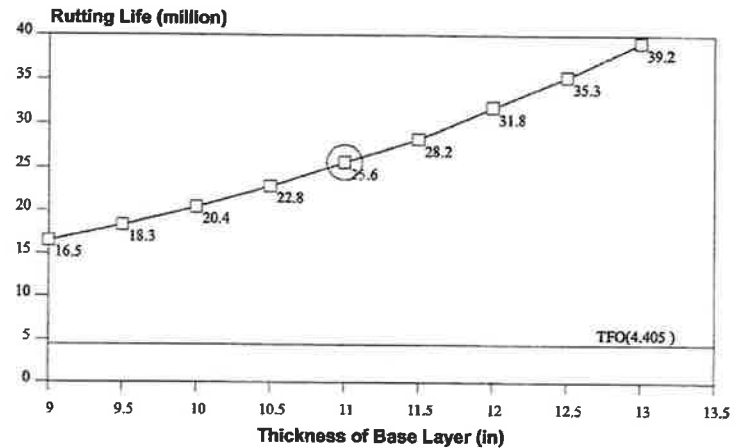
TFO(Traffic to 1st Overlay): 4.40 (million)

Crack Life: 10.41 (million) $\epsilon_\tau = 106.00 (\mu\epsilon)$

Rut Life: 25.61 (million) $\epsilon_v = -232.00 (\mu\epsilon)$

Traffic to 1st Overlay is calculated by analysis period: 20years and 18 kips:6.63millions.


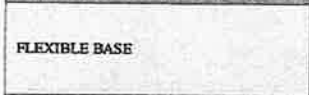
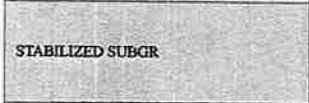
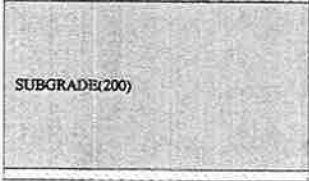
Also the start ADT:13693.0 and ending ADT:20347.0



Mechanistic Check Conclusion:

The design is OK !

FPS 21 Mechanistic Design Check Output (FPS21-1.5Release:12-12-2018)			
Highway	Dicker	Problem	001
C-S-J	0921 - 02 - 312	Date	4/20/2020
District	Pharr	County	HILDAGO
Design Type:Asphalt concrete + Flexible Base + Stabilized Subgrade over Subgrade			

	Thickness (Inches)	Modulus (ksi)	Poisson's Ratio	Material Name
	7.00	650.00	0.35	ASPH CONC PVMT
	11.00	45.00	0.35	FLEXIBLE BASE
	12.00	25.00	0.35	STABILIZED SUBGR
	200.00	5.00	0.40	SUBGRADE(200)
Bed Rock		500.00	0.15	Bed Rock

INPUT PARAMETERS:

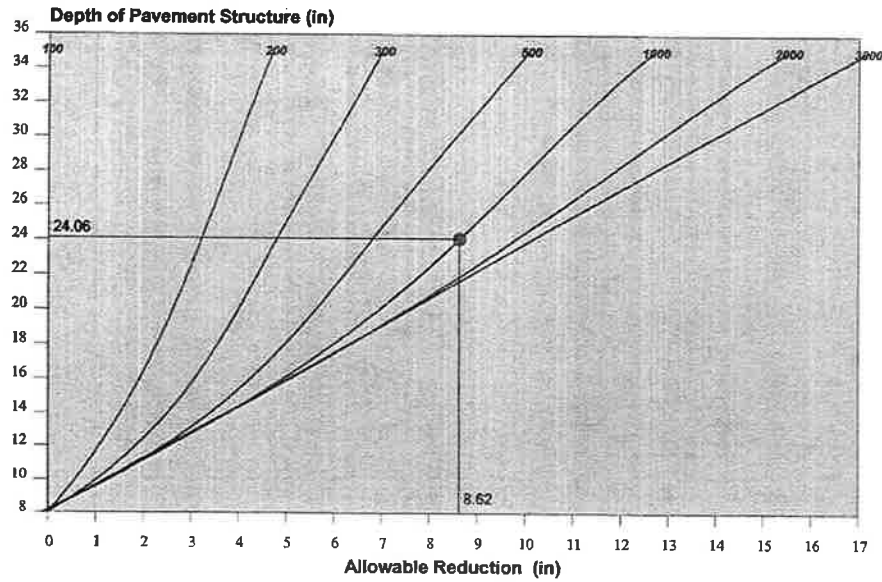
The Heaviest Wheel Loads Daily (ATHWLD)	12000.0 (lb)
Percentage of Tandem/Axles	26.0 (%)
Modified Cohesionmeter Value	1000.0
Design Wheel Load	12000.0 (lb)
Subgrade Texas Triaxial Class Number (TTC)	5.72
Calculated TTC based on input soil PI	
User Input Sub-Grade Plasticity Index (PI)	36.00

RESULT:

Triaxial Thickness Required	24.1 (in)
The FPS Design Thickness	30.0 (in)
Allowable Thickness Reduction	8.6 (in)
Modified Triaxial Thickness	15.4 (in)

TRIAXIAL CHECK CONCLUSION:

The Design OK !



Thickness Reduction Chart for Stabilized Layers

FPS 21 Triaxial Design Check Output (FPS21-1.5Release:12-12-2018)			
Highway	Dicker	Problem	001
C-S-J	0921 - 02 - 312	Date	4/20/2020
District	Pharr	County	HILDAGO
Design Type: Asphalt concrete + Flexible Base + Stabilized Subgrade over Subgrade			

2GS LLC dba,



PROPOSAL

P.O. Box 595 Penitas, TX. 78576

PROJECT:	Dicker Rd Reconstruction		
OWNER:	Hidalgo County Precinct 2	DATE PREPARED:	4/27/20
ENGINEER:	B2Z		
LOCATION:			

We are pleased to submit these prices for your consideration

ITEM #	DESCRIPTION	Unit	QTY	UNIT COST	TOTAL COST
Quote to furnish and install guardrail end treatments (MASH)					
540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	-100	\$24.64	-\$2,464.00
544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	2	\$3,728.00	\$7,456.00
	Quote to furnish and install guardrail end treatment				
					\$4,992.00

Report Updated by CST-CMISD :: 04/14/2020

CONSTRUCTION PROJECT-AVERAGE LOW BID			STATEWIDE						DISTRICT NAME PHARR					
District PHARR			3 Month			12 Month			3 Month			12 Month		
ITEM CODE	ITEM DESCRIPTION	ITEM UNIT	STATEWIDE 3M COUNT	STATEWIDE 3M QUANTITY	STATEWIDE 3M AVG	STATEWIDE 12M COUNT	STATEWIDE 12M QUANTITY	STATEWIDE 12M AVG	DISTRICT21 - 3M COUNT	DISTRICT21 - 3M QUANTITY	DISTRICT21 - 3M AVG	DISTRICT21 - 12M COUNT	DISTRICT21 - 12M QUANTITY	DISTRICT21 - 12M AVG
05436001	CABLE BARRIER SYSTEM (TL-3)	LF	1	4,881.00	\$11.03	3	67,030.00	\$10.16						
05436002	CABLE BARRIER SYSTEM (TL-4)	LF	8	717,390.00	\$8.36	36	2,828,632.00	\$8.36				2	48,990.00	\$13.43
05436006	CABLE BARRIER SYSTEM (TL-4) (10'-0")	LF	1	2,438.00	\$12.10	4	26,635.00	\$10.00						
05436019	CABLE BARRIER TERMINAL SECTION (TL-3)	EA	1	6.00	\$3,310.03	4	111.00	\$2,922.18						
05436020	CABLE BARRIER TERMINAL SECTION (TL-4)	EA	8	464.00	\$2,668.88	36	2,283.00	\$2,739.38				2	96.00	\$4,336.20
05436021	REMOVE CABLE BARRIER	LF	2	7,183.00	\$4.09	10	183,307.00	\$3.64				1	1,219.00	\$19.13
05436022	REMOVE CABLE BARRIER TERMINAL SECTION	EA				7	67.00	\$465.34						
05446001	GUARDRAIL END TREATMENT (INSTALL)	EA	104	1,550.00	\$2,683.94	382	6,772.00	\$2,704.12	1	11.00	\$3,500.00	6	94.00	\$3,011.84
05446002	GUARDRAIL END TREATMENT (MOVE & RESET)	EA	5	24.00	\$2,572.00	11	86.00	\$1,388.09						
05446003	GUARDRAIL END TREATMENT (REMOVE)	EA	55	677.00	\$271.58	228	3,470.00	\$280.47	1	11.00	\$650.00	5	43.00	\$637.62
05446004	GDRAIL END TRT (INST)(WOOD POST)(TY I)	EA				2	8.00	\$2,850.10						
05446005	GDRAIL END TRT (INST)(WOOD POST)(TY II)	EA	1	61.00	\$2,661.00	2	67.00	\$2,711.51						
05446006	GDRAIL END TRT (INST)(WOOD POST)(TY III)	EA				1	2.00	\$3,242.78						
05446007	GDRAIL END TRT (INSTALL)(HBA POST)	EA				4	47.00	\$2,613.40						
05446011	GDRL END TRTMT (RETRO W/O HEAD)(WD POST)	EA	1	6.00	\$1,100.00	1	6.00	\$1,100.00						
05456001	CRASH CUSH ATTEN (INSTL)	EA				39	238.00	\$9,355.32				1	2.00	\$9,690.00
05456002	CRASH CUSH ATTEN (DES SOURCE)	EA	1	2.00	\$4,000.00	6	31.00	\$4,438.33						
05456003	CRASH CUSH ATTEN (MOVE & RESET)	EA	28	312.00	\$1,571.36	153	3,039.00	\$1,339.71				4	36.00	\$3,563.43
05456004	CRASH CUSH ATTEN (STKPL)	EA	5	31.00	\$1,528.06	22	104.00	\$1,352.87						
05456005	CRASH CUSH ATTEN (REMOVE)	EA	29	235.00	\$776.10	162	1,333.00	\$831.78				5	44.00	\$1,645.93
05456006	CRASH CUSH ATTEN (INSTL)(L)(N)(TL2)	EA	1	4.00	\$18,900.00	4	11.00	\$21,243.84						
05456007	CRASH CUSH ATTEN (INSTL)(L)(N)(TL3)	EA	6	28.00	\$31,647.14	42	351.00	\$22,975.14				3	32.00	\$19,277.72
05456008	CRASH CUSH ATTEN (INSTL)(L)(N)(70)	EA				2	11.00	\$24,945.45						
05456010	CRASH CUSH ATTEN (INSTL)(L)(W)(TL3)	EA				5	10.00	\$32,643.17						
05456012	CRASH CUSH ATTEN (INSTL)(R)(N)(TL2)	EA				1	1.00	\$10,000.00						
05456013	CRASH CUSH ATTEN (INSTL)(R)(N)(TL3)	EA	7	51.00	\$17,408.36	27	165.00	\$16,590.40				1	16.00	\$22,776.43
05456014	CRASH CUSH ATTEN (INSTL)(R)(N)(70)	EA				2	24.00	\$16,400.00						
05456015	CRASH CUSH ATTEN (INSTL)(R)(W)(TL2)	EA				1	1.00	\$29,000.00						
05456016	CRASH CUSH ATTEN (INSTL)(R)(W)(TL3)	EA				4	6.00	\$22,467.50						
05456018	CRASH CUSH ATTEN (INSTL)(S)(N)(TL2)	EA	1	2.00	\$7,065.45	6	15.00	\$7,034.06						
05456019	CRASH CUSH ATTEN (INSTL)(S)(N)(TL3)	EA	26	202.00	\$6,692.64	95	712.00	\$7,846.14						
05456020	CRASH CUSH ATTEN (INSTL)(S)(N)(70)	EA				1	2.00	\$12,371.26						
05456022	CRASH CUSH ATTEN (INSTL)(S)(W)(TL3)	EA	2	3.00	\$8,416.67	6	12.00	\$9,353.03						
05456024	CRASH CUSHION ATTEN (INSTALL)(TRACC)	EA	1	1.00	\$25,000.00	2	3.00	\$16,666.67						
05456025	CRASH CUSHION ATTEN (INSTALL)(REACT)(N)	EA				2	24.00	\$17,125.00						
05456027	CRASH CUSHION ATTEN (INSTALL)(QUAD)(W)	EA				2	7.00	\$15,142.86						
05506001	CHAIN LINK FENCE (INSTALL) (6')	LF				8	6,860.00	\$21.18				2	2,725.00	\$20.77
05506003	CHAIN LINK FENCE (REMOVE)	LF	1	1,118.00	\$7.09	7	8,287.00	\$8.31						
05506006	GATE (REMOVE)	EA	1	1.00	\$1,000.00	6	17.00	\$864.94						
05506008	CHAIN LINK FENCE (INSTALL) (8')	LF				4	3,597.00	\$45.44						
05506009	CHAIN LINK FENCE (INSTALL) (6') (BARB TOP)	LF				1	293.00	\$49.15						

BID CODE AVG PRICES

