CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		1

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

FINAL PLANS

DATE OF LETTING: _____

DATE WORK BEGAN: _____

DATE WORK COMPLETED: _____

DATE WORK ACCEPTED: _____

FINAL CONTRACT COST: $ _____

CONTRACTOR: _____

LIST OF APPROVED FIELD CHANGES, CHANGE ORDERS & SUPPLEMENTAL AGREEMENTS:

THIS IS TO CERTIFY THAT ALL CONSTRUCTION SUBSTANTIAL WORK WAS PERFORMED IN ACCORDANCE WITH THE PLANS SPECIFICATIONS AND CONTRACT. ALL PROPOSED CONSTRUCTION WAS COMPLETED UNLESS OTHERWISE NOTED.

_____ _____

HECTOR SILLER, P.E. DATE
PHARR AREA ENGINEER

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL AID PROJECT NUMBER: STP 2023(834)HES

CSJ 2094-01-071

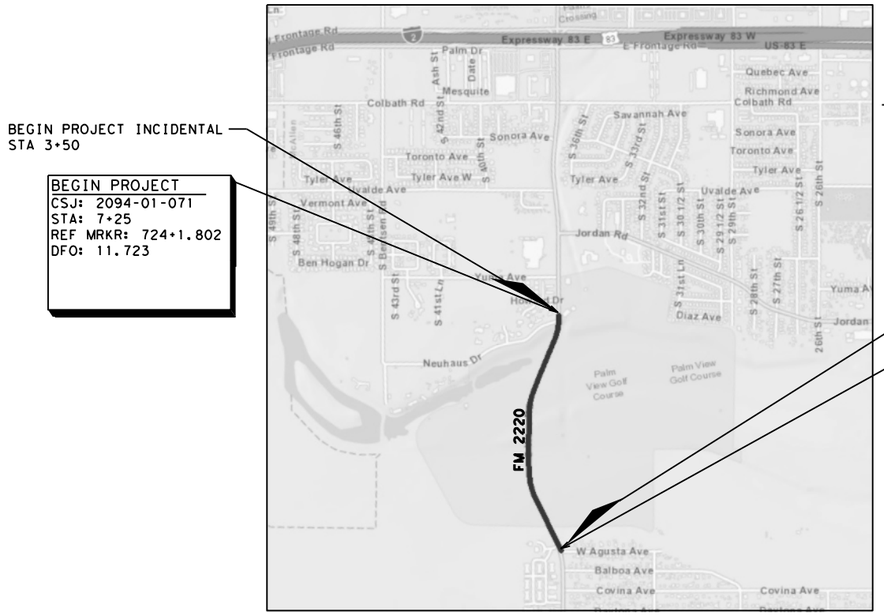
NET LENGTH OF PROJECT = 3,637.92 FEET = 0.689 MILES
- ROADWAY = 3,527.92 FEET = 0.668 MILES
- BRIDGE = 110 FEET = 0.021 MILES

HIDALGO
FM 2220

FROM: NEUHAUS DR.
TO: AUGUSTA AVE.

FOR THE INSTALLATION OF A RAISED MEDIAN

CONSISTING OF: MILLING, OVERLAY, RAISED MEDIAN INSTALLATION AND PAVEMENT MARKINGS



LOCATION MAP NOT TO SCALE

PROJECT DATA

DESIGN SPEED:
50 MPH

HIGHWAY FUNCTIONAL CLASS:
PRINCIPAL ARTERIAL

TRAFFIC VOLUMES:
2021 ADT 28,332
2041 ADT 39,665

PERCENT TRUCKS: 2.6% ADT

EXCEPTIONS: NONE

EQUATIONS: NONE

RAILROAD CROSSINGS: NONE

TDLR INSPECTION NOT REQUIRED

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION ON NOVEMBER 1, 2014 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, JULY 2022).

RECOMMENDED FOR LETTING: DATE: 4/26/2023

DocuSigned by: Pedro R. Alvarez
EABA335C2DAA48C...
DISTRICT ENGINEER

SUBMITTED FOR LETTING: DATE: 4/26/2023

DocuSigned by: Romualdo Mena Jr
8D395A956F70440...
DISTRICT CENTRAL DESIGN SUPERVISOR

FILE: T:\PHRDSGN\Arleene\FM 2220*CRM*2094-01-071\1. GENERAL\FM2220*Title Sheet.dgn
DATE: 2/27/2023 5:35:44 PM

INDEX OF SHEETS

LEGEND:

[S] STATE STANDARDS
[D] DISTRICT STANDARDS

>> THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY SUPERVISION AND ARE APPLICABLE TO THIS PROJECT.

Joel Garcia P.E.

JOEL GARCIA, P.E.

03/01/2023

DATE

STATE OF TEXAS
JOEL GARCIA
106398
PROFESSIONAL ENGINEER

Pharr District Central Design

Texas Department of Transportation

FM 2220

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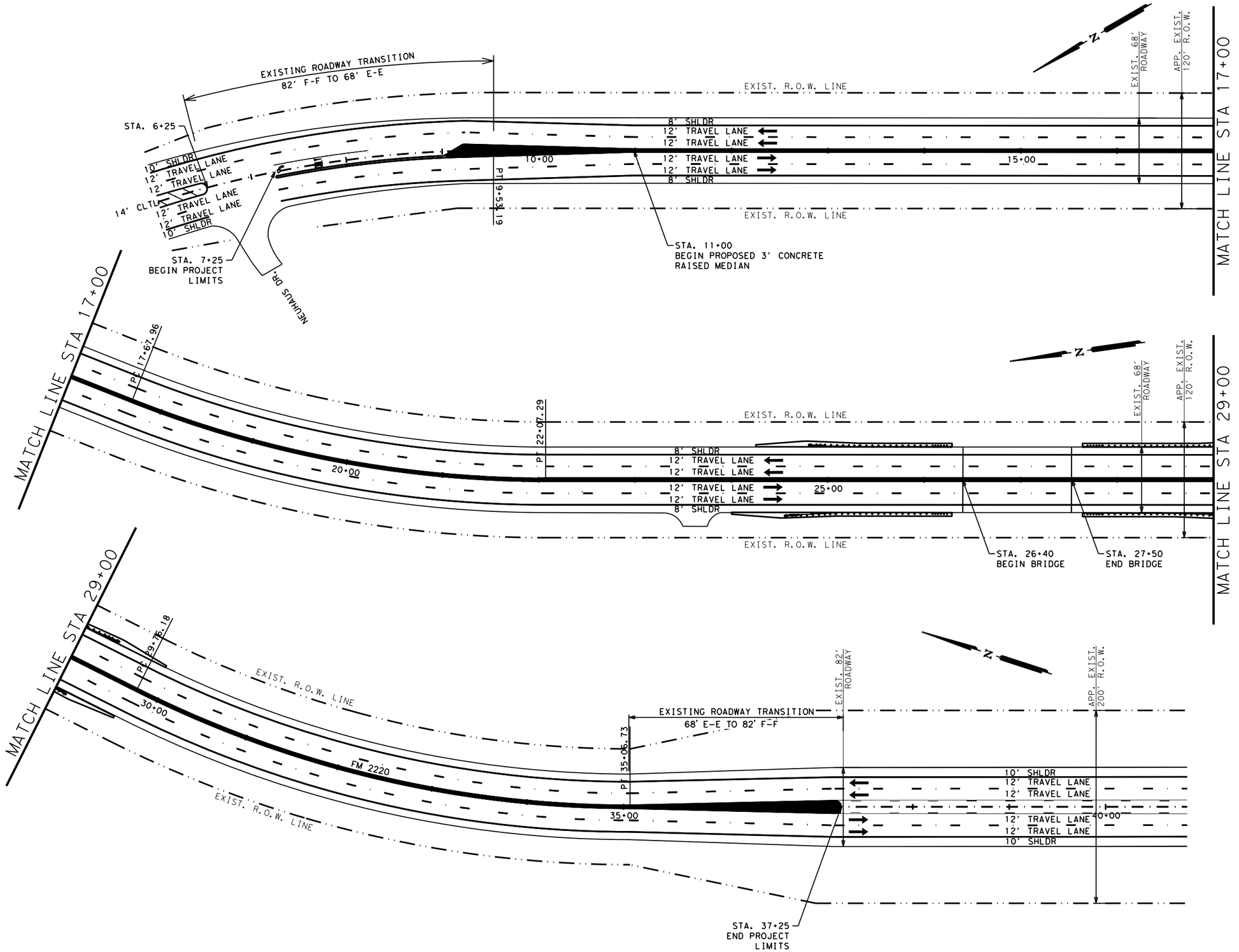

LEGEND:

- → - DIRECTION OF TRAFFIC FLOW
- ·—· - EXISTING R.O.W. LINE
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- F-F - FACE OF CURB TO FACE OF CURB
- E-E - EDGE OF PAVEMENT TO EDGE OF PAVEMENT
- SHLDR. - SHOULDER

GENERAL NOTES:

1. INCIDENTAL CONSTRUCTION FROM STA. 3+50 TO STA. 7+25 & FROM STA. 37+25 TO STA. 41+00. SEE "PROPOSED ROADWAY & MEDIAN LAYOUT" FOR MORE INFORMATION.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220

PROJECT LAYOUT

SCALE: 1"=100' SHEET 1 OF 1

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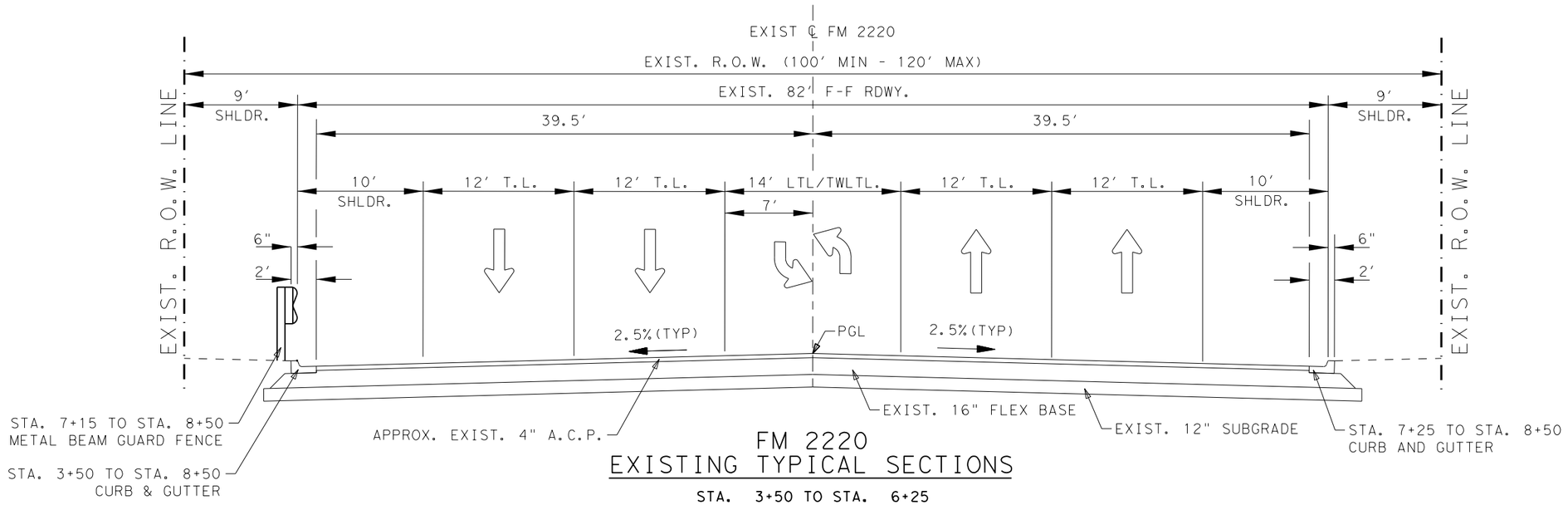
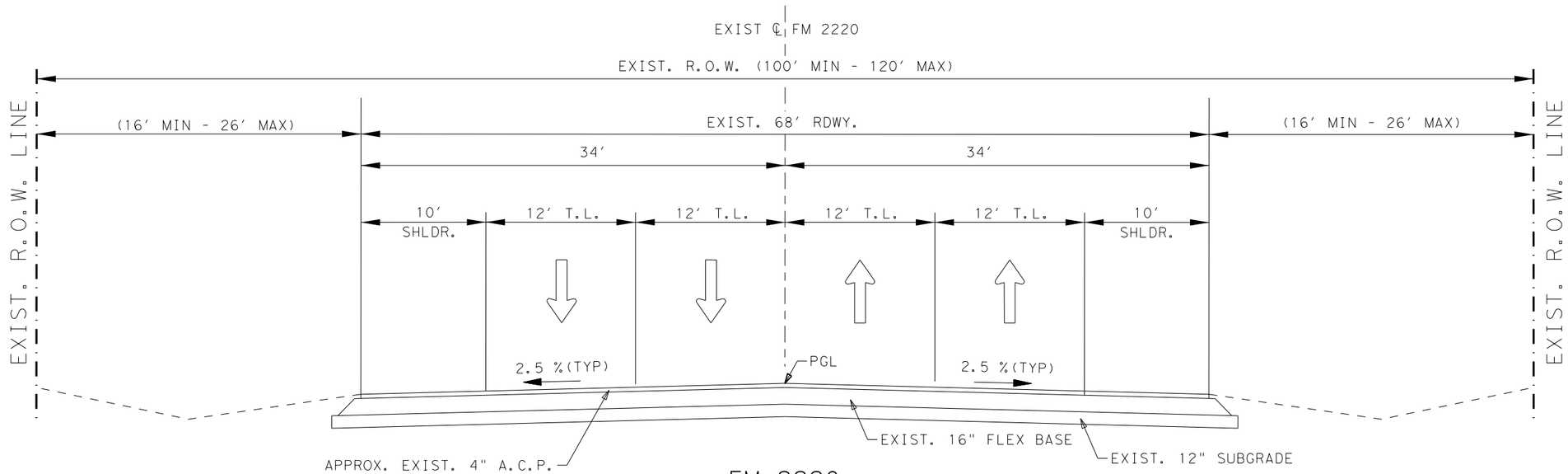


FM 2220
EXISTING TYPICAL SECTIONS

STA. 3+50 TO STA. 6+25
STA. 6+25 TO STA. 9+50 (ROADWAY TRANS. FROM 82′ TO 68′)
STA. 35+00 TO STA. 37+20 (ROADWAY TRANS. FROM 68′ TO 82′)
STA. 37+20 TO STA. 41+00



FM 2220
EXISTING TYPICAL SECTIONS

STA. 9+50 TO STA. 24+60
STA. 29+30 TO STA. 35+00

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
L.T.L. - LEFT TURNING LANE
F-F - FACE OF CURB TO FACE OF CURB

GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.

STATE OF TEXAS
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EXISTING TYPICAL SECTIONS

SCALE: N.T.S. SHEET 1 OF 2

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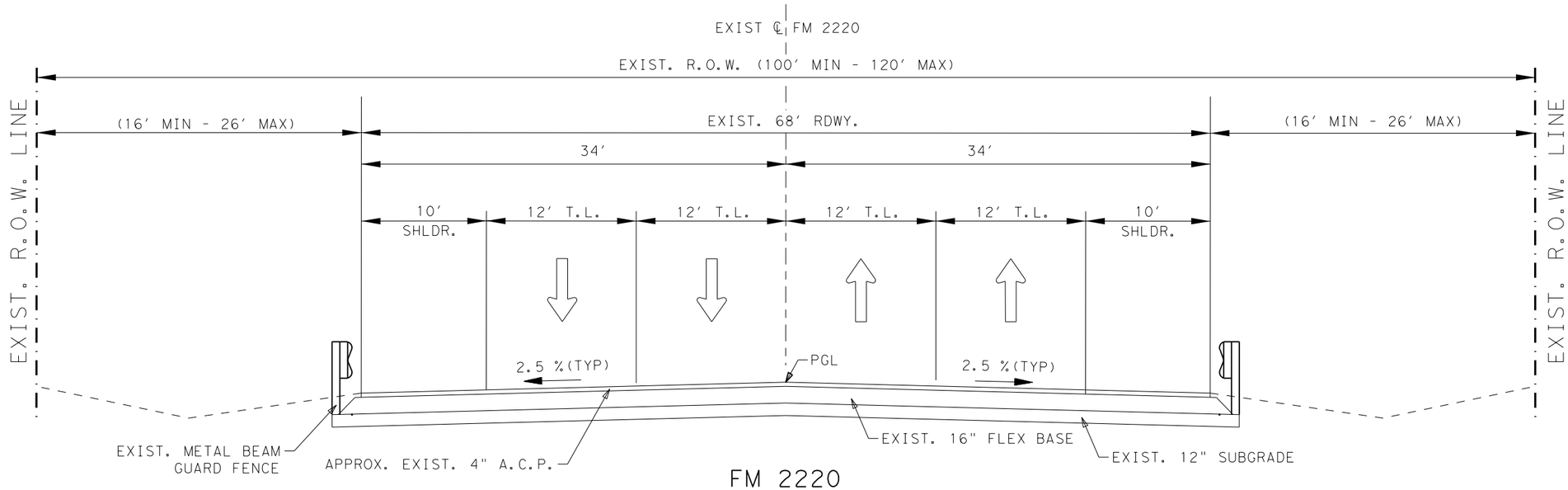
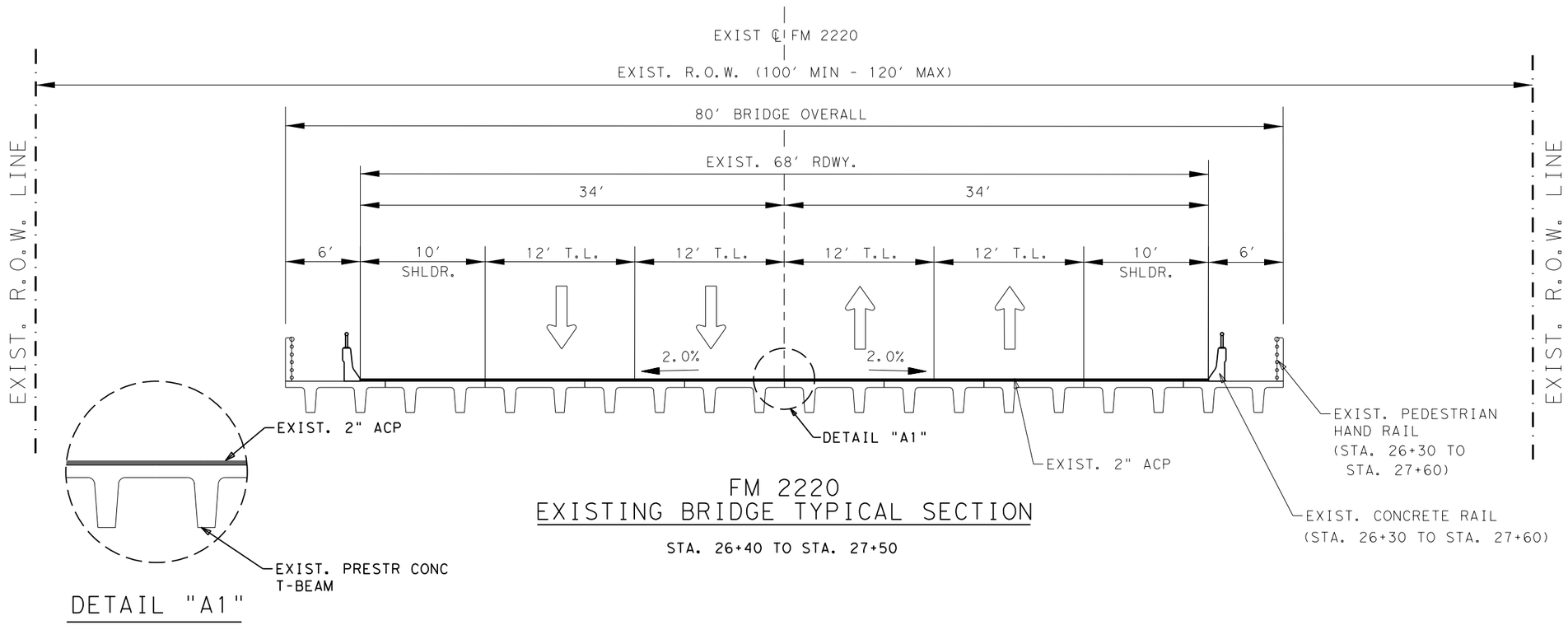


FM 2220
EXISTING TYPICAL SECTIONS

STA. 24+60 TO STA. 26+40
STA. 27+50 TO STA. 29+30



DETAIL "A1"

FM 2220
EXISTING BRIDGE TYPICAL SECTION

STA. 26+40 TO STA. 27+50

LEGEND:

℄	- CENTER LINE
PGL	- PROFILE GRADE LINE
PCJ	- PERMISSIBLE CONSTRUCTION JOINT
R.O.W.	- RIGHT OF WAY
SHLDR	- SHOULDER
CRM	- CONCRETE RAISED MEDIAN
T.L.	- TRAVEL LANE
L.T.L.	- TWO WAY LEFT TURNING LANE
F-F	- FACE OF CURB TO FACE OF CURB

GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.

STATE OF TEXAS
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EXISTING TYPICAL SECTIONS

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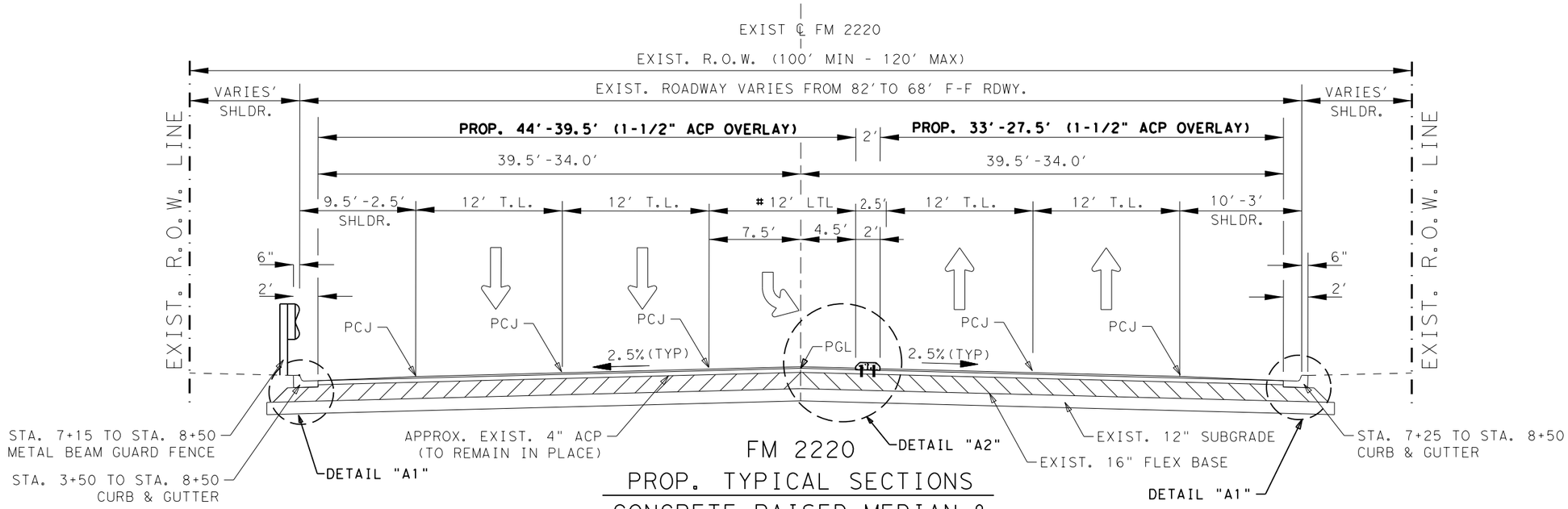


FM 2220

PROP. TYPICAL SECTIONS
CONCRETE RAISED MEDIAN &
(1-1/2" ACP OVERLAY)

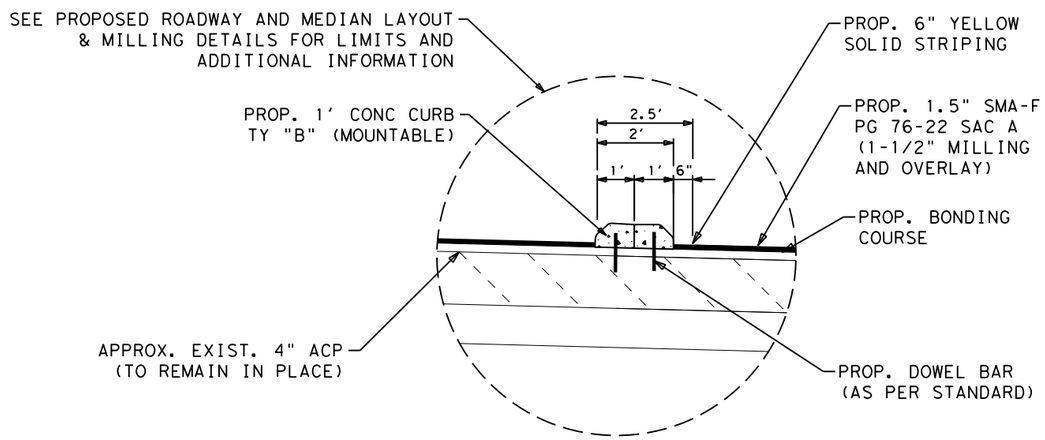
STA. 6+25 TO STA. 9+50 (ROADWAY TRANSITION FROM 82' TO 68')
STA. 7+25 TO STA. 9+00 (PROP.12' LEFT TURN LANE)
STA. 9+00 TO STA.11+00 (PROP. CRM TRANS. FROM 14'TO 3')

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
F-F - FACE OF CURB TO FACE OF CURB

GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.
3. SEE PROPOSED ROADWAY AND MEDIAN LAYOUTS FOR MORE INFORMATION.
4. SEE MILLING DETAILS LAYOUT FOR LIMITS AND ADDITIONAL ROADWAY DETAILS.



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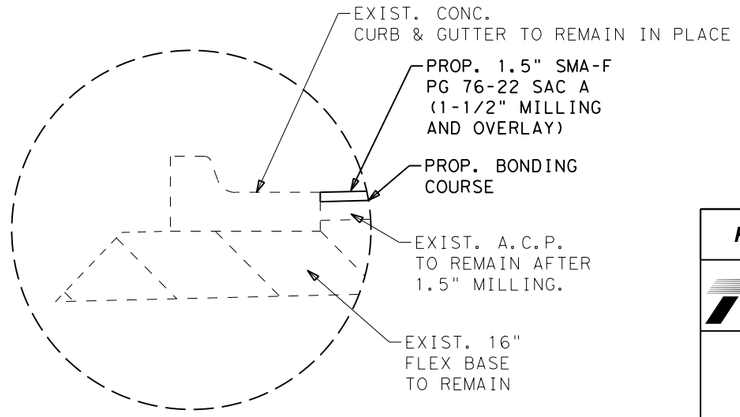

DETAIL "A2"

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220

PROPOSED TYPICAL SECTIONS

SCALE: N. T. S. SHEET 1 OF 4

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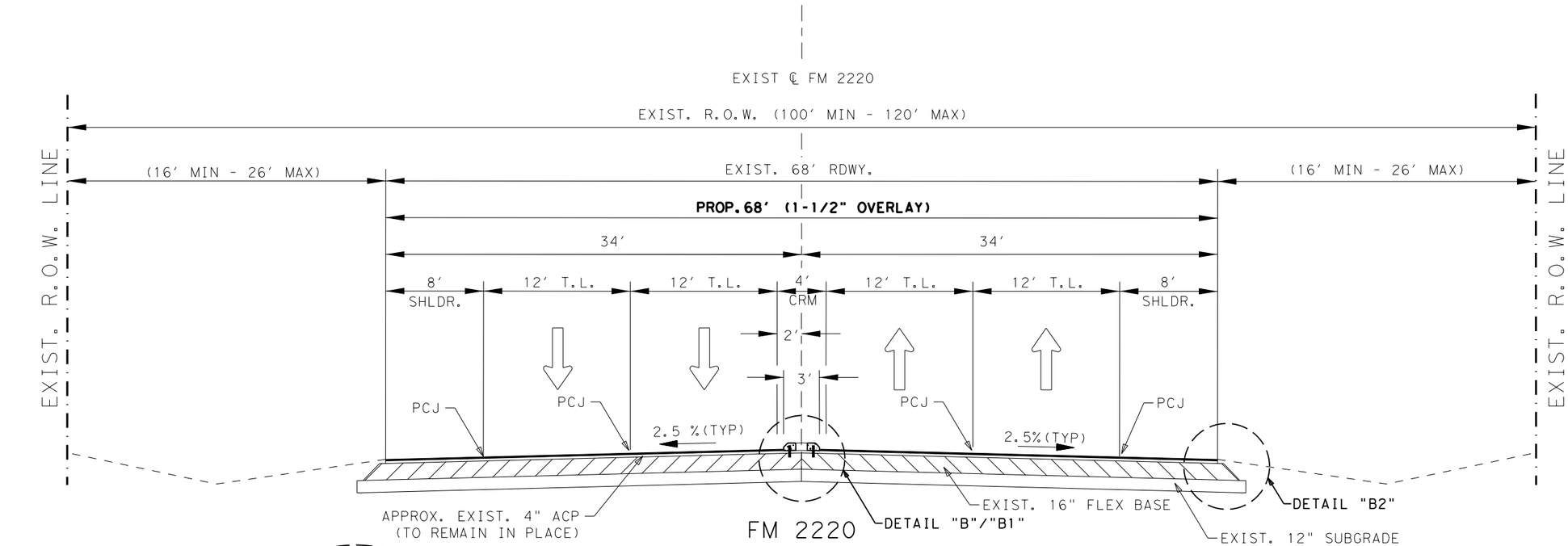


FM 2220

PROP. TYPICAL SECTIONS
CONCRETE RAISED MEDIAN &
(1-1/2" ACP OVERLAY)

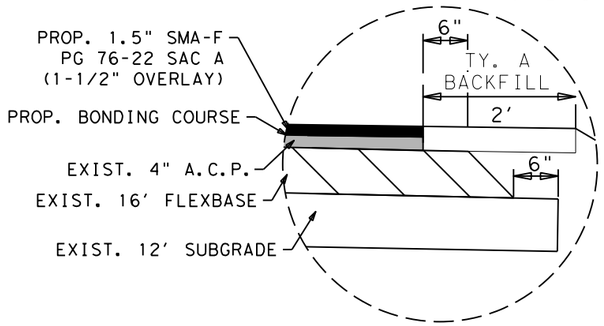
STA. 11+00 TO STA. 24+60
STA. 29+30 TO STA. 37+25
STA. 35+00 TO STA. 37+20 (ROADWAY TRANS. 68' TO 82' ROADWAY)
STA. 35+00 TO STA. 37+25 (PROP. CRM TRANS. FROM 3' TO 13')

LEGEND:

- ℄ - CENTER LINE
- PGL - PROFILE GRADE LINE
- PCJ - PERMISSIBLE CONSTRUCTION JOINT
- R.O.W. - RIGHT OF WAY
- SHLDR - SHOULDER
- CRM - CONCRETE RAISED MEDIAN
- T.L. - TRAVEL LANE
- LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
- F-F - FACE OF CURB TO FACE OF CURB

GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.
3. SEE PROPOSED ROADWAY AND MEDIAN LAYOUTS FOR MORE INFORMATION.
4. SEE MILLING DETAILS LAYOUT FOR LIMITS AND ADDITIONAL ROADWAY DETAILS.



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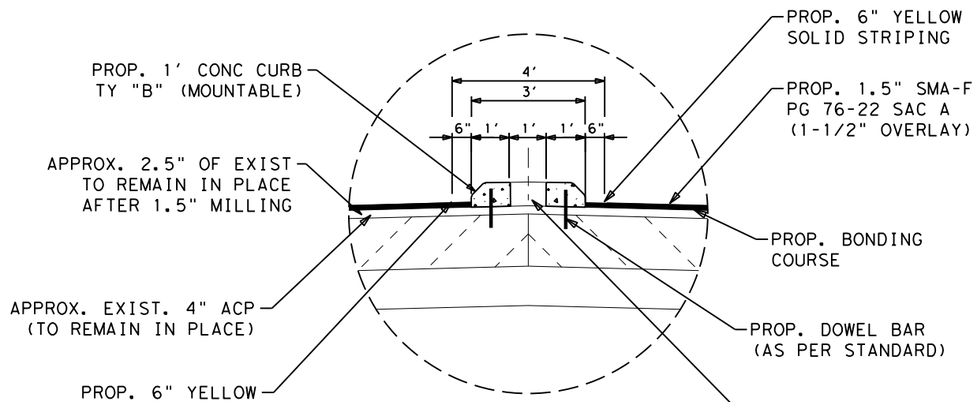
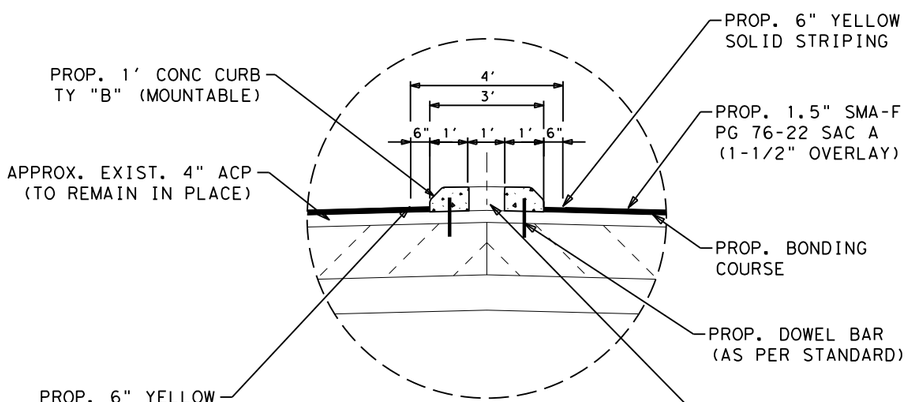


DETAIL "B"

FOR SECTION OF MILLING & OVERLAY



DETAIL "B1"

FOR SECTION OF OVERLAY ONLY (NO MILLING)

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
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03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220

PROPOSED TYPICAL SECTIONS

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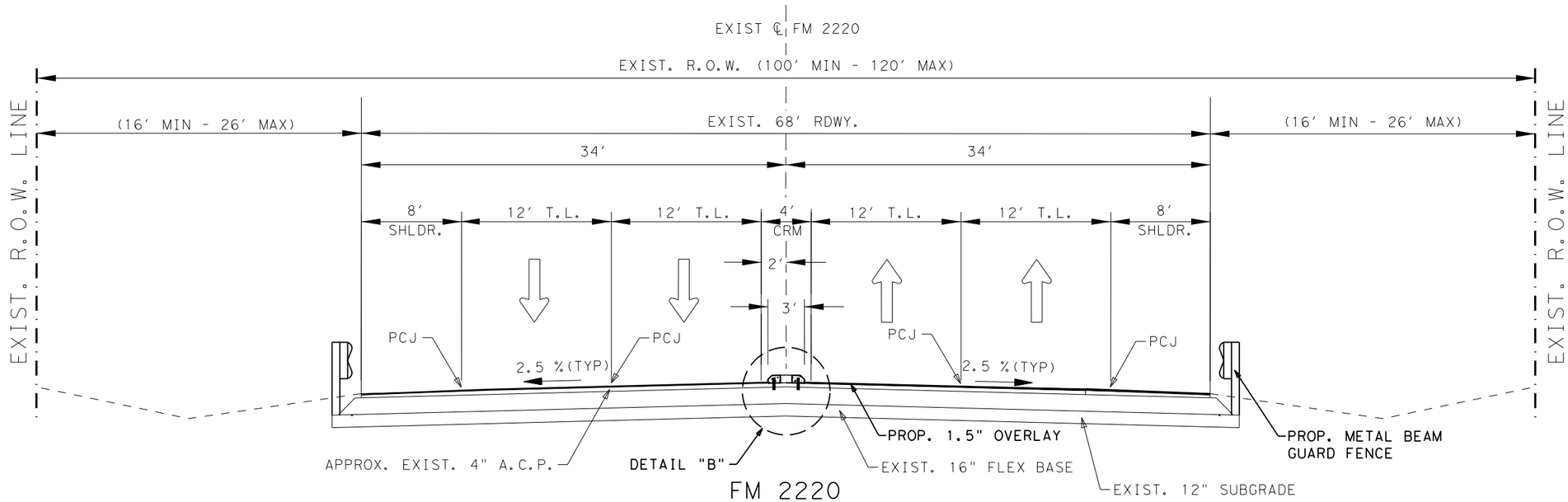
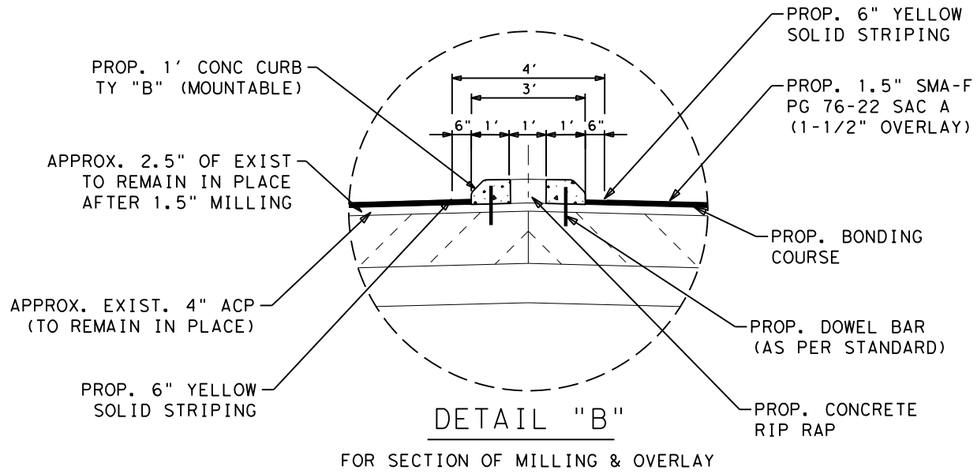


FM 2220
PROPOSED TYPICAL SECTIONS

STA. 24+60 TO STA. 26+40
STA. 27+50 TO STA. 29+30



DETAIL "B"

FOR SECTION OF MILLING & OVERLAY

LEGEND:

- ℄ - CENTER LINE
- PGL - PROFILE GRADE LINE
- PCJ - PERMISSIBLE CONSTRUCTION JOINT
- R.O.W. - RIGHT OF WAY
- SHLDR - SHOULDER
- CRM - CONCRETE RAISED MEDIAN
- T.L. - TRAVEL LANE
- LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
- F-F - FACE OF CURB TO FACE OF CURB

GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.
3. SEE PROPOSED ROADWAY AND MEDIAN LAYOUTS FOR MORE INFORMATION.
4. SEE MILLING DETAILS LAYOUT FOR LIMITS AND ADDITIONAL ROADWAY DETAILS.
5. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATIONS ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER
03/01/2023

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PROPOSED TYPICAL SECTIONS

SCALE: N.T.S. SHEET 3 OF 4

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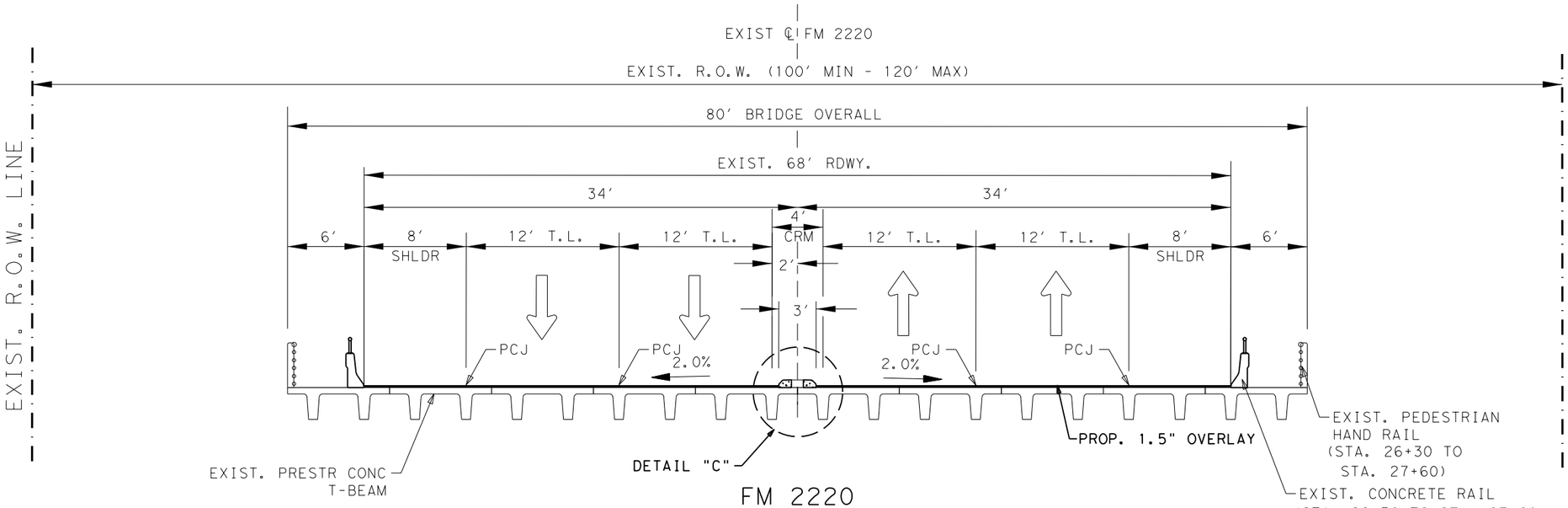


FM 2220
PROPOSED BRIDGE TYPICAL SECTION
ADDITION OF CRM, 1.5" MILLING AND 1.5" OVERLAY

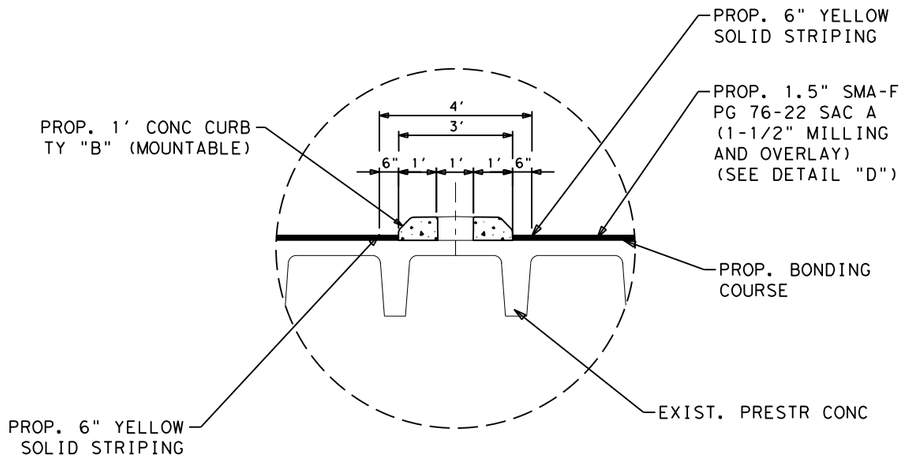
STA. 26+40 TO STA. 27+50

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
F-F - FACE OF CURB TO FACE OF CURB

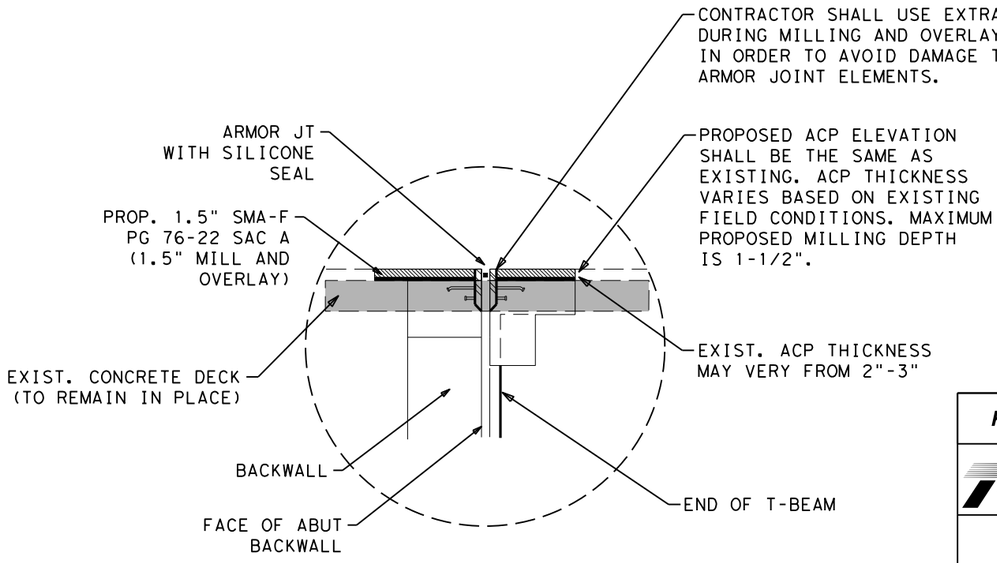
GENERAL NOTES:

1. PROPOSED STATIONS ARE FOR REFERENCE ONLY.
2. EXISTING TYPICAL SECTIONS ARE PROPOSED TO REFLECT TRAVEL LANE DESIGNATION AND DO NOT REFLECT SUPERELEVATED ROADWAY SEGMENTS.
3. SEE PROPOSED ROADWAY AND MEDIAN LAYOUTS FOR MORE INFORMATION.
4. SEE MILLING DETAILS LAYOUT FOR LIMITS AND ADDITIONAL ROADWAY DETAIS.
5. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATIONS ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
6. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.



DETAIL "C"

FOR SECTION OF MILLING & OVERLAY



DETAIL "D"

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220

PROPOSED TYPICAL SECTIONS

SCALE: N.T.S. SHEET 4 OF 4

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Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220

2014 SPECS GENERAL NOTES:

****

General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the "Texas Aggregate Quarry and Pit Safety Act."

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

ITEM 2: Instructions to Bidders

Contractor questions on this project are to be addressed to the following individual(s):

Hector Siller, P.E., Pharr Area Engineer; Hector.Siller@txdot.gov

Jesus Noriega, P.E., Assist. Area Engineer; Jesus.Noriega@txdot.gov

Contractor questions will be accepted through email, phone, and in person by the above individuals. Questions may also be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

ITEM 5: Control of the Work

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.3., "Method C."

Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220

ITEM 6: Control of Materials

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization.

The Buy America Material Classification Sheet is located at the below link.

https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html for clarification on material categorization.

ITEM 7: Legal Relations and Responsibilities

No significant traffic generator events identified.

Roadway or Lane closures during the following key dates and/or special events are prohibited:

- National Holidays
- The day before a National Holiday
- During emergency events such as natural disasters or as directed by the Engineer
- Local Special Event

ITEM 8: Prosecution and Progress

Working days will be computed and charged in accordance with Article 8.3.1.4. Standard Workweek.

Prepare progress schedules using the Critical Path Method (CPM).

Construction shall be done at night in accordance with Article 8.3.3.2.1.

ITEM 134: Backfilling Pavement Edges

Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill Ty A shall not contain particles more than two inches in size and shall have a minimum PI of 10 and a maximum PI of 20.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly. It will be considered subsidiary to this bid Item.

ITEM 301: Asphalt Antistripping Agents

Hydrated Lime shall be added as an Antistripping additive between the rates of 1% minimum and 2.0% maximum by weight for Items 292, 3076, 3077, and 3080. If the Hamburg Wheel Test cannot be met within these limits, Liquid Antistripping agents as approved by the Engineer may be used in conjunction with lime for Items 3076, 3077, and 3080.

ITEM 314: Emulsified Asphalt Treatment

The Contractor shall exercise diligence in the application of emulsified asphalt by the use of flagging to keep from spraying or splattering the traveling public with asphaltic material.

ITEM 354: Planing and Texturing Pavement

Contractor is to place seal coat or ACP layer(s) as indicated on plans within 14-calendar days of planing/milling operation unless otherwise directed by the Engineer.

All planing/milling operation drop offs greater than 1-inch need to have a 3:1 slope taper unless otherwise directed by the Engineer. The cost of the 3:1 slope taper is subsidiary to Item 354.

For full width planing/milling locations, Contractor is to place seal coat or ACP layer(s) as indicated on the plans within 2-calendar days of the planing/milling operation unless otherwise directed by the Engineer. Contractor will not be allowed to move onto the next planing/milling location or seal coat/ACP overlay location until the exposed area is covered as per above. Contractor cannot get paid for the planing/milling operation until exposed area is covered as per above.

ITEM 421: Hydraulic Cement Concrete

Provide equipment at the batch plant for determining the free moisture and/or absorption of aggregates in accordance with applicable TXDOT Test.

Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220

Provide the following items for concrete batch inspection in accordance with specifications outlined in DMS-10101, “Computer Equipment”:

(1) One Desktop Microcomputer or One Laptop Microcomputer
(2) One Integrated Printer/Scanner/Copier/Fax Unit
(3) Contractor-Furnished Software
(4) Hardware

Submit to the Engineer for approval the project locations for all Portland Cement concrete washout areas prior to starting any concrete work.

Fiber Reinforced Concrete is not permitted.

ITEM 432: Riprap

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 502: Barricades, Signs, and Traffic Handling

Shadow vehicles equipped with Truck-Mounted Attenuators are required for traffic handling. See notes for Item 6185: Truck Mounted Attenuator/Trailer Attenuator, for additional references pertaining to the TMAs.

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the “Texas Manual on Uniform Traffic Control Devices”. In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

The Contractor Force Account “Safety Contingency” that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent traffic management reviews on the project. The “Safety Contingency” is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department’s specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

The Contractor Force Account “Erosion Control Maintenance” that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor’s Responsible Person based on weekly or more frequent BMP management reviews on the project. The “Erosion Control Maintenance” is not intended to be used in lieu of bid Items established by the contract.

ITEM 529: Concrete Curb, Gutter, and Combined Curb and Gutter

Before final acceptance of the project, remove discoloration caused by tire marks, mud, asphalt, paint, or other similar material by any method satisfactory to the Engineer to achieve a uniform color and texture of the finished surface exposed to view.

Curb attached to the MBGF thrie-beam transition section will be subsidiary to the MBGF transition.

Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220

ITEM 540: Metal Beam Guard Fence

The optional terminal anchor post with the terminal connector will be required as shown on the Metal Beam Guard Fence Standard.

Galvanize the rail elements supplied for this project using a Type II Zinc Coating.

ITEM 542: Removing Metal Beam Guard Fence

Dispose all metal beam guard fence materials unless shown otherwise in the plans.

ITEM 544: Guardrail End Treatments

Label “end treatment type” on backside of unit at time of installation.

ITEM 585: Ride Quality for Pavement Surfaces

Use Surface Test Type "B" for service roads and ramps.

Quality control results shall be submitted to TxDOT the next working day after each day’s paving.

Pavement areas with public turnout intersections that carry major traffic volumes will not be subjected to inertial profiler testing. These areas shall be evaluated using the 10-ft. straightedge.

Diamond grinding shall be used to remove localized roughness.

Use Surface Test Type B pay adjustment schedule 1 to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.” This includes ramps and service road travel lanes.

ITEMS 662 and 666: Work Zone Pavement Markings and Retroreflectorized Pavement Markings

All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed

per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 677: Eliminating Existing Pavement Markings and Markers

Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

ITEM 3080: Stone-Matrix Asphalt

The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

All surplus RAP from this project will remain the property of the Contractor.

Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

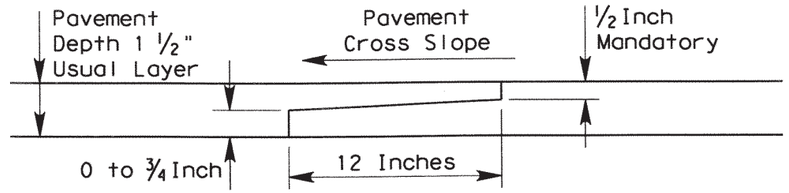
Aggregates used on shoulders and ramps are required to meet SAC requirements.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum ½-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.

Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220



NOTCHED WEDGE JOINT

The engineer may allow for variances to the dimensions shown.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3080.

The use of RAP and RAS (recycled asphalt shingles) will not be allowed as part of the mix design for the final riding surface.

Use a release agent from the Department's MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

SAC B aggregate must have material properties that require 10 or less on the magnesium sulfate soundness test and 20 or less on the Micro-Deval test.

ITEM 3084 – Bonding Course

The minimum application rates are listed in Table BC.

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course, bonding material, or hot mix material. The remaining informational test cores shall be taken once every 3 lots for surface mix. Informational tests are not required for non-surface mix beyond the first 5 lots unless there is a change to placement method of bonding course, bonding material, or hot mix material. Results from these informational tests will not be used for specification compliance.

Table BC

Material	Minimum Application Rate (gal. per square yard)
TRAIL – Emulsified Asphalt	0.06
TRAIL – Hot Asphalt	0.12
Spray Applied Underseal Membrane	0.10

Table BCS (For Informational Tests)

Material	Target Shear Bond Strength (Tex-249-F psi)
SMA – Stone-Matrix Asphalt	60.0
All Other Materials	40.0

ITEM 3096: Asphalts, Oils, and Emulsions

Temporary ramps/detours and driveways may use Performance Grade Binder 64-22.

ITEM 5088: Bird Exclusion Methods

Contractor's attention is directed to the plan's EPIC sheets, Bird Exclusion Detail standard sheets and shall refer to the Migratory Bird Treaty Act requirements. Also, refer to the TPWD BMPSs sheets for specific adherence to the environmental requirements of the Best Management Practices.

ITEM 6185: Truck Mounted Attenuator/Trailer Attenuator

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for the project, provide 2 additional shadow vehicle(s) with TMA;
as per TCP (1-4) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (2-4) -18 as detailed on General Note 6 of this standard sheet.

Therefore, 3 total shadow vehicles with TMA will be required on this project for the type of work as shown on the plans. The Contractor will be responsible for determining if one or more of his construction operations will be ongoing at the same time and thus determine the total number of TMAs needed for the project.

Project Number:

County: Hidalgo **Control:** 2094-01-071

Highway: FM 2220

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2094-01-071 **DISTRICT** Pharr **COUNTY** Hidalgo
HIGHWAY FM 2220

			CONTROL SECTION JOB		**2094-01-071**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00184574**		
			COUNTY		**Hidalgo**		
			HIGHWAY		**FM 2220**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	100-6002	PREPARING ROW	STA	37.500		37.500	
	134-6001	BACKFILL (TY A)	STA	31.000		31.000	
	354-6041	PLANE ASPH CONC PAV (1.5")	SY	5,488.000		5,488.000	
	354-6051	PLANE ASPH CONC PAV (0" TO 1 1/2")	SY	3,194.000		3,194.000	
	432-6004	RIPRAP CONC (8 IN)	CY	117.000		117.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	46.000		46.000	
	438-6009	CLEANING EXISTING JOINTS	LF	136.000		136.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	3.000		3.000	
	506-6021	CONSTRUCTION EXITS (INSTALL) (TY 2)	SY	156.000		156.000	
	506-6024	CONSTRUCTION EXITS (REMOVE)	SY	156.000		156.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	120.000		120.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	120.000		120.000	
	529-6024	CONC CURB (MOUNTABLE)	LF	6,020.000		6,020.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	350.000		350.000	
	540-6006	MTL BEAM GD FEN TRANS (THRIE-BEAM)	EA	4.000		4.000	
	542-6001	REMOVE METAL BEAM GUARD FENCE	LF	350.000		350.000	
	542-6002	REMOVE TERMINAL ANCHOR SECTION	EA	2.000		2.000	
	542-6004	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	EA	4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	544-6003	GUARDRAIL END TREATMENT (REMOVE)	EA	2.000		2.000	
	662-6001	WK ZN PAV MRK NON-REMOV (W)4"(BRK)	LF	1,620.000		1,620.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	6,205.000		6,205.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	6,205.000		6,205.000	
	662-6060	WK ZN PAV MRK REMOV (W)4"(BRK)	LF	280.000		280.000	
	662-6063	WK ZN PAV MRK REMOV (W)4"(SLD)	LF	550.000		550.000	
	662-6095	WK ZN PAV MRK REMOV (Y)4"(SLD)	LF	550.000		550.000	
	662-6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	600.000		600.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	264.000		264.000	
	666-6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	100.000		100.000	
	666-6141	REFL PAV MRK TY I (Y)12"(SLD)(100MIL)	LF	18.000		18.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	360.000		360.000	
	666-6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1,590.000		1,590.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	280.000		280.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	1,510.000		1,510.000	
	666-6321	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	LF	5,730.000		5,730.000	
	666-6342	REF PROF PAV MRK TY I(W)4"(SLD)(100MIL)	LF	1,350.000		1,350.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 2094-01-071 **DISTRICT** Pharr **COUNTY** Hidalgo
HIGHWAY FM 2220

			CONTROL SECTION JOB		**2094-01-071**	TOTAL EST.	TOTAL FINAL
			PROJECT ID		**A00184574**		
			COUNTY		**Hidalgo**		
			HIGHWAY		**FM 2220**		
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	666-6343	REF PROF PAV MRK TY I(W)6"(SLD)(100MIL)	LF	6,025.000		6,025.000	
	668-6077	PREFAB PAV MRK TY C (W) (ARROW)	EA	1.000		1.000	
	668-6085	PREFAB PAV MRK TY C (W) (WORD)	EA	1.000		1.000	
	672-6007	REFL PAV MRKR TY I-C	EA	5.000		5.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	38.000		38.000	
	672-6010	REFL PAV MRKR TY II-C-R	EA	101.000		101.000	
	677-6001	ELIM EXT PAV MRK & MRKS (4")	LF	9,380.000		9,380.000	
	3080-6013	STONE-MTRX-ASPH SMA-F SAC-A PG76-22	TON	2,022.000		2,022.000	
	3084-6001	BONDING COURSE	GAL	1,655.000		1,655.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	90.000		90.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	90.000		90.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	
		EROSION CONTROL MAINTENANCE: CONTRACTOR FORCE ACCOUNT WORK (PART)	LS	1.000		1.000	

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

FM 2220	662 6004	662 6001	662 6034	662 6063	662 6060	662 6095	677 6001
	WK ZN PAV MRK NON-REMOV (W)4" (SLD)	WK ZN PAV MRK NON-REMOV (W)4" (BRK)	WK ZN PAV MRK NON-REMOV (Y)4" (SLD)	WK ZN PAV MRK REMOV (W)4" (SLD)	WK ZN PAV MRK REMOV (W)4" (BRK)	WK ZN PAV MRK REMOV (Y)4" (SLD)	ELIM EXT PAV MRK & MRKS (4")
	LF	LF	LF	LF	LF	LF	LF
TCP PHASE I STEP I (SHEET 1 OF 3)	2625	600	2625	275	140	275	3620
TCP PHASE I STEP I (SHEET 2 OF 3)	3580	1020	3580	275	140	275	5760
TCP PHASE I STEP I (SHEET 3 OF 3)	-	-	-	-	-	-	-
PROJECT TOTALS	**6205**	**1620**	**6205**	**550**	**280**	**550**	**9380**

SUMMARY OF MOBILIZATION ITEMS

FM 2220	500 6001	502 6001	6001 6002	6185 6002	6185 6005
	MOBILIZATION	BARRICADES, SIGNS AND TRAFFIC HANDLING	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LS	MO	EA	DAY	DAY
	1.00	3.00	2	90	90
PROJECT TOTALS	**1**	**3**	**2**	**90**	**90**

SUMMARY OF ROADWAY ITEMS

FM 2220	100 6002	134 6001	432 6004	432 6045	438 6009	529 6024	540 6001	540 6006	542 6001	542 6002	542 6004	544 6001	544 6003
	PREPARING ROW	BACKFILL (TY A)	RIPRAP CONC (8 IN)	RIPRAP (MOW STRIP) (4 IN)	CLEANING EXISTING JOINTS	CONC CURB (MOUNTAB LE)	MTL W-BEAM GD FEN (TIM POST)	MTL BEAM GD FEN TRANS (THRIE-BEAM)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	RM MTL BM GD FENCE TRANS (THRIE-BEAM)	GUARDRAIL END TREATMENT (INSTALL)	GUARDRAIL END TREATMENT (REMOVE)
	STA	STA	CY	CY	LF	LF	LF	EA	LF	EA	EA	EA	EA
PROPOSED ROADWAY AND MEDIAN LAYOUTS													
SHEET 1 OF 5	8.5	5	30	-	-	950	-	-	-	-	-	-	-
SHEET 2 OF 5	7	7	17	-	-	1400	-	-	-	-	-	-	-
SHEET 3 OF 5	7	7	17	23	-	1400	175	-	175	1	-	2	1
SHEET 4 OF 5	7	7	17	23	136	1400	175	4	175	1	4	2	1
SHEET 5 OF 5	8	5	36	-	-	870	-	-	-	-	-	-	-
PROJECT TOTALS	**37.5**	**31**	**117**	**46**	**136**	**6020**	**350**	**4**	**350**	**2**	**4**	**4**	**2**

SUMMARY OF ROADWAY ITEMS

FM 2220	354 6041	354 6051	3080 6013	3084 6001
	PLANE ASPH CONC PAV (1.5")	PLANE ASPH CONC PAV (0" TO 1 1/2")	STONE-MTR X-ASPH SMA-F SAC-A PG76-22	BONDING COURSE
	SY	SY	TON	GAL
PHASE I STEP I	934	492	381	312
PHASE I STEP II	4554	2702	1641	1343
PROJECT TOTALS	**5488**	**3194**	**2022**	**1655**

EST. APPL. RATE OF (346 6026) SMA = 114 LBS/SY/IN

EST. APPL. RATE OF (3084 6001) BONDING COURSE = 0.07 GAL/SY

SUMMARY OF PAVEMENT MARKING ITEMS

FM 2220	662 6109	662 6111	666 6343	666 6306	666 6321	666 6036	666 6141	668 6077	668 6085	672 6010	672 6007	672 6009	666 6315	666 6312	666 6342	666 6300
	WK ZN PAV MRK SHT TERM (TAB)TY W	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	REF PROF PAV MRK TY I (W)6" (SLD)(100MIL)	RE PM W/RET REQ TY I (W)6" (BRK)(100MIL)	RE PM W/RET REQ TY I (Y)6" (SLD)(100MIL)	REFL PAV MRK TY I (W)8" (SLD)(100MIL)	REFL PAV MRK TY I (Y)12" (SLD)(100MIL)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	REFL PAV MRKR TY II-C-R	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y)4" (SLD)(100MIL)	RE PM W/RET REQ TY I (Y)4" (BRK)(100MIL)	REF PROF PAV MRK TY I (W)4" (SLD)(100MIL)	RE PM W/RET REQ TY I (W)4" (BRK)(100MIL)
	EA	EA	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	LF	LF	LF	LF
PROPOSED ROADWAY & MEDIAN LAYOUTS																
SHEET 1 OF 5	150	112	975	290	680	100	18	1	1	23	5	18	760	80	600	160
SHEET 2 OF 5	108	-	1400	360	1400	-	-	-	-	18	-	-	-	-	-	-
SHEET 3 OF 5	108	-	1400	360	1400	-	-	-	-	18	-	-	-	-	-	-
SHEET 4 OF 5	108	-	1400	360	1400	-	-	-	-	18	-	-	-	-	-	-
SHEET 5 OF 5	126	152	850	220	850	-	-	-	-	24	-	20	750	200	750	200
PROJECT TOTALS	**600**	**264**	**6025**	**1590**	**5730**	**100**	**18**	**1**	**1**	**101**	**5**	**38**	**1510**	**280**	**1350**	**360**

SUMMARY OF EROSION CONTROL ITEMS

FM 2220	506 6021	506 6024	506 6041	506 6043
	CONSTRUCTION EXITS (INSTALL) (TY 2)	CONSTRUCTION EXITS (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	LF	LF
TCP LAYOUT PHASE I STEP I (SHEET 1 OF 3)	78	78	-	-
TCP LAYOUT PHASE I STEP I (SHEET 2 OF 3)	78	78	120	120
TCP LAYOUT PHASE I STEP I (SHEET 3 OF 3)	-	-	-	-
PROJECT TOTALS	**156**	**156**	**120**	**120**

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220 SUMMARY OF ESTIMATED QUANTITIES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		18

DATE: 3/31/2023 1:12:42 PM
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TRAFFIC CONTROL PLAN COVER SHEET

DATE: 2/27/2023 5:38:22 PM
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Pharr District Central Design

Texas Department of Transportation

FM 2220

TCP COVER SHEET

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		19

GENERAL NOTES AND SPECIFICATIONS DATA:

USE A POWER-BROOM WHEN CLEANING THE ROADWAY AS NEEDED.

REMOVE & DISPOSE ALL MATERIAL NOT DEEMED SALVAGEABLE BY THE ENGINEER, UNLESS OTHERWISE SHOWN ON THE PLANS.

ON EXISTING PAVEMENT THAT WILL REMAIN IN PLACE, SAND BLAST OR SURFACE TREAT IN ORDER TO REMOVE EXISTING STRIPING.

DO NOT BLOCK DRAINAGE WHEN HANDLING & STOCKPILING EXCAVATED MATERIAL.

MAINTAIN ACCESS TO DRIVEWAYS AND INTERSECTIONS THROUGH ALL PHASES OF CONSTRUCTION.

MAINTAIN POSITIVE DRAINAGE DURING ALL PHASES OF CONSTRUCTION.

ALWAYS COMPLETE THE PROPOSED DRIVEWAYS DURING THEIR TCP PHASE BEFORE SWITCHING TRAFFIC TO A NEW PHASE UNLESS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES:

AT THE COMMENCEMENT OF THE PROJECT, ALL TRAFFIC CONTROL DEVICES SHALL BE IN ACCEPTABLE CONDITION, AND MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT, AS PER GUIDELINES FOR TEMPORARY TRAFFIC CONTROL DEVICES AND FEATURES.

NOTIFY THE AREA ENGINEER(AE) IN WRITING(E-MAIL IS ACCEPTABLE) ONCE THE TRAFFIC CONTROL PLAN(TCP) AND ALL TRAFFIC CONTROL DEVICES HAVE BEEN INSTALLED AS PER PLANS ON THE PROJECT SO THAT THE DEPARTMENT'S RESPONSIBLE PERSON ACCOMPANIED BY THE CONTRACTOR'S RESPONSIBLE PERSON CAN CONDUCT A NIGHT INSPECTION ON THE SAID TCP AND TRAFFIC CONTROL DEVICES. COMMENCEMENT OF WORK WILL NOT BE AUTHORIZED NOR ALLOWED UNTIL THE AE NOTIFIES THE CONTRACTOR IN WRITING(E-MAIL IS ACCEPTABLE) TO PROCEED WITH THE WORK.

CONTRACTOR SHALL HAVE A SUFFICIENT AMOUNT OF TRAFFIC CONTROL DEVICES IN ACCEPTABLE CONDITION TO REPLACE ANY DAMAGED TRAFFIC CONTROL DEVICE WITHIN 24 HOURS OF NOTIFICATION.

PROVIDE ADDITIONAL SIGNS AND BARRICADES AS NECESSARY TO ADDRESS FIELD CONSTRUCTIBILITY & VISIBILITY. THESE ADDITIONAL SIGNS WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

REMOVE OR COMPLETELY COVER ALL EXISTING SIGNS WHICH ARE IN CONFLICT WITH THE TRAFFIC CONTROL PLAN.

ADJUST STOP SIGNS AS NEEDED ON INTERSECTING STREETS DURING THE VARIOUS CONSTRUCTION PHASES. DO NOT REMOVE ANY EXISTING STOP SIGNS UNTIL TEMPORARY SIGNS ARE IN PLACE.

COORDINATE THE TRAFFIC CONTROL PLAN AND THE VARIOUS SEQUENCES OF CONSTRUCTION WITH ADJACENT CONSTRUCTION PROJECTS IF APPLICABLE, TO ENSURE THE UNINTERRUPTED AND SAFE FLOW OF TRAFFIC.

NOTIFY THE ENGINEER IN WRITING WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE WORKING DAYS PRIOR TO THE CHANGE.

ALL WORK ZONE PAVEMENT MARKINGS FOR THIS PROJECT SHALL BE 0.100 INCHES (100 MIL) THICK THERMOPLASTIC.

SAFETY:

PROTECT EXPOSED PITS THAT MUST REMAIN OPEN DURING NON-WORKING HOURS AS PER OSHA REQUIREMENTS.

PROJECT SPECIFIC NOTES:

THIS TRAFFIC CONTROL PLAN (TCP), PHASING AND SEQUENCE OF CONSTRUCTION SERVES AS A GUIDE FOR THE SAFE TRAFFIC HANDLING DURING CONSTRUCTION OF THE PROJECT. THE TCP DOES NOT ATTEMPT TO ADDRESS EVERY ASPECT OF CONSTRUCTION THAT IS REQUIRED DURING EACH OF THE PROPOSED PHASES. THE TCP DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF CONSTRUCTING THE COMPLETE ROADWAY AND ANY OTHER RELATED ITEMS, AS NOTED IN THE PLANS AND SPECIFICATIONS.

CONTRACTOR SHALL NOTIFY THE PROPER CITY, COUNTY, E.M.S., FIRE DEPARTMENT POLICE DEPARTMENT, TEXAS D.P.S. AND TXDOT OFFICIALS WHEN MAJOR TRAFFIC CHANGES ARE TO BE MADE. NOTIFICATIONS MUST BE GIVEN A MINIMUM OF THREE (3) DAYS PRIOR THE CHANGE.

CONTRACTOR SHALL COORDINATE WITH TXDOT AND/OR PROPERTY OWNERS PRIOR TO SELECTING A STAGING/STOCKPILING AREA. CONTRACTOR SHALL NOT STOCKPILE ANY MATERIAL IN PRIVATE PROPERTY. STAGING/STOCKPILING AREA IS SUBJECT TO THE APPROVAL OF THE PROJECT ENGINEER.

CONTRACTOR SHALL NOTIFY AND COORDINATE WITH PROPERTY OWNERS, BUSINESSES AND ANY AFFECTED INDIVIDUALS/ENTITIES PRIOR TO CLOSING LANES, DRIVEWAYS, ENTRANCES, ACCESSES, ETC. TO AVOID ACCESSIBILITY ISSUES DURING THE PROJECT.

THE PORTION OF THIS PROJECT WHICH COINCIDES WITH EXISTING ROADS AND/OR PRIVATE DRIVES SHALL BE KEPT OPEN TO TRAFFIC AT ALL TIMES, UNLESS OTHERWISE PROVIDED FOR OR APPROVED BY THE ENGINEER.

THE CONTRACTOR SHALL KEEP TRAVELED SURFACES USED IN HIS HAULING OPERATIONS CLEAR AND FREE OF DIRT, DEBRIS, OR OTHER OBSTRUCTIONS. THIS SURFACE CLEARING AND CLEANING OPERATIONS WILL BE PERFORMED IMMEDIATELY UPON THE OCCURANCE OF DEBRIS ON THE TRAVEL LANES.

FOR THE PURPOSES OF THIS TRAFFIC CONTROL PLAN, THE FOLLOWING DEFINITIONS SHALL APPLY:

PEAK HOURS
MONDAY.-FRIDAY. 6:00 A.M. TO 9:00 A.M.
MONDAY.-FRIDAY. 4:00 P.M. TO 7:00 P.M.
OFF-PEAK HOURS
MONDAY.-FRIDAY. 9:00 A.M. TO 4:00 P.M.
MONDAY.-FRIDAY. 7:00 P.M. TO 10:00 P.M.
NIGHTTIME HOURS
MONDAY.-FRIDAY. 10:00 P.M. TO 6:00 A.M.
WEEKEND HOURS
FRIDAY. 10:00 P.M. TO MONDAY. 6:00 A.M.

CONTRACTOR SHALL REMOVE ALL CONFLICTING PAVEMENT MARKINGS AS SHOWN ON THE PLANS. FAILURE TO ELIMINATE CONFLICTING PAVEMENT MARKINGS NOT ADHERING TO ITEM 502 WILL RESULT IN A PENALTY THAT WILL NOT ALLOW CONTRACTOR TO MOVE TO NEXT TCP PHASE/STEP.

PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISD MEDIAN INSTALLATION, AND BRIDGE OVERLAY OPERATIONS ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.

THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER

03/01/2023

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FM 2220

TCP GENERAL NOTES

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
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FM 2220
SEQUENCE OF CONSTRUCTION

NO PHASE/STEP OF CONSTRUCTION SHALL START UNTIL COMPLETION OF THE PREVIOUS PHASE/STEP/STAGE, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

INSTALL PROJECT LIMITS AND ADVANCE WARNING SIGNS, CROSSROADS BARRICADES/SIGNS, AS SHOWN ON THE TRAFFIC CONTROL PLANS (TCP), IN ACCORDANCE WITH THE TMUTCD AND/OR AS DIRECTED BY THE ENGINEER. THESE SIGNS SHALL BE ERECTED AND PLACED PRIOR TO COMMENCING ANY PROPOSED ROADWAY CONSTRUCTION AND SHALL REMAIN IN PLACE FOR THE DURATION OF THE PROJECT UNTIL COMPLETION AND ACCEPTANCE OF THE PROJECT BY TxDOT.

TO ACCOMMODATE THE VARIOUS PHASES OF CONSTRUCTION, THE CONTRACTOR WILL BE RESPONSIBLE FOR THE TEMPORARY ADJUSTMENTS AND RELOCATION OF EXISTING SIGNAL HEADS, POLES, LOW-PROFILE CONCRETE TRAFFIC BARRIER, SIGNING, AND ANY OTHER INCIDENTAL WORK NECESSARY TO PROVIDE FOR PROPER TRAFFIC SIGNAL OPERATION. THE ADJUSTMENTS AND RELOCATIONS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDARY TO ITEM 502, "BARRICADES, SIGNS AND TRAFFIC HANDLING."

ADEQUATE SIGNS AND BARRICADES SHALL BE INSTALLED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO OPENING ANY SECTION TO TRAFFIC. SIGNS ADDITIONAL TO THOSE REQUIRED BY THE BARRICADE STANDARDS OR DEEMED NECESSARY AND APPROVED BY THE ENGINEER WILL BE CONSIDERED SUBSIDIARY TO ITEM 502.

TEMPORARY EROSION CONTROL DEVICES MUST BE INSTALLED PRIOR TO THE START OF ANY CONSTRUCTION.

MAJOR WORK ITEMS SHALL BE PERFOMED USING OVERNIGHT OPERATIONS FROM THE HOURS OF 10:00 PM TO 6:00 AM.

PHASE I STEP I CONSTRUCTION

1. PRIOR TO THE BEGINNING OF THIS STEP, ADVANCED WARNINGS SIGNS SHALL BE ERECTED AND INSTALLED IN ACCORDANCE TO THE ADVANCED WARNING SIGN LAYOUTS, CONTRACTOR SHALL FURNISH AND INSTALL TRAFFIC CONTROL DEVICES AS CALLED FOR IN THE TCP LAYOUTS PHASE I STEP I, AND INSTALL TEMPORARY EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUTS.
2. ALL SIGNS THAT ARE IN CONFLICT WITH PROPOSED TRAFFIC CONTROL PLAN SHALL BE COVERED, ADJUSTED OR REMOVED.
3. CONTRACTOR THEN SHALL INSTALL ALL TRAFFIC CONTROL DEVICES, ELIMINATE ALL STRIPING PAVEMENT MARKINGS THAT ARE IN CONFLICT WITH PROPOSED TCP, AND INSTALL TEMPORARY WORK ZONE PAVEMENT MARKINGS AS SHOWN ON TCP LAYOUTS PHASE I STEP I.
4. PRIOR TO COMMENCEMENT OF MILL OPERATIONS, AS PER MILLING DETAIL LAYOUT, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CLEAN THE EXISTING PAVEMENT SURFACE FROM ANY DEBRIS, DIRT FROM VEHICLE TRACKING, OR LOOSE AGGREGATE FROM SURFACE. THERE MUST BE AT LEAST ONE TRAVEL LANE OPEN IN EACH DIRECTION DURING OVERNIGHT TRAFFIC OPERATIONS. DURING PEAK HOURS, 2 LANES MUST REMAIN OPEN. WHEN CLOSING TRAVEL LANES, APPLICABLE TXDOT STANDARDS ARE TO BE FOLLOWED.
5. CONTRACTOR SHALL INSTALL THE CONCRETE RAISED MEDIAN FROM STA. 7+25 TO STA. 37+25 DURING OVERNIGHT OPERATIONS. IN THE EXISTING BRIDGE AREA, STA. 26+40 TO STA. 27+50, BEFORE THE CONCRETE RAISED MEDIAN INSTALLATION, EXISTING 1.5" OF ACP ARE TO BE MILLED. PROPOSED 1.5" OF ACP IS TO BE PLACED IMMEDIATELY AFTER MILLING OPERATIONS IN BRIDGE LIMITS AS TO NOT DAMAGE EXISTING ARMOR JOINT. NO MORE THAN 1.5" ARE TO BE MILLED IN BRIDGE LIMITS. FOR CONCRETE RAISED MEDIAN DETAILS, SEE PROPOSED ROADWAY & MEDIAN LAYOUTS TO FIND MORE INFORMATION. FOR MILLING DETAILS IN BRIDGE APPROACH FROM STA. 23+60 TO STA. 30+30, SEE "FM 2220 MILLING DETAILS".
6. ONCE BRIDGE SECTION AND APPROACHES ARE MILLED, FOLLOWING "FM 2220 MILLING DETAILS."

PHASE I STEP II CONSTRUCTION (MOBILE OPERATIONS)

1. PRIOR TO ANY CONSTRUCTION ACTIVITIES FOR PHASE I STEP II, CONTRACTOR SHALL INSTALL EROSION CONTROL DEVICES AS SHOWN ON SW3P LAYOUTS AND ASSOCIATED SW3P STANDARDS.
2. CONTRACTOR SHALL ADJUST TRAFFIC CONTROL DEVICES INSTALLED IN PHASE I STEP I.
3. CONTRACTOR THEN SHALL INSTALL ALL TRAFFIC CONTROL DEVICES, FOLLOWING THE PERTINENT MOBILE OPERATIONS (MILL & OVERLAY) STANDARDS.
4. DURING PEAK HOURS, 2 LANES MUST REMAIN OPEN. WHEN CLOSING TRAVEL LANES, APPLICABLE TXDOT STANDARDS ARE TO BE FOLLOWED.
5. PERFORM 1-1/2" MILL FROM STA. 6+25 TO STA. 7+25. CONTRACTOR SHALL PERFORM 1-1/2" MILL FROM STA. 7+25 TO STA. 8+50. PERFORM 1-1/2" TO 0" MILL FROM STA. 8+50 TO STA. 9+50.PERFORM 0" TO 1-1/2" FROM STA. 37+25 TO STA. 38+25. WHEN PERFORMING MILLING & OVERLAY OPERATIONS ON BRIDGE, THE PROPOSED 1.5" ACP MUST BE PLACED IMMEDIATELY AFTER AS TO NOT LEAVE THE ARMOR JOINT EXPOSED.
6. PRIOR TO COMMENCEMENT OVERLAY OPERATIONS, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CLEAN THE EXISTING PAVEMENT SURFACE FROM ANY DEBRIS, OR LOOSE AGGREGATE FROM SURFACE.
7. CONTRACTOR SHALL REMOVE METAL BEAM GUARD FENCE IN BRIDGE LIMITS AND INSTALL NEW METAL BEAM GUARD FENCE, AS PER LAYOUT, WHILE KEEPING SAFE TRAFFIC FLOW.
8. CONTRACTOR SHALL INSTALL PAVEMENT MARKINGS FOLLOWING THE FINAL STRIPING CONFIGURATION AS SHOWN IN THE PROPOSED ROADWAY AND MEDIAN LAYOUTS.

FINAL ADJUSTMENTS & CLEAN-UP OF WORK ZONE

1. REMOVE ANY TEMPORARY SIGN COVERS OR SIGNS AND COMPLETE ALL MISCELLANEOUS WORK TO FINISH THE PROJECT AS DIRECTED BY THE ENGINEER.
2. CONTRACTOR SHALL REMOVE ALL EROSION CONTROL DEVICES APPROVED BY THE ENGINEER.
3. PRIOR TO FINAL ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL REMOVE ALL TEMPORARY STRIPING, BARRICADES AND SIGNS, EROSION CONTROL DEVICES, MISCELLANEOUS DEBRIS SUCH AS LEFT-OVER WORK ZONE TABS, POWER BRROM TO REMOVE ALL LOOSE AGGREGATE/DIRT, AND OPEN ALL TRAVEL LANES TO TRAFFIC MUST LEAVE ADVANCED WARNINGS SINGS IN PLACE UNTIL FINAL ACCEPTANCE BY THE ENGINEER.

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106398
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03/01/2023

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Texas Department of Transportation

FM 2220
TCP
SEQUENCE OF CONSTRUCTION

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
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R20-3T
48"x42"

1

G20-10T
60"x48"

2

G20-9TP
24"x24"

R20-5T
24"x30"

R20-5aTP
24"x12"

3

CW20-1D
48"x48"

4

R4-1
24"x30"

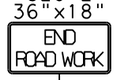
5

G20-5T
48"x24"

G20-6T
48"x30"

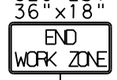
6

G20-2
36"x18"



7

G20-2bT
36"x18"



8

CW3-5
36"x36"

9

G20-5aP
36"x24"

R2-1
36"x48"

10

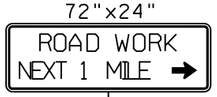
CW21-5aR
36"x36"

11

CW1-6aT
36"x36"

12

G20-1bTR
72"x24"

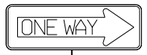


13

R3-2
36"x36"

14

R6-1R
36"x12"



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FM 2220

TCP
SIGN INVENTORY

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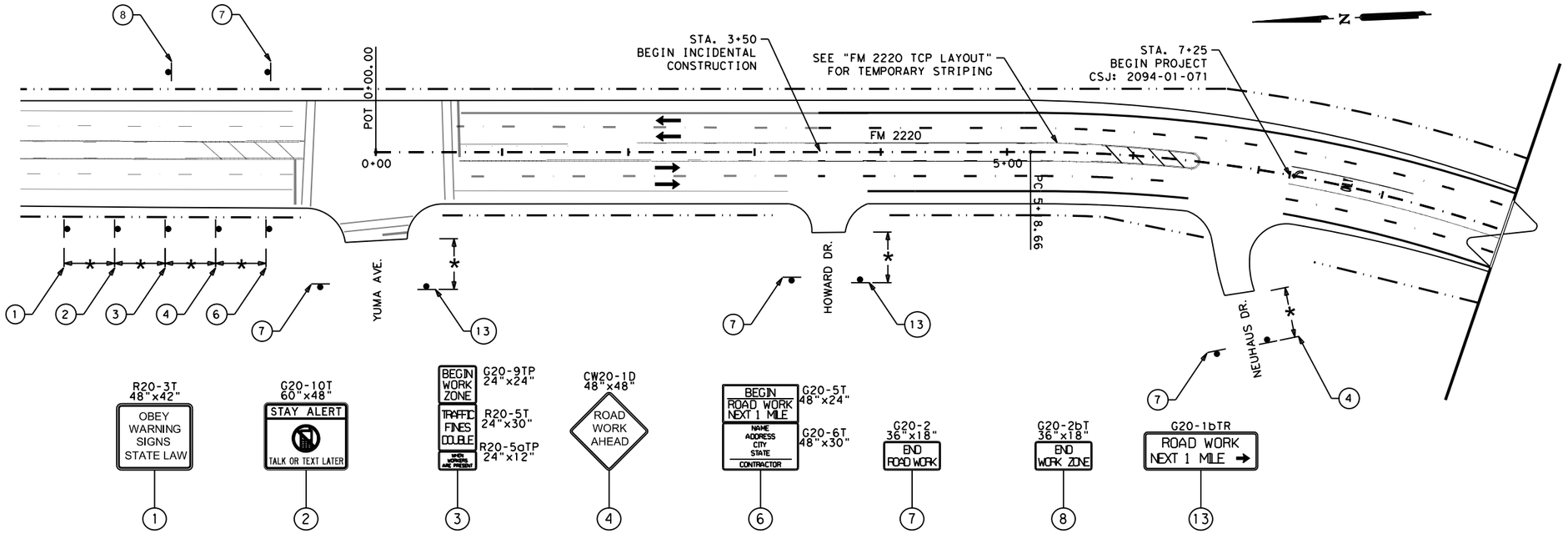
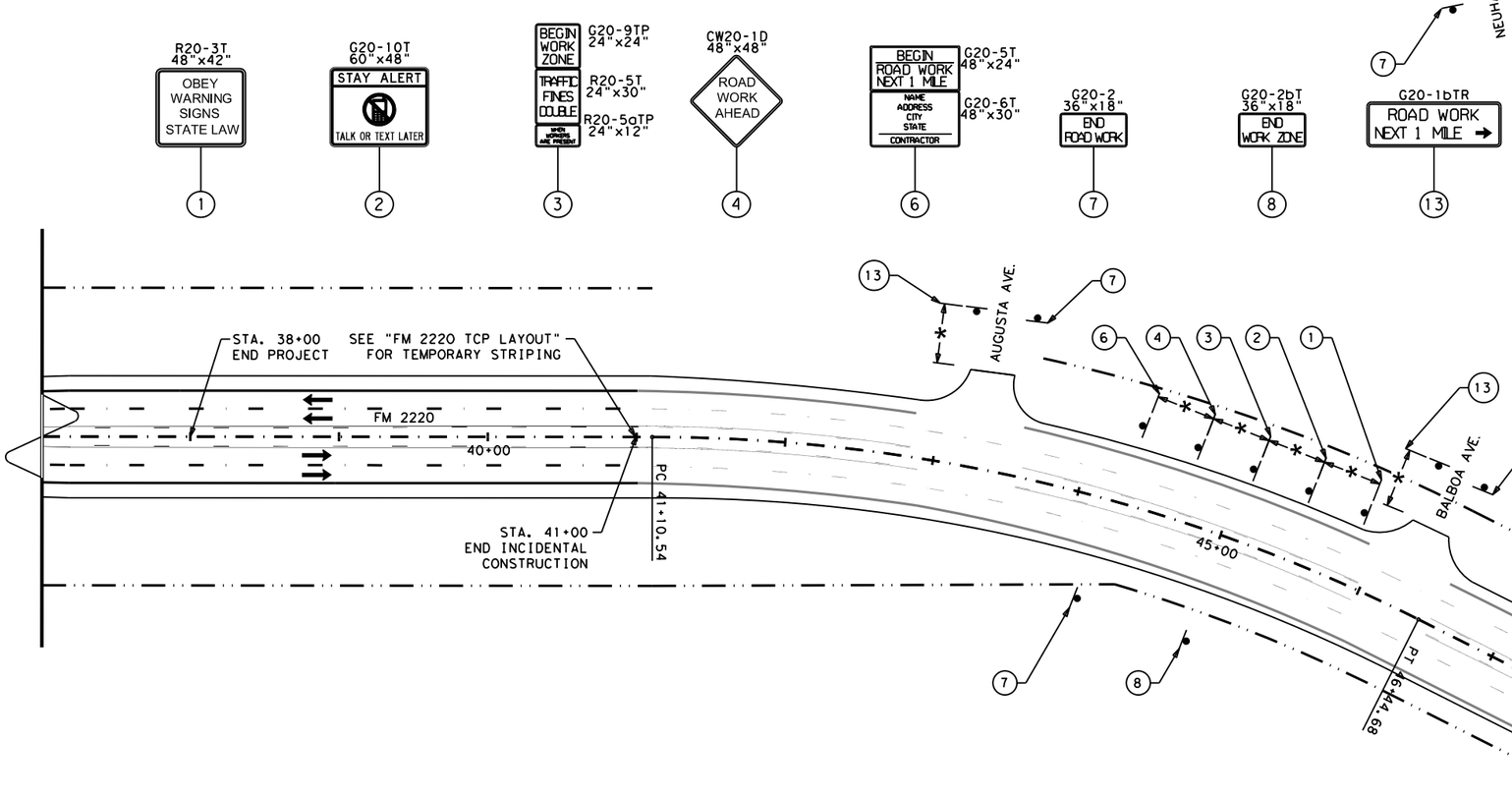
PHR	HIDALGO		22





LEGEND:

- CONSTRUCTION SIGN
- TRAFFIC FLOW
- EXISTING R.O.W. LINE

NOTES:

1. "*" THE CONTRACTOR SHALL REFER TO THE LATEST "BC" AND "TCP" STANDARDS FOR SIGN SPACING AND ADDITIONAL SIGNING.
2. ADVANCED WARNING SIGNS SHALL REMAIN IN PLACE THROUGHOUT ALL PHASES OF CONSTRUCTION, AND REMAIN IN PLACE UNTIL THE COMPLETION AND ACCEPTANCE OF THE PROJECT.
3. SIGNS MAY BE ADJUSTED DUE TO FIELD CONDITIONS OR AS APPROVED BY THE ENGINEER.
4. APPROPRIATE DISTANCES BASED ON LATEST "BC" AND "TCP" STANDARDS SHOULD BE MAINTAINED BETWEEN ADVANCED WARNING SIGNS AND PROPOSED TCP SIGNS SHOWN IN TCP LAYOUTS.
5. SIGNS NOT TO SCALE.

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JOEL GARCIA
106398
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FM 2220
TCP ADVANCED WARNING SIGNS LAYOUT

SCALE: 1"=100' SHEET 1 OF 1

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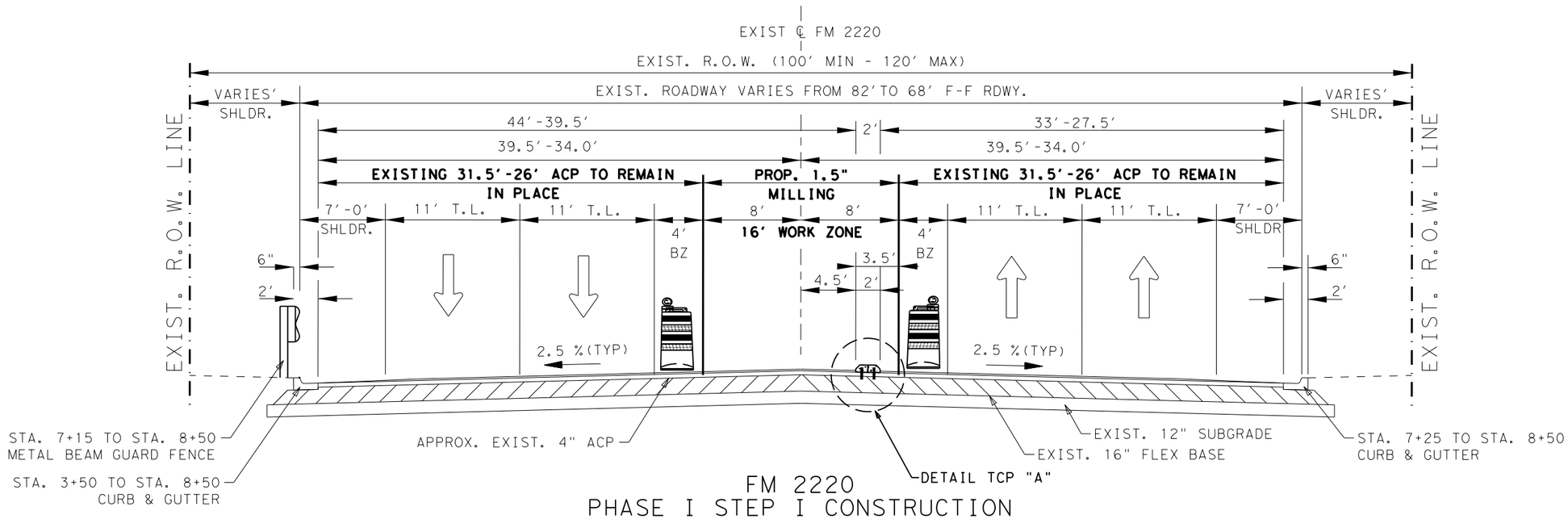
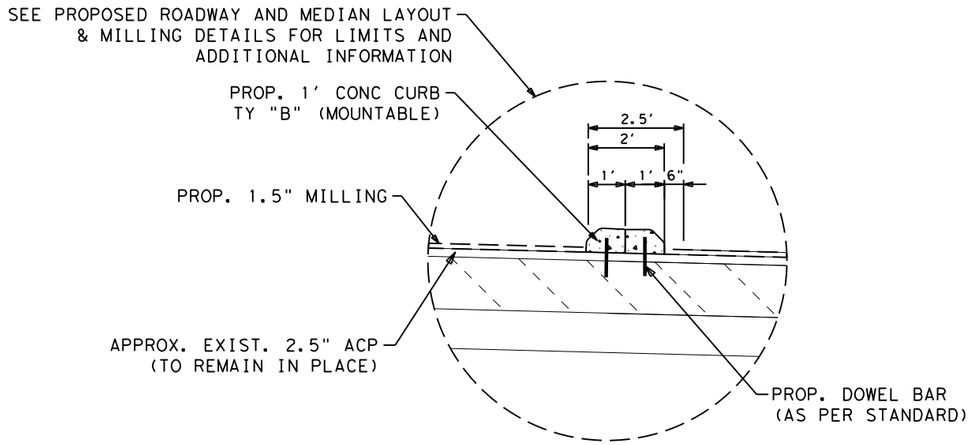


FM 2220
PHASE I STEP I CONSTRUCTION

STA. 7+25 TO STA. 9+00
STA. 9+00 TO STA. 11+00 (PROP. CRM TRANS. FROM 14' TO 3')



DETAIL TCP "A"

FOR SECTION OF MILLING & OVERLAY

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.

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FM 2220
TCP
PHASE I STEP I
TYPICAL SECTIONS

SHEET 1 OF 4

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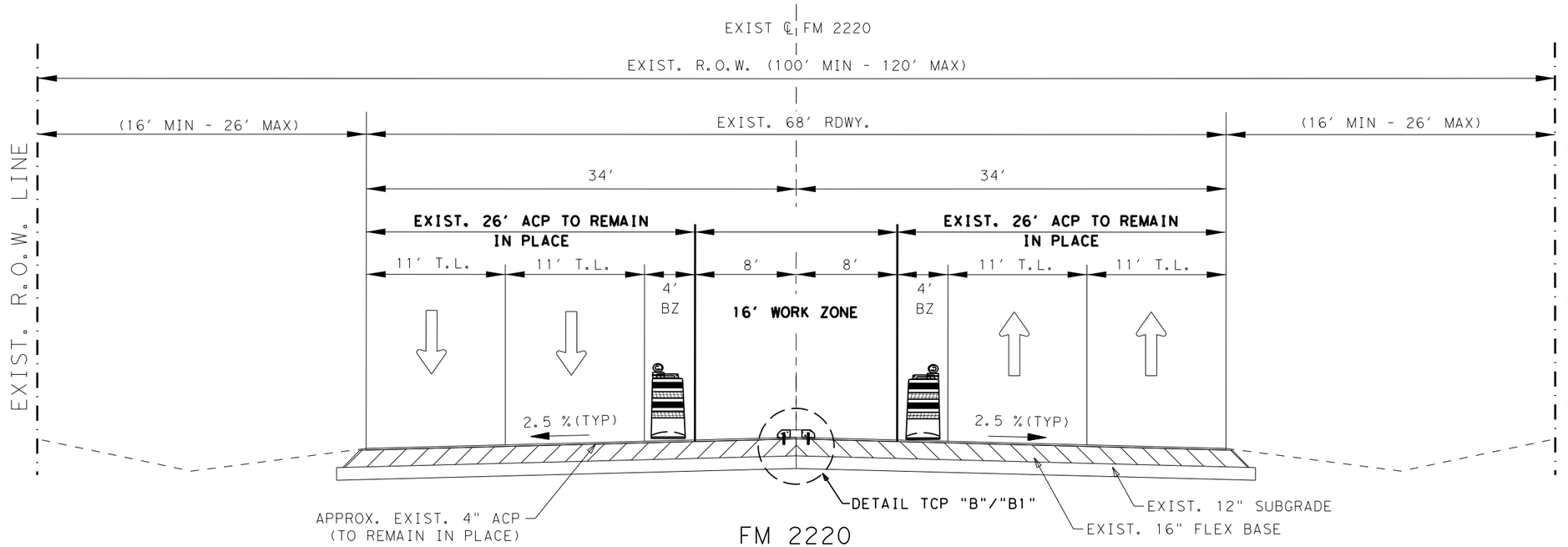


FM 2220
PHASE I STEP I CONSTRUCTION

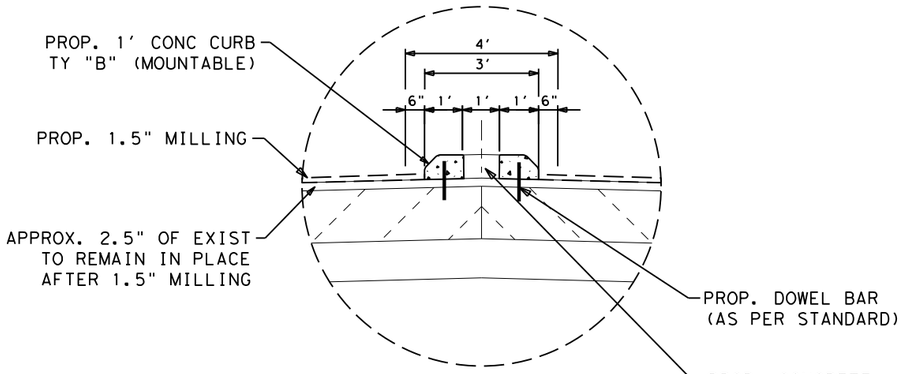
STA. 11+00 TO STA. 24+60
STA. 29+30 TO STA. 37+25
STA. 35+00 TO STA. 37+20 (ROADWAY TRANS. 68' TO 82' ROADWAY)
STA. 35+00 TO STA. 37+25 (PROP. CRM TRANS. FROM 3' TO 13')

LEGEND:

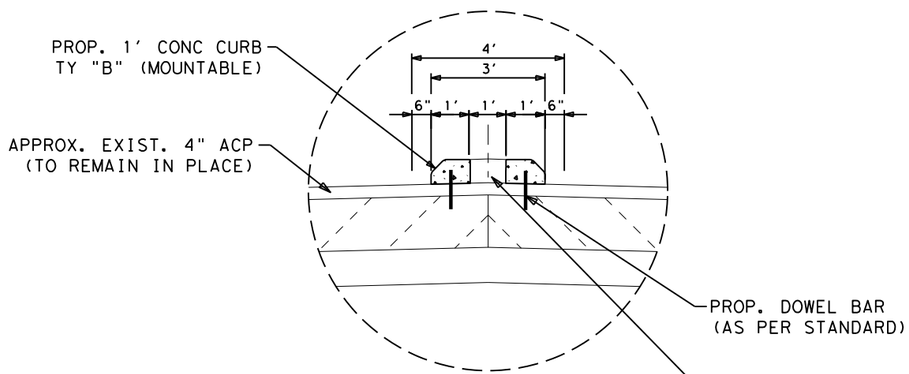
℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.



DETAIL TCP "B"
FOR SECTION OF MILLING



DETAIL TCP "B1"
FOR SECTION OF OVERLAY ONLY (NO MILLING)

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FM 2220
TCP
PHASE I STEP I
TYPICAL SECTIONS

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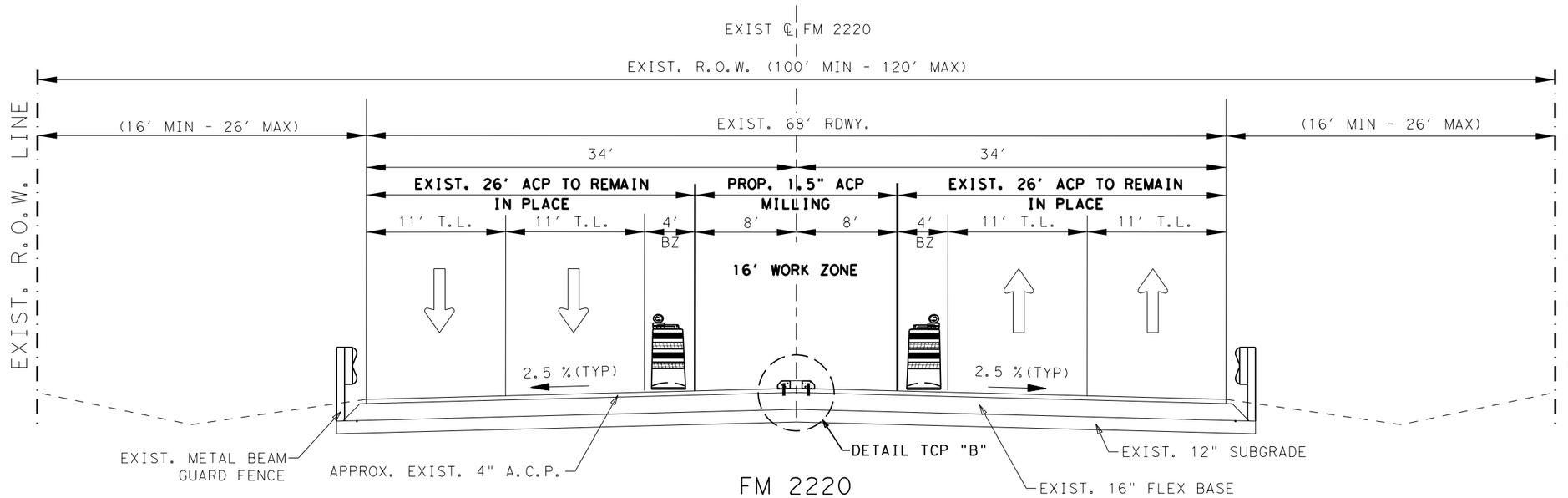
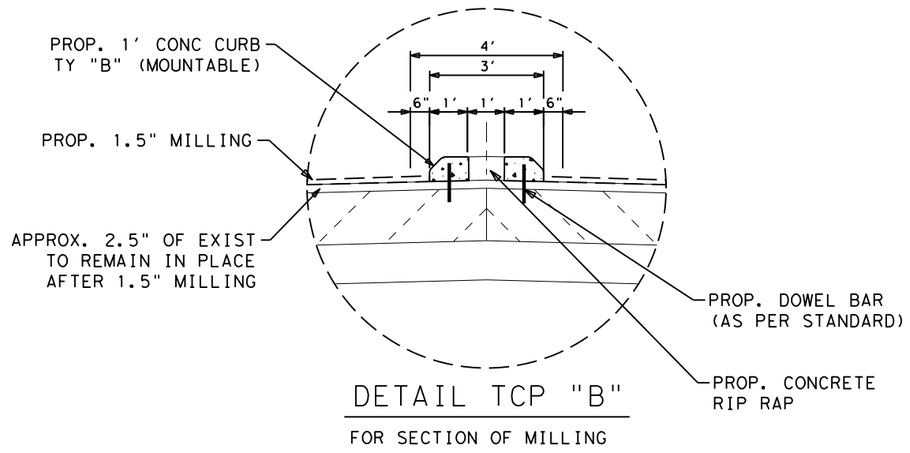


FM 2220
PHASE I STEP I CONSTRUCTION

STA. 24+60 TO STA. 26+40
STA. 27+50 TO STA. 29+30



DETAIL TCP "B"
FOR SECTION OF MILLING

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.
4. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATION ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.

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JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

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FM 2220
TCP
PHASE I STEP I
TYPICAL SECTIONS

SHEET 3 OF 4

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
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DATE: 2/27/2023 5:40:04 PM
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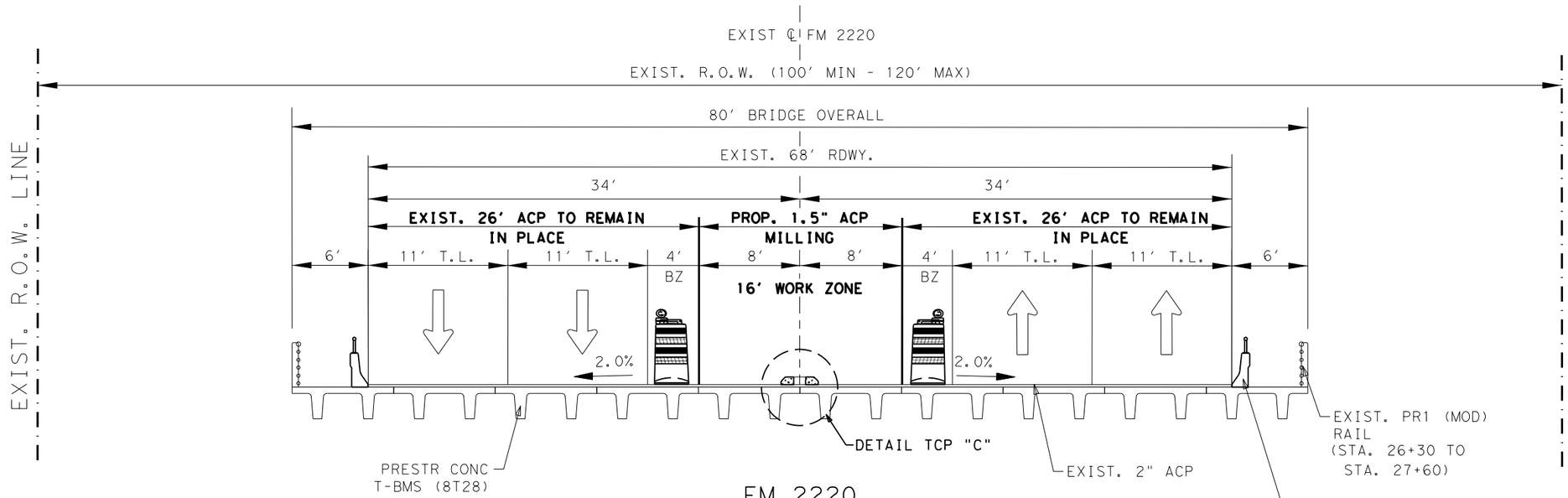


FM 2220
PHASE I STEP I CONSTRUCTION

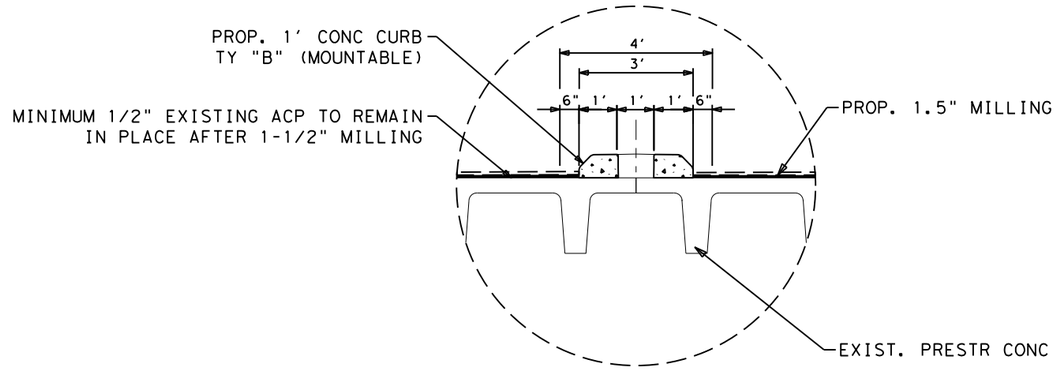
STA. 26+40 TO STA. 25+50

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.
4. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATION ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.



DETAIL TCP "C"

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

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FM 2220
TCP
PHASE I STEP I
TYPICAL SECTIONS

SHEET 4 OF 4

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		27

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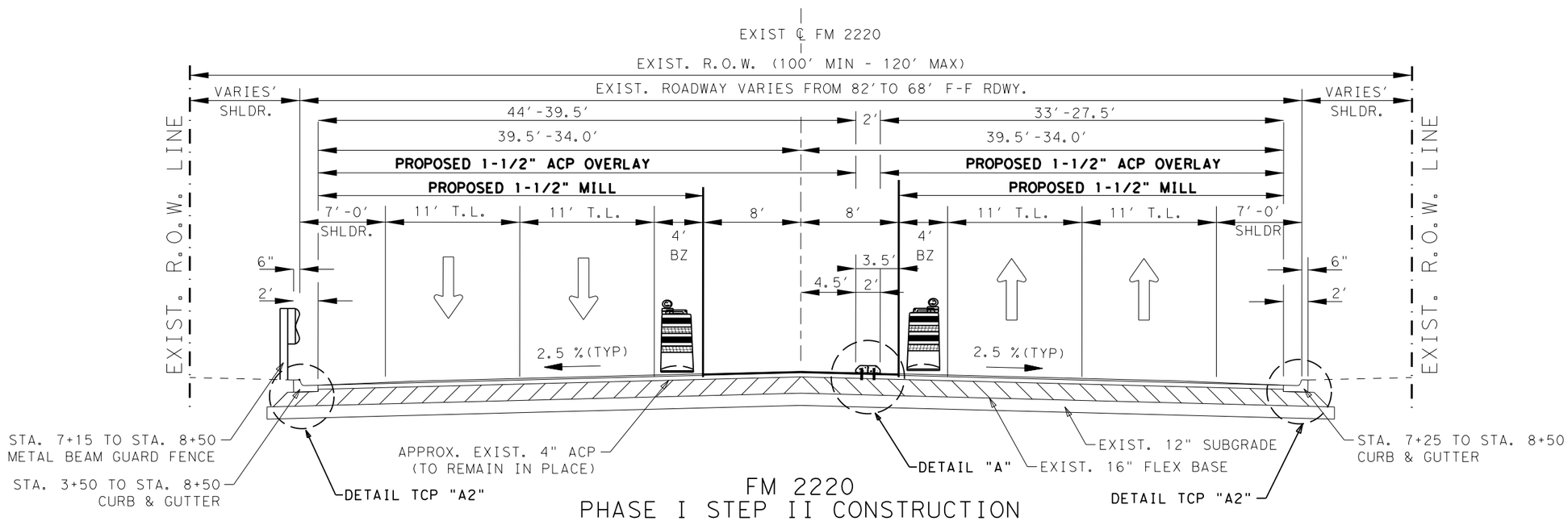


FM 2220
PHASE I STEP II CONSTRUCTION

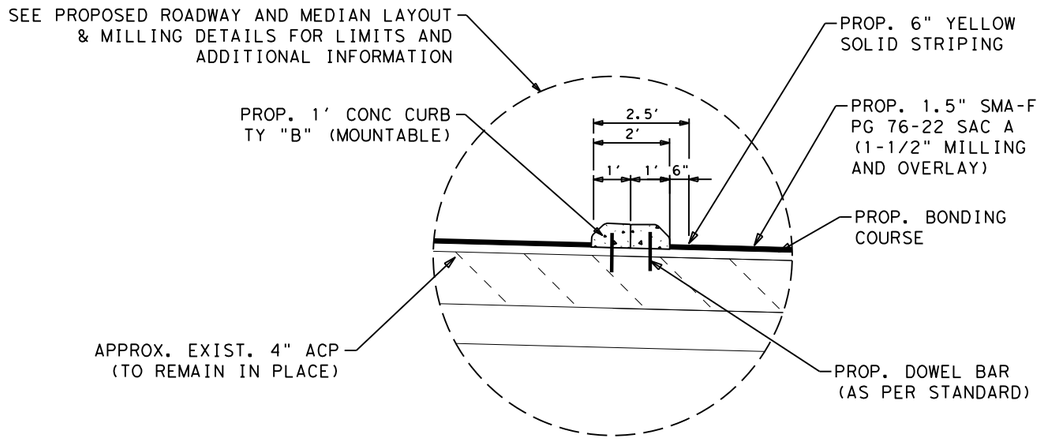
STA. 7+25 TO STA. 9+00
STA. 9+00 TO STA. 11+00 (PROP. CRM TRANS. FROM 14' TO 3')

LEGEND:

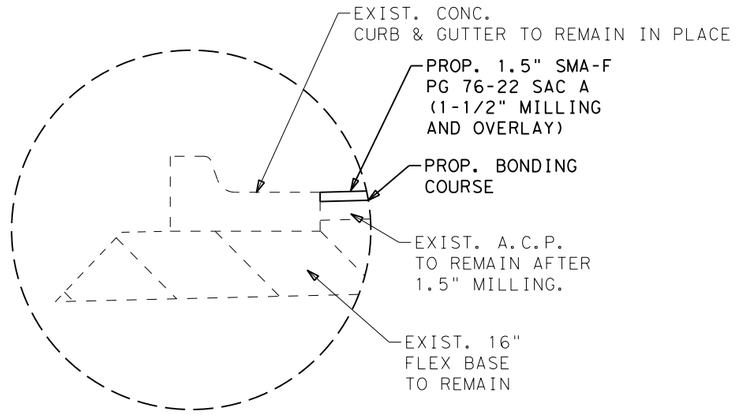
℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.



DETAIL "A"



DETAIL TCP "A2"

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Texas Department of Transportation

FM 2220 TCP PHASE I STEP II TYPICAL SECTIONS

SHEET 1 OF 4

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		28

DATE: 2/27/2023 5:40:04 PM
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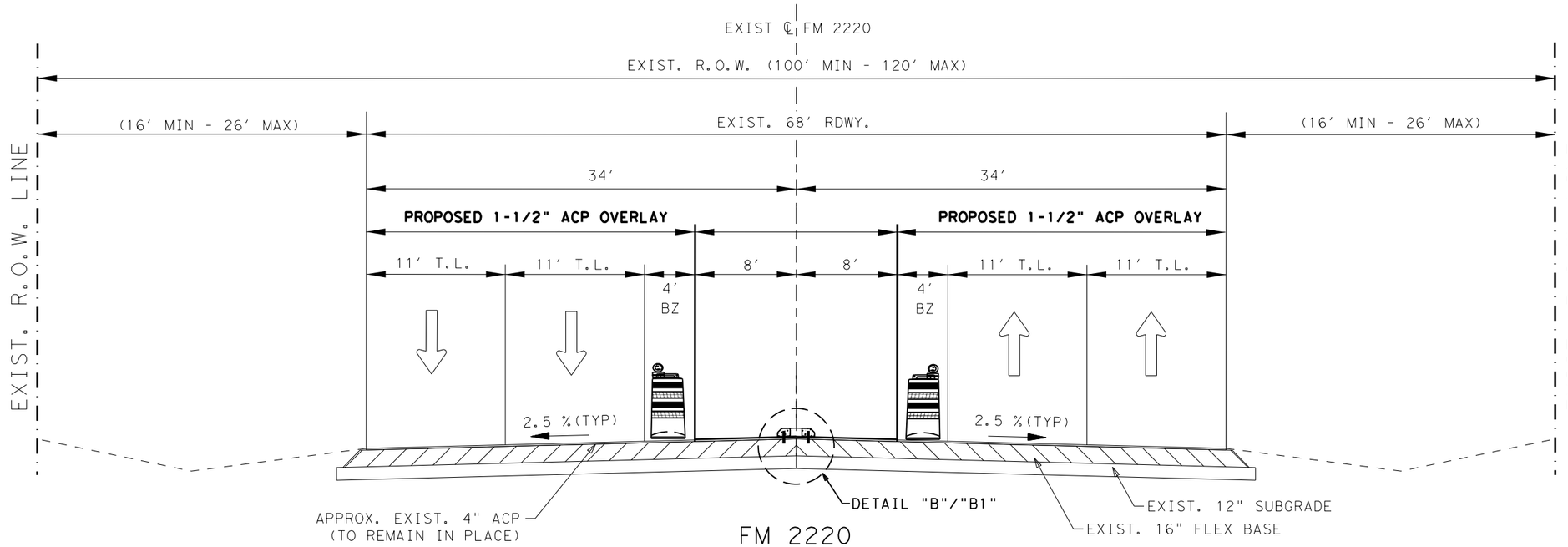


FM 2220
PHASE I STEP II CONSTRUCTION

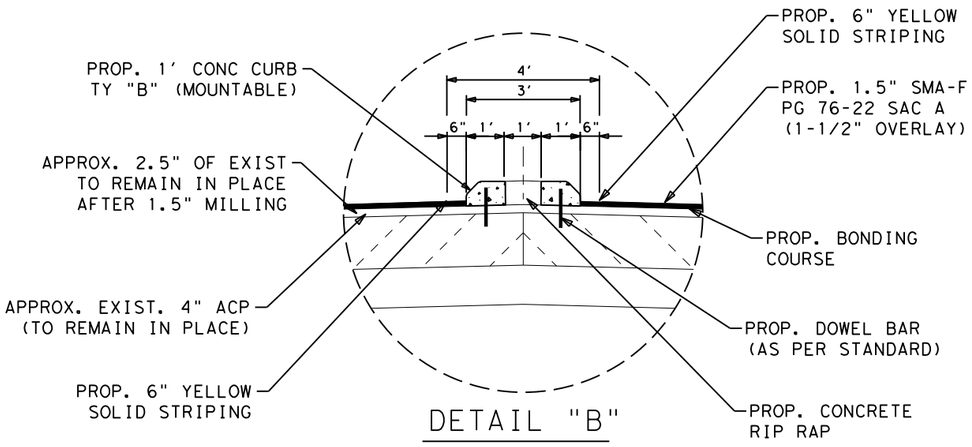
STA. 11+00 TO STA. 24+60
STA. 29+30 TO STA. 37+25
STA. 35+00 TO STA. 37+20 (ROADWAY TRANS. 68' TO 82' ROADWAY)
STA. 35+00 TO STA. 37+25 (PROP. CRM TRANS. FROM 3' TO 13')

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

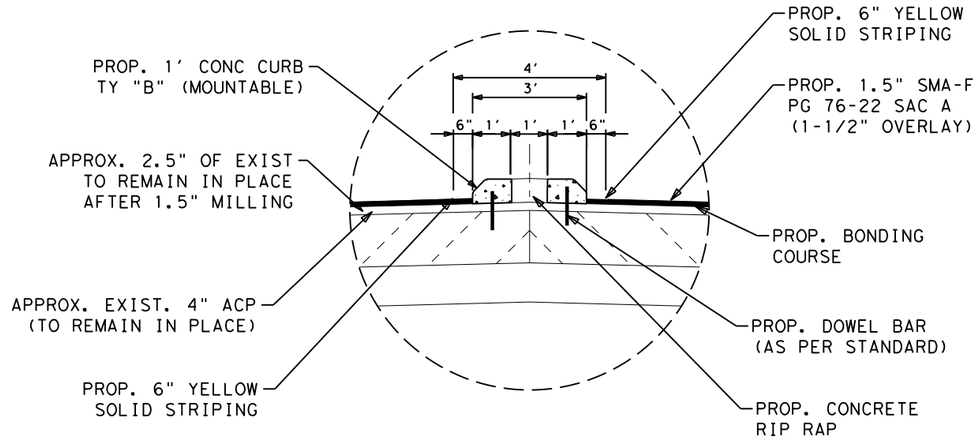
GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.



DETAIL "B"

FOR SECTION OF MILLING & OVERLAY



DETAIL "B1"

FOR SECTION OF OVERLAY ONLY (NO MILLING)

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FM 2220
TCP
PHASE I STEP II
TYPICAL SECTIONS

SHEET 2 OF 4

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		29

DATE: 2/27/2023 5:40:04 PM
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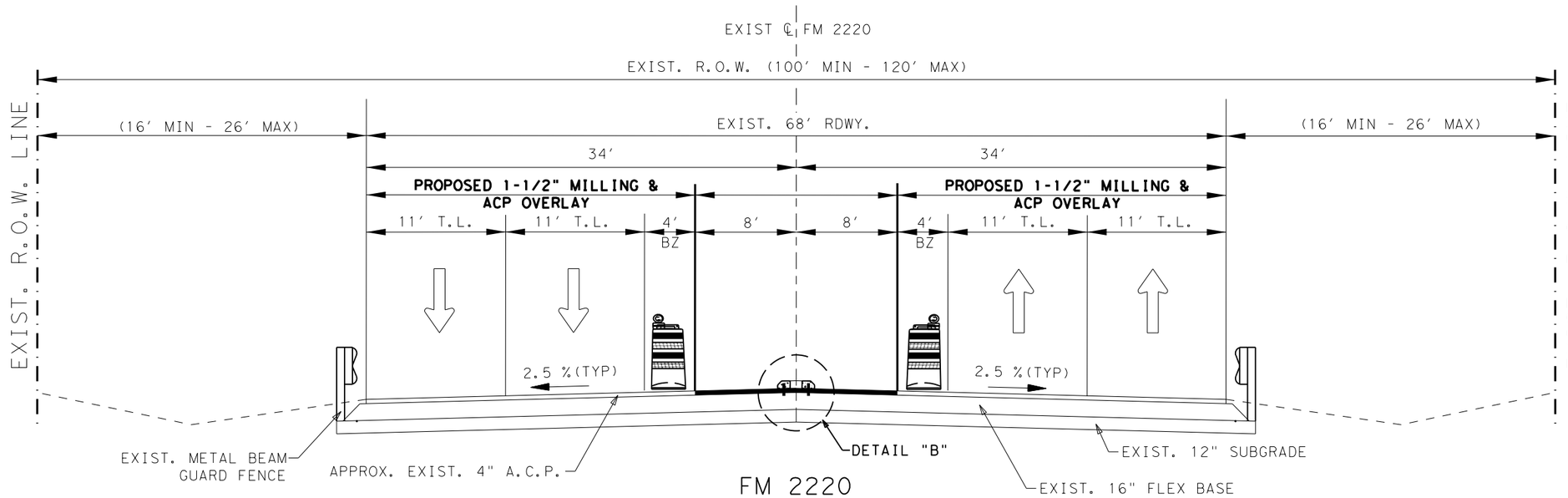
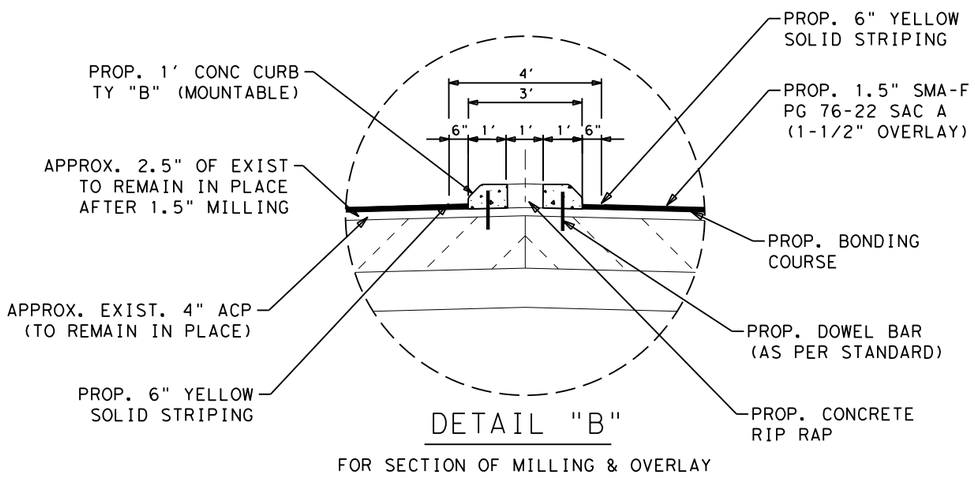


FM 2220
PHASE I STEP II CONSTRUCTION

STA. 24+60 TO STA. 26+40
STA. 27+50 TO STA. 29+30



DETAIL "B"

FOR SECTION OF MILLING & OVERLAY

LEGEND:

℄ - CENTER LINE
PGL - PROFILE GRADE LINE
PCJ - PERMISSIBLE CONSTRUCTION JOINT
R.O.W. - RIGHT OF WAY
SHLDR - SHOULDER
CRM - CONCRETE RAISED MEDIAN
T.L. - TRAVEL LANE
LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.
4. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATION ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT OF THE BRIDGE ARMOR JOINT, AT THEIR OWN COST, IF ANY DAMAGE OCCURS DURING CONSTRUCTION OPERATIONS.

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FM 2220
TCP
PHASE I STEP II
TYPICAL SECTIONS

SHEET 3 OF 4

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		30

DATE: 2/27/2023 5:40:05 PM
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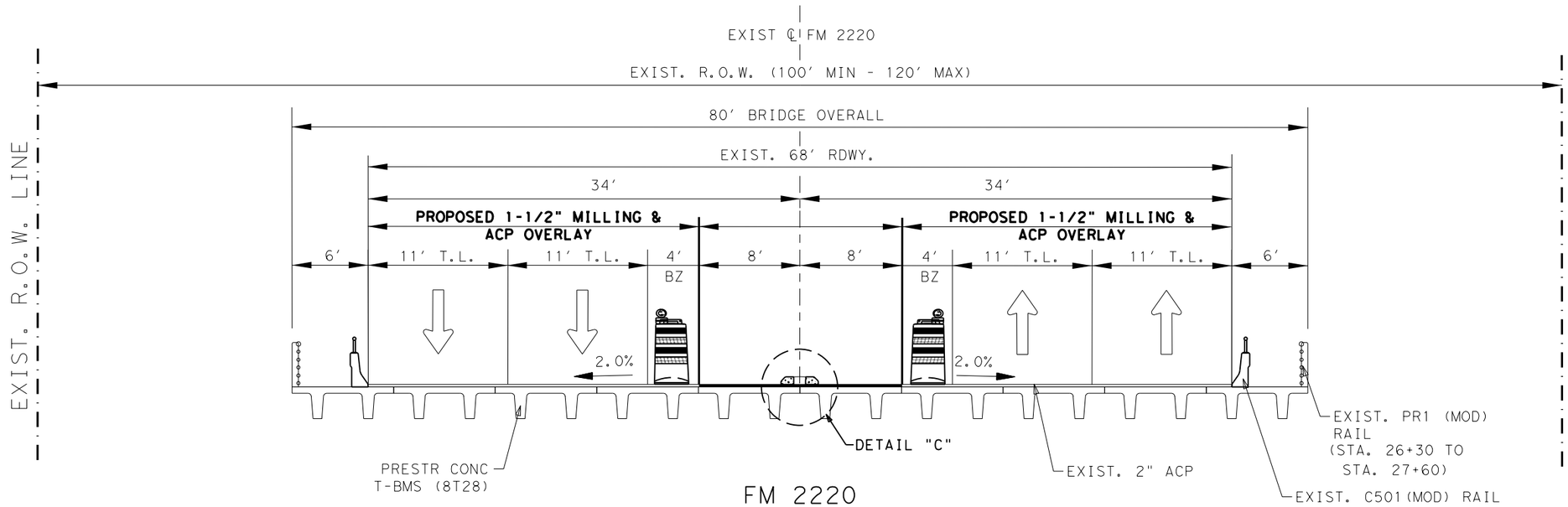
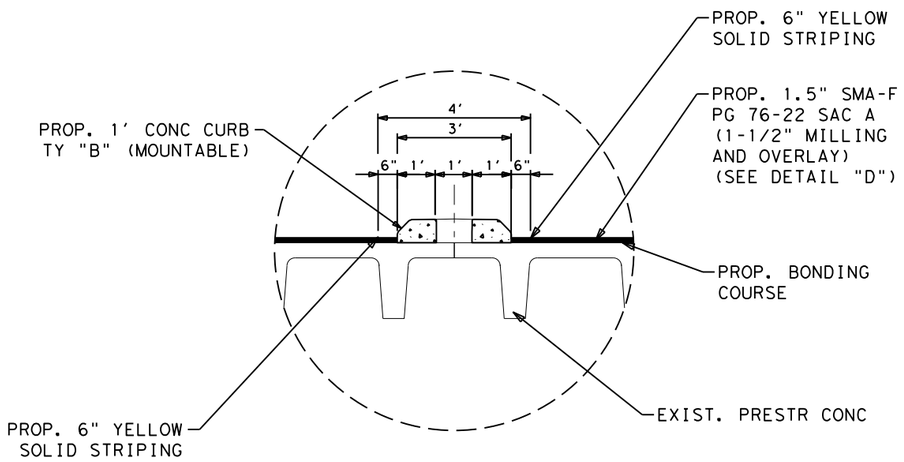


FM 2220
PHASE I STEP II CONSTRUCTION

STA. 26+40 TO STA. 27+50



DETAIL "C"

FOR SECTION OF MILLING & OVERLAY

LEGEND:

- ℄ - CENTER LINE
- PGL - PROFILE GRADE LINE
- PCJ - PERMISSIBLE CONSTRUCTION JOINT
- R.O.W. - RIGHT OF WAY
- SHLDR - SHOULDER
- CRM - CONCRETE RAISED MEDIAN
- T.L. - TRAVEL LANE
- LTL/TWLTL - LEFT TURNING LANE/TWO WAY LEFT TURNING LANE
- L.P.C.B. - LOW PROFILE CONCRETE BARRIER
- TRAFFIC BARREL WITH REFLECTOR AS PER BC-21 STANDARDS.

GENERAL NOTES:

1. SCOPE OF WORK INCLUDES CONSTRUCTION OF CONCRETE RAISED MEDIAN, MILLING, ACP OVERLAY AND STRIPING.
2. SEE TCP LAYOUTS, TCP GENERAL NOTES AND SEQUENCE OF CONSTRUCTION FOR ADDITIONAL INFORMATION.
3. FOR MILLING LIMITS AND DETAILS, REFER TO "MILLING DETAILS" SHEET.
4. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATION ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
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STATE OF TEXAS
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FM 2220
TCP
PHASE I STEP II
TYPICAL SECTIONS

SHEET 4 OF 4

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		31

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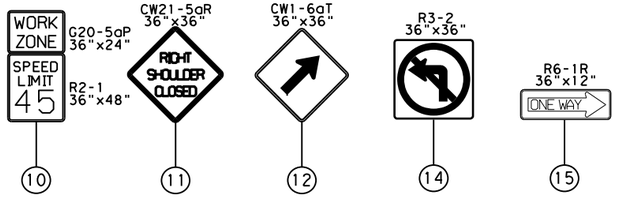


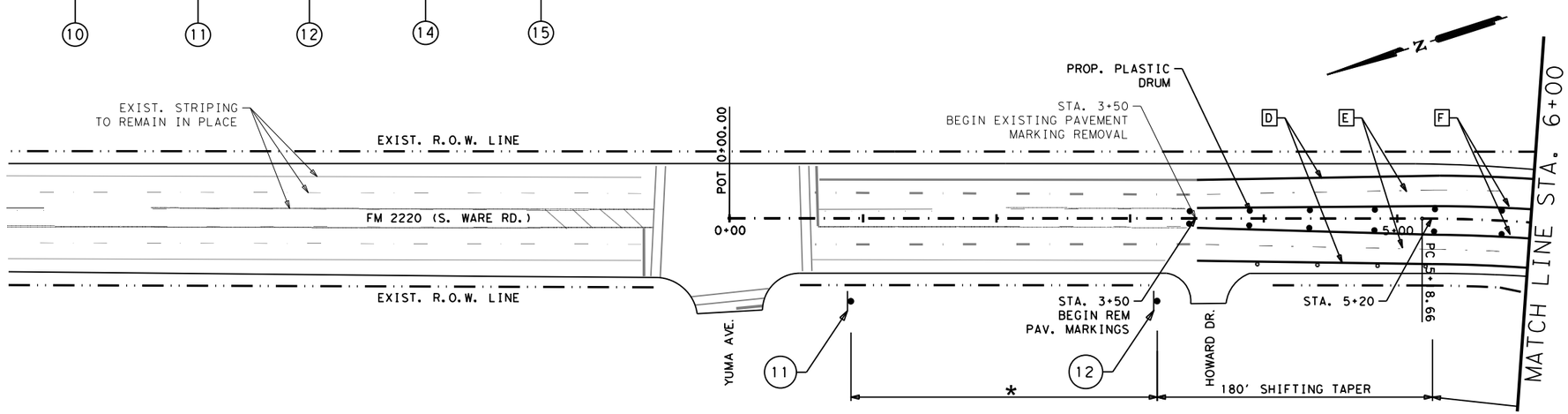
(1) PROP. S.E.T. CONSTRUCTION EXIT (78 SF) PHASE I STEP I & PHASE I STEP II

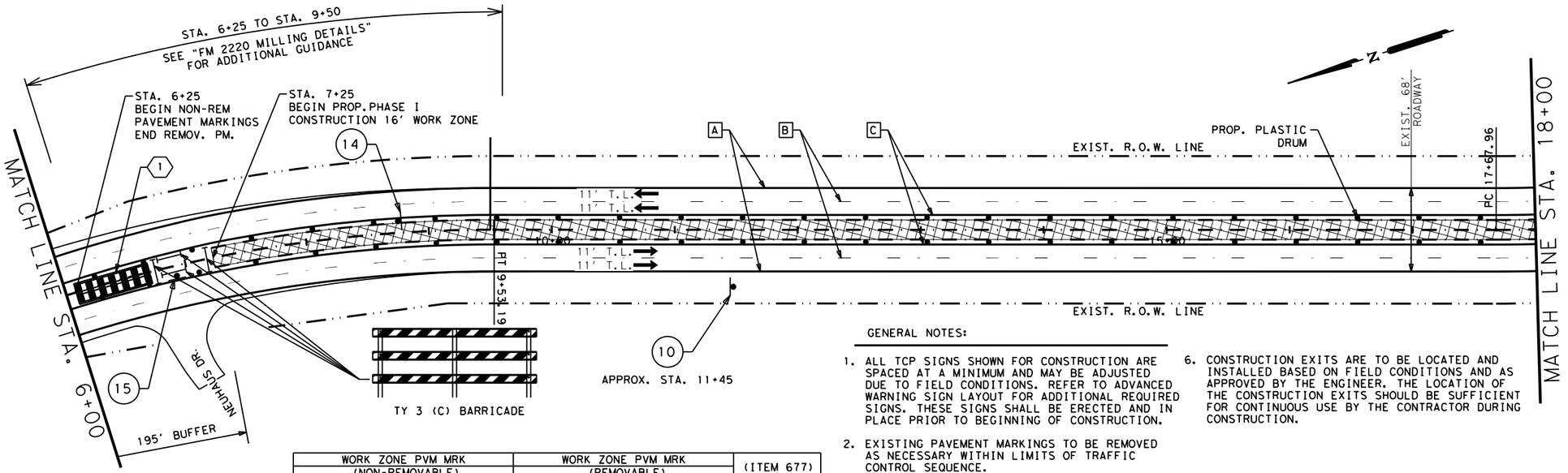
INSTALLED:_____

REMOVED:_____

SEE NOTE 6 FOR REFERENCE.

EROSION CONTROL MEASURES	
506	506
6021	6024
CONSTR. EXIT (INSTALL) (EA)	CONSTR. EXIT (REMOVE) (EA)
78	78





WORK ZONE PVM MRK (NON-REMOVABLE)			WORK ZONE PVM MRK (REMOVABLE)			(ITEM 677)
662	662	662	662	662	662	677
6004	6001	6034	6063	6060	6095	6001
4" (W) SLD (LF)	4" (W) BRK (LF)	4" (Y) SLD (LF)	4" (W) SLD (LF)	4" (W) BRK (LF)	4" (Y) SLD (LF)	ELIM EXST. PAV MARKS (4")
A	B	C	D	E	F	(LF)
2625	600	2625	275	140	275	3620

GENERAL NOTES:

1. ALL TCP SIGNS SHOWN FOR CONSTRUCTION ARE SPACED AT A MINIMUM AND MAY BE ADJUSTED DUE TO FIELD CONDITIONS. REFER TO ADVANCED WARNING SIGN LAYOUT FOR ADDITIONAL REQUIRED SIGNS. THESE SIGNS SHALL BE ERECTED AND IN PLACE PRIOR TO BEGINNING OF CONSTRUCTION.
2. EXISTING PAVEMENT MARKINGS TO BE REMOVED AS NECESSARY WITHIN LIMITS OF TRAFFIC CONTROL SEQUENCE.
3. FOR PLASTIC BARREL SPACING, REFER TO BC-21 STANDARDS.
4. SEE "FM 2220 MILLING DETAILS" FOR ADDITIONAL GUIDANCE.
5. EROSION CONTROL DEVICES MAY BE MODIFIED TO MEET FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.
6. CONSTRUCTION EXITS ARE TO BE LOCATED AND INSTALLED BASED ON FIELD CONDITIONS AND AS APPROVED BY THE ENGINEER. THE LOCATION OF THE CONSTRUCTION EXITS SHOULD BE SUFFICIENT FOR CONTINUOUS USE BY THE CONTRACTOR DURING CONSTRUCTION.

LEGEND:

- PROPOSED CONSTRUCTION AREA
- CONSTRUCTION SIGN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- PLASTIC DRUM
- * REFER TO TCP STANDARDS FOR SIGN SPACING
- TYPE 3 BARRICADE
- T.L. TRAVEL LANE
- R.O.W. RIGHT OF WAY
- SHLDR. SHOULDER
- CONSTRUCTION EXIT
- ECL EROSION CONTROL LOG
- A WORK ZONE PVMT MARK (NON-REM) 4" WHITE SOLID
- B WORK ZONE PVMT MARK (NON-REM) 4" WHITE BROKEN
- C WORK ZONE PVMT MARK (NON-REM) 4" YELLOW SOLID
- D WORK ZONE PVMT MARK (REM) 4" WHITE SOLID
- E WORK ZONE PVMT MARK (REM) 4" WHITE BROKEN
- F WORK ZONE PVMT MARK (REM) 4" YELLOW SOLID

STATE OF TEXAS
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LICENSED PROFESSIONAL ENGINEER

03/01/2023

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FM 2220
TCP
PHASE I STEP I
LAYOUT

SCALE: 1"=100' SHEET 1 OF 3

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		32

DATE: 2/27/2023 5:41:34 PM
FILE: T:\PHRDSGN\Arleene\FM 2220_CRM_2094-01-071\2. TCP\FM2220_PHASE1_SHEETS.dgn

(1) PROP. S.E.T. EROSION CONTROL LOG (30 LF) PHASE I STEP I & PHASE I STEP II
INSTALLED: _____
REMOVED: _____

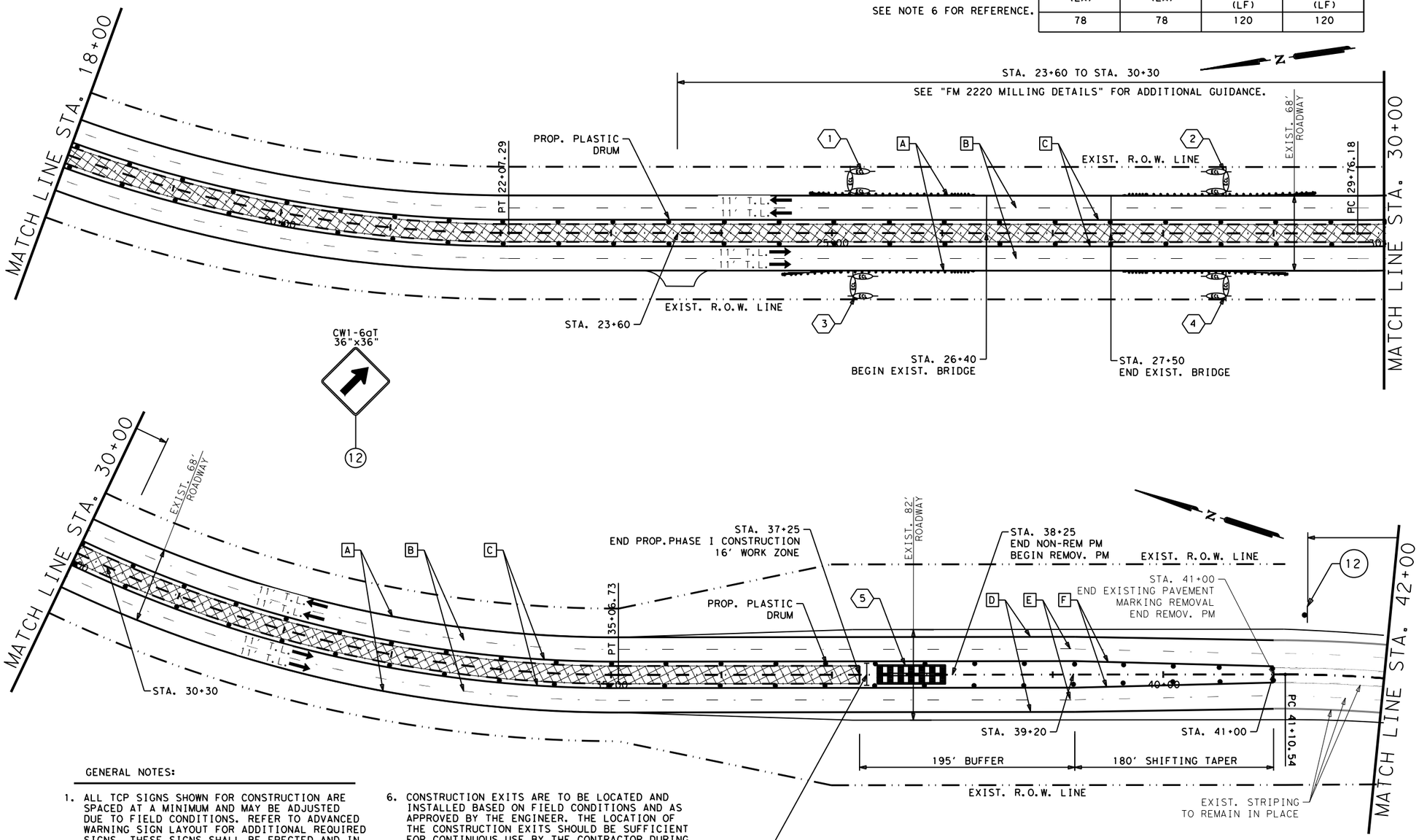
(2) PROP. S.E.T. EROSION CONTROL LOG (30 LF) PHASE I STEP I & PHASE I STEP II
INSTALLED: _____
REMOVED: _____

(3) PROP. S.E.T. EROSION CONTROL LOG (30 LF) PHASE I STEP I & PHASE I STEP II
INSTALLED: _____
REMOVED: _____

(4) PROP. S.E.T. EROSION CONTROL LOG (30 LF) PHASE I STEP I & PHASE I STEP II
INSTALLED: _____
REMOVED: _____

(5) PROP. S.E.T. CONSTRUCTION EXIT (78 SF) PHASE I STEP I & PHASE I STEP II
INSTALLED: _____
REMOVED: _____
SEE NOTE 6 FOR REFERENCE.

EROSION CONTROL MEASURES			
506	506	506	506
6021	6024	6041	6043
CONSTR. EXIT (INSTALL) (EA)	CONSTR. EXIT (REMOVE) (EA)	BIODEG EROSN CONT LOGS (INSTL) (12") (LF)	BIODEG EROSN CONT LOGS (REMOVE) (LF)
78	78	120	120

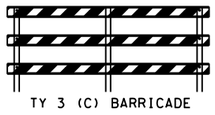


LEGEND:

- PROPOSED CONSTRUCTION AREA
- CONSTRUCTION SIGN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- PLASTIC DRUM
- * REFER TO TCP STANDARDS FOR SIGN SPACING
- TYPE 3 BARRICADE
- T.L. TRAVEL LANE
- R.O.W. RIGHT OF WAY
- SHLDR. SHOULDER
- CONSTRUCTION EXIT
- EGL EROSION CONTROL LOG
- A WORK ZONE PVMT MARK (NON-REM) 4" WHITE SOLID
- B WORK ZONE PVMT MARK (NON-REM) 4" WHITE BROKEN
- C WORK ZONE PVMT MARK (NON-REM) 4" YELLOW SOLID
- D WORK ZONE PVMT MARK (REM) 4" WHITE SOLID
- E WORK ZONE PVMT MARK (NON-REM) 4" WHITE BROKEN
- F WORK ZONE PVMT MARK (NON-REM) 4" YELLOW SOLID

GENERAL NOTES:

1. ALL TCP SIGNS SHOWN FOR CONSTRUCTION ARE SPACED AT A MINIMUM AND MAY BE ADJUSTED DUE TO FIELD CONDITIONS. REFER TO ADVANCED WARNING SIGN LAYOUT FOR ADDITIONAL REQUIRED SIGNS. THESE SIGNS SHALL BE ERECTED AND IN PLACE PRIOR TO BEGINNING OF CONSTRUCTION.
2. EXISTING PAVEMENT MARKINGS TO BE REMOVED AS NECESSARY WITHIN LIMITS OF TRAFFIC CONTROL SEQUENCE.
3. FOR PLASTIC BARREL SPACING, REFER TO BC-21 STANDARDS.
4. SEE "FM 2220 MILLING DETAILS" FOR ADDITIONAL GUIDANCE.
5. EROSION CONTROL DEVICES MAY BE MODIFIED TO MEET FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.
6. CONSTRUCTION EXITS ARE TO BE LOCATED AND INSTALLED BASED ON FIELD CONDITIONS AND AS APPROVED BY THE ENGINEER. THE LOCATION OF THE CONSTRUCTION EXITS SHOULD BE SUFFICIENT FOR CONTINUOUS USE BY THE CONTRACTOR DURING CONSTRUCTION.


TY 3 (C) BARRICADE

WORK ZONE PVM MRK (NON-REMOVABLE)			WORK ZONE PVM MRK (REMOVABLE)			(ITEM 677)
662	662	662	662	662	662	677
6004	6001	6034	6063	6060	6095	6001
4" (W) SLD (LF)	4" (W) BRK (LF)	4" (Y) SLD (LF)	4" (W) SLD (LF)	4" (W) BRK (LF)	4" (Y) SLD (LF)	ELIM EXST. PAV MARKS (4")
A	B	C	D	E	F	(LF)
3580	1020	3580	275	140	275	5760

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03/01/2023

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FM 2220
TCP
PHASE I STEP I
LAYOUT

SCALE: 1"=100' SHEET 2 OF 3

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		33

DATE: 2/27/2023 5:41:34 PM
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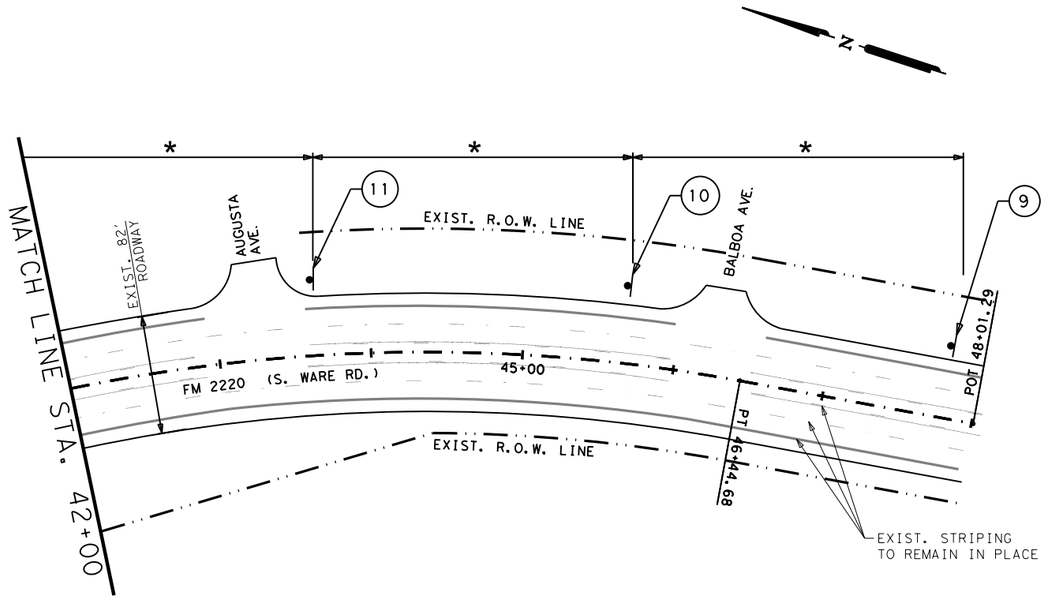

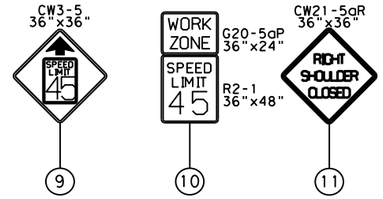

LEGEND:

- PROPOSED CONSTRUCTION AREA
- CONSTRUCTION SIGN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- PLASTIC DRUM
- * - REFER TO TCP STANDARDS FOR SIGN SPACING
- TYPE 3 BARRICADE
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER
- CONSTRUCTION EXIT
- ECL - EROSION CONTROL LOG
- A - WORK ZONE PVMT MARK (NON-REM) 4" WHITE SOLID
- B - WORK ZONE PVMT MARK (NON-REM) 4" WHITE BROKEN
- C - WORK ZONE PVMT MARK (NON-REM) 4" YELLOW SOLID
- D - WORK ZONE PVMT MARK (REM) 4" WHITE SOLID
- E - WORK ZONE PVMT MARK (NON-REM) 4" WHITE BROKEN
- F - WORK ZONE PVMT MARK (NON-REM) 4" YELLOW SOLID

GENERAL NOTES:

1. ALL TCP SIGNS SHOWN FOR CONSTRUCTION ARE SPACED AT A MINIMUM AND MAY BE ADJUSTED DUE TO FIELD CONDITIONS. REFER TO ADVANCED WARNING SIGN LAYOUT FOR ADDITIONAL REQUIRED SIGNS. THESE SIGNS SHALL BE ERECTED AND IN PLACE PRIOR TO BEGINNING OF CONSTRUCTION.
2. EXISTING PAVEMENT MARKINGS TO BE REMOVED AS NECESSARY WITHIN LIMITS OF TRAFFIC CONTROL SEQUENCE.
3. FOR PLASTIC BARREL SPACING, REFER TO BC-21 STANDARDS.
4. SEE "FM 2220 MILLING DETAILS" FOR ADDITIONAL GUIDANCE.
5. EROSION CONTROL DEVICES MAY BE MODIFIED TO MEET FIELD CONDITIONS OR AS DIRECTED BY THE ENGINEER.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220
TCP
PHASE I STEP I
LAYOUT

SCALE: 1"=100' SHEET 3 OF 3

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		34

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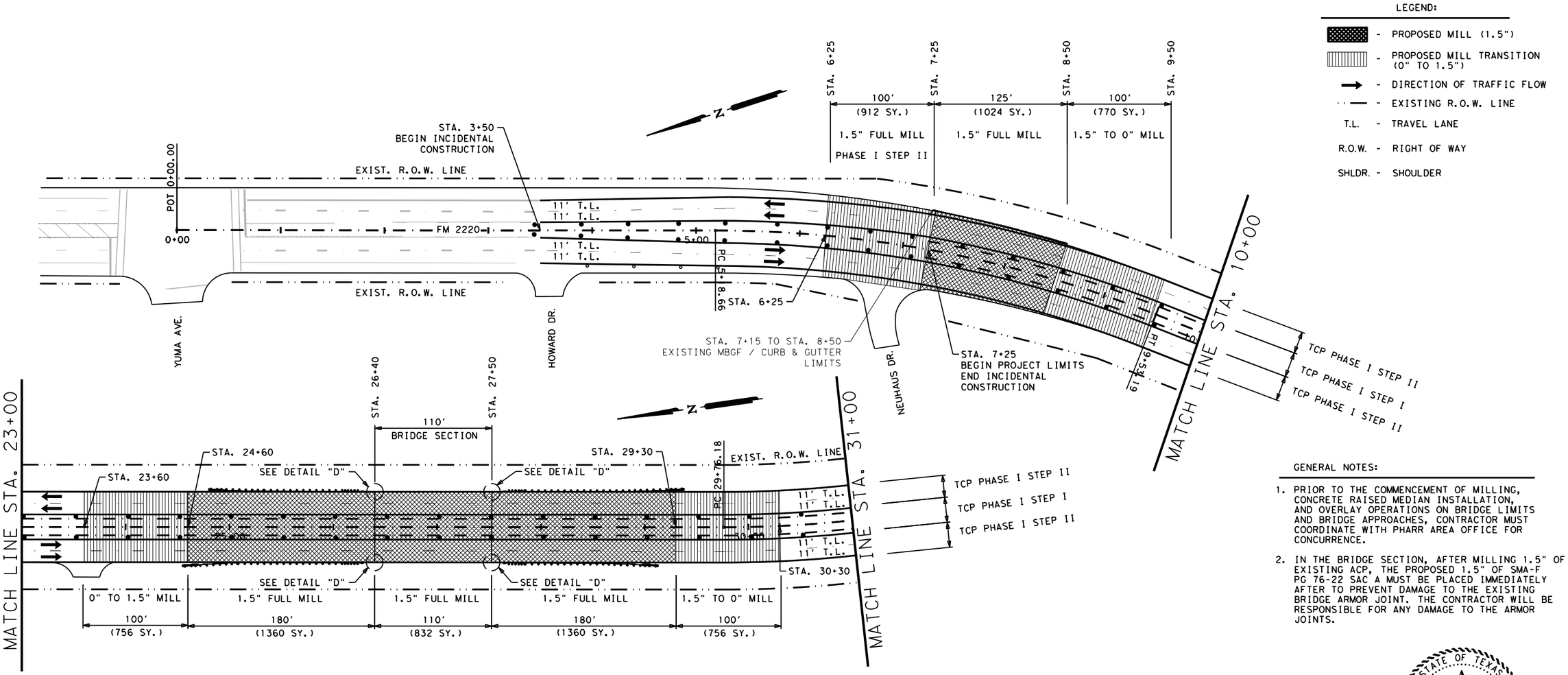

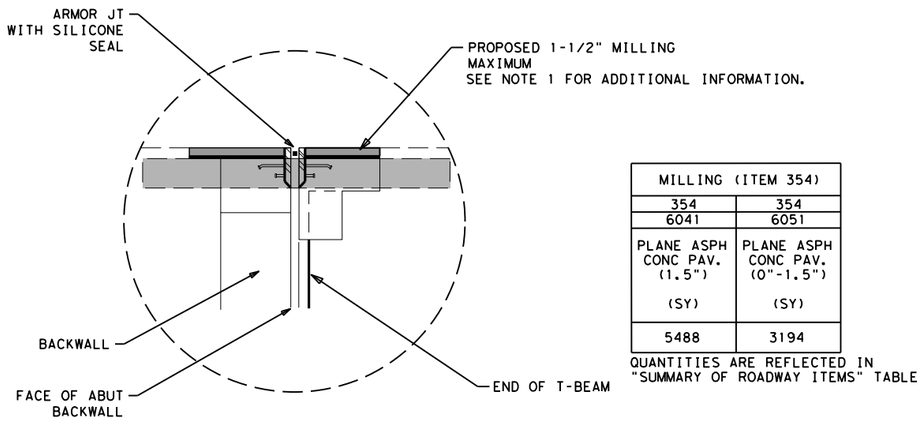

DETAIL "D"
ARMOR JOINT BRIDGE DETAIL

MILLING (ITEM 354)	
354	354
6041	6051
PLANE ASPH CONC PAV. (1.5") (SY)	PLANE ASPH CONC PAV. (0"-1.5") (SY)
5488	3194

QUANTITIES ARE REFLECTED IN "SUMMARY OF ROADWAY ITEMS" TABLE

GENERAL NOTES:

1. PRIOR TO THE COMMENCEMENT OF MILLING, CONCRETE RAISED MEDIAN INSTALLATION, AND OVERLAY OPERATIONS ON BRIDGE LIMITS AND BRIDGE APPROACHES, CONTRACTOR MUST COORDINATE WITH PHARR AREA OFFICE FOR CONCURRENCE.
2. IN THE BRIDGE SECTION, AFTER MILLING 1.5" OF EXISTING ACP, THE PROPOSED 1.5" OF SMA-F PG 76-22 SAC A MUST BE PLACED IMMEDIATELY AFTER TO PREVENT DAMAGE TO THE EXISTING BRIDGE ARMOR JOINT. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO THE ARMOR JOINTS.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220
MILLING DETAILS

SCALE: 1"=100′ SHEET 1 OF 1

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		35

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
4-03 7-13	DIST	COUNTY		SHEET NO.
9-07 8-14	PHR	HIDALGO		36
5-10 5-21				

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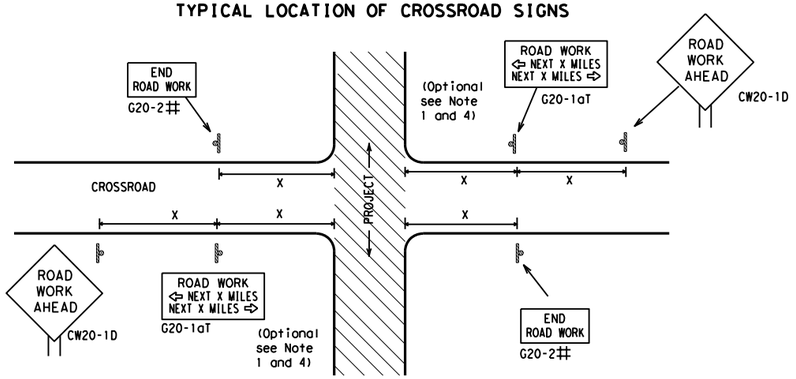
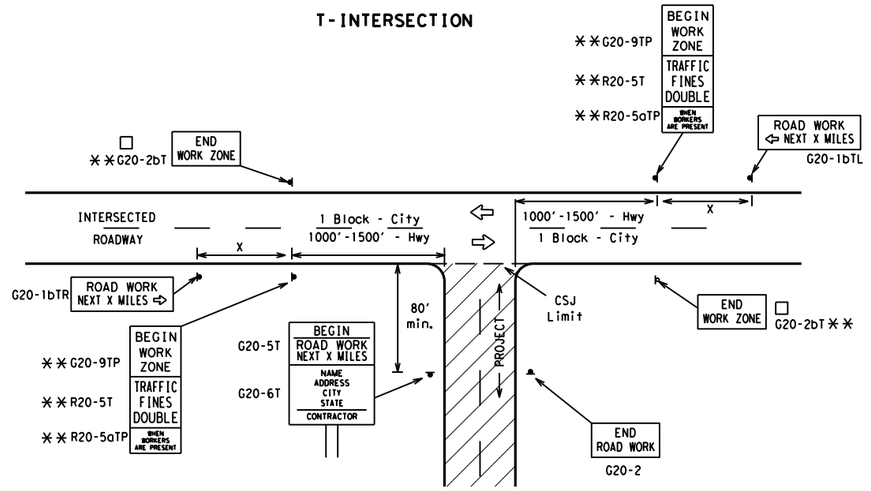
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

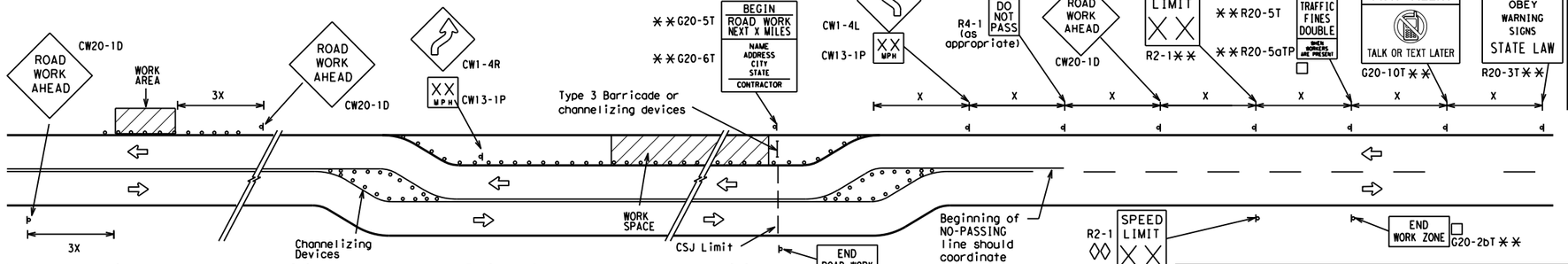
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

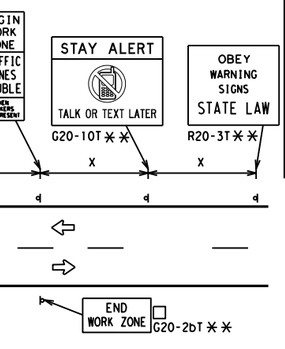
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

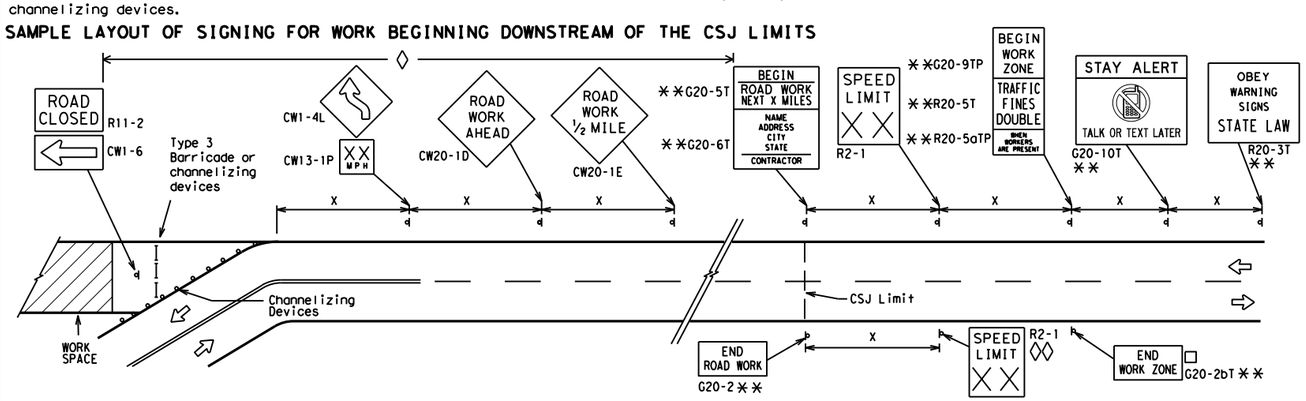


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⟼	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		37

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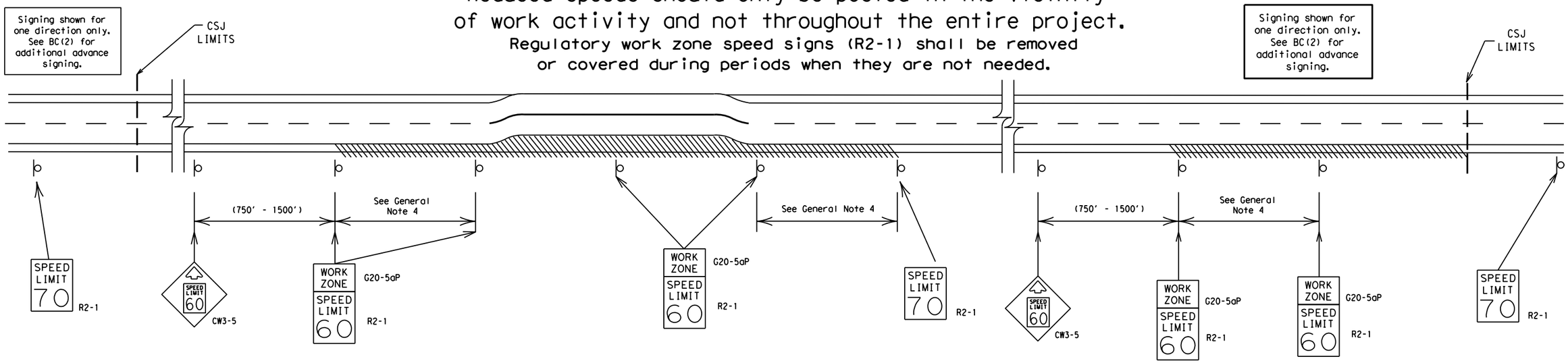
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		38

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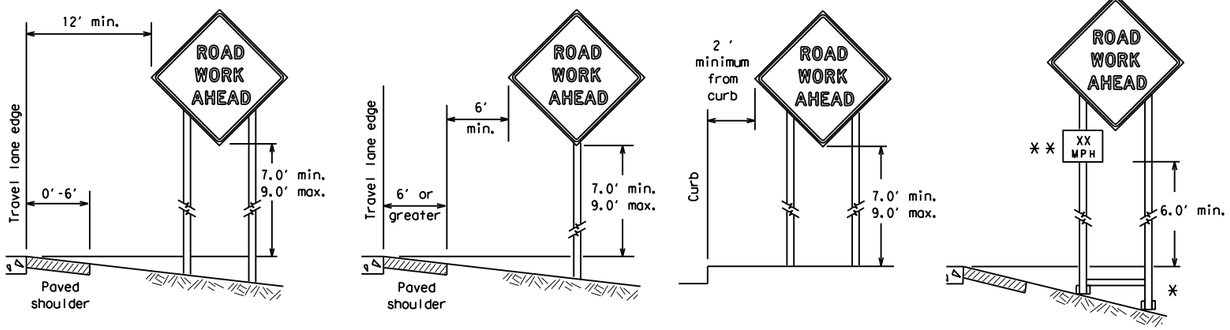
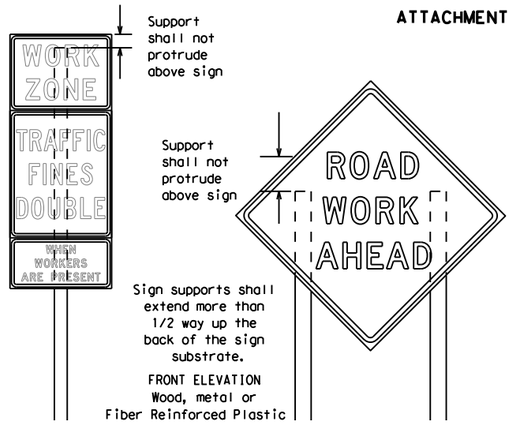
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

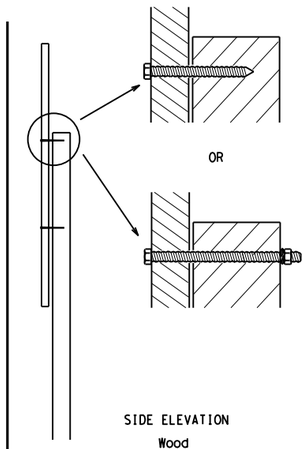


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





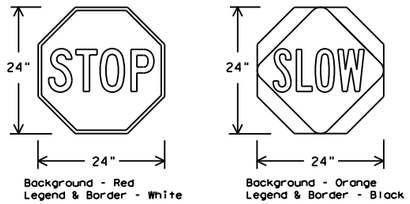
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		39

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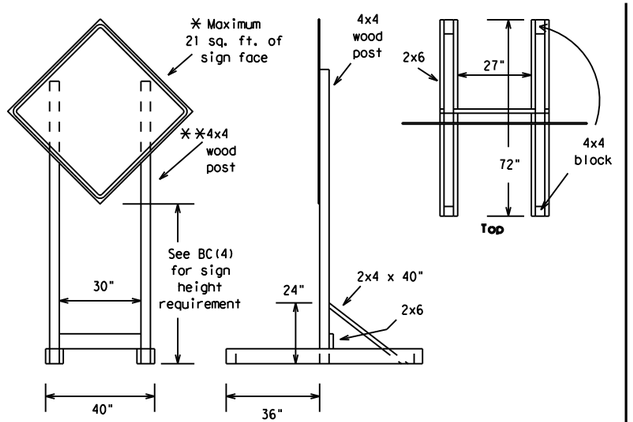
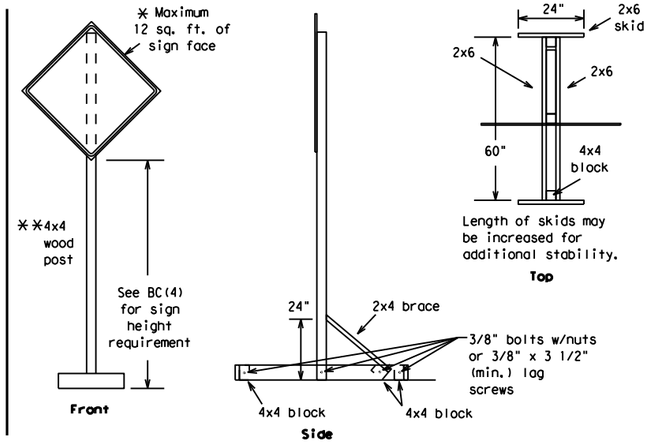
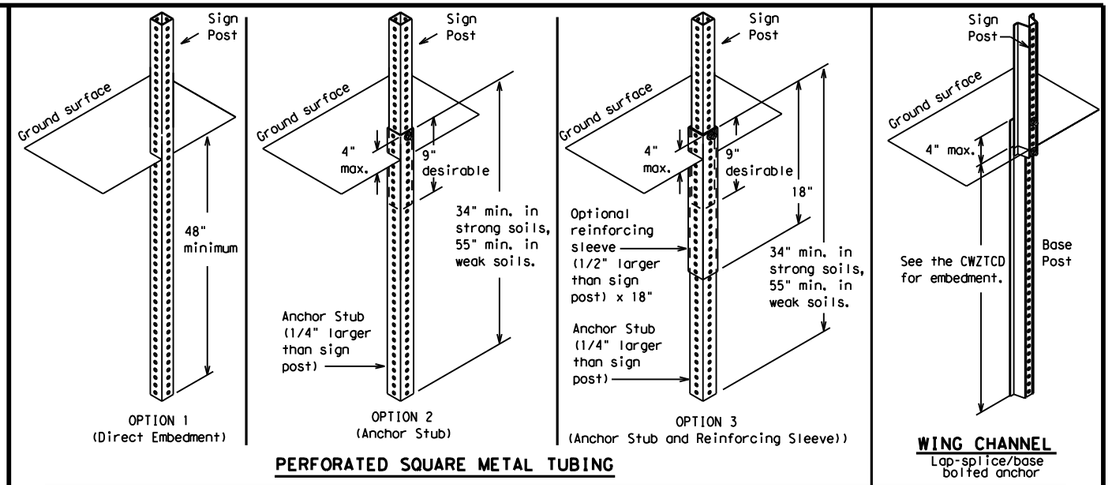




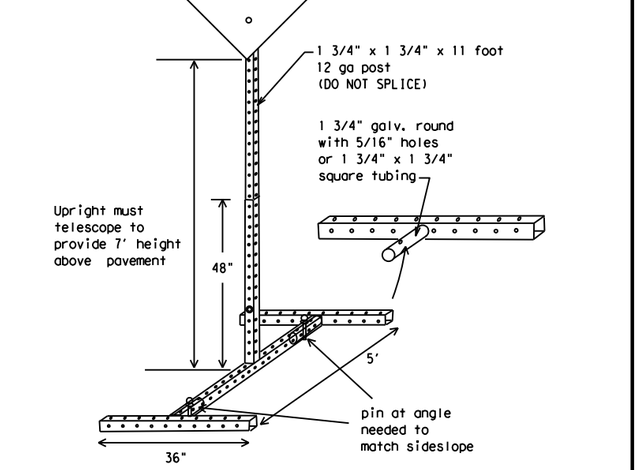
SKID MOUNTED WOOD SIGN SUPPORTS

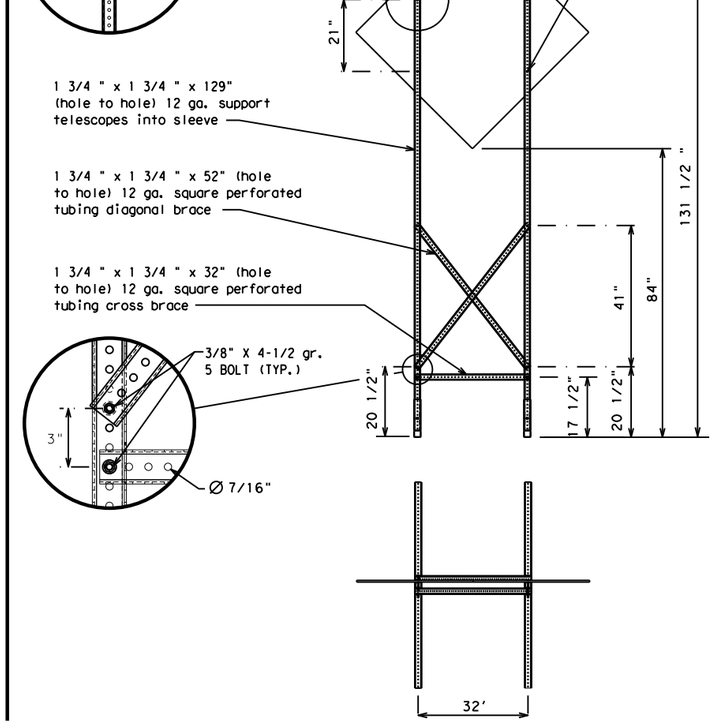
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

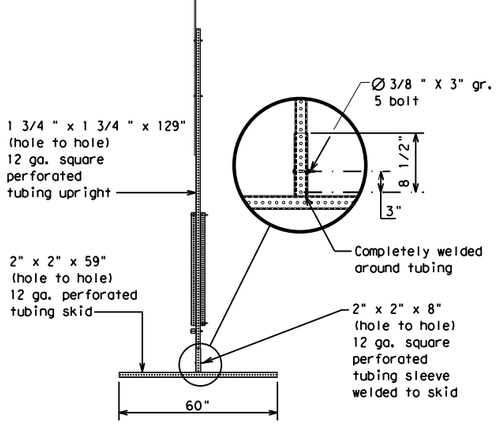


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		40

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	**Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		41

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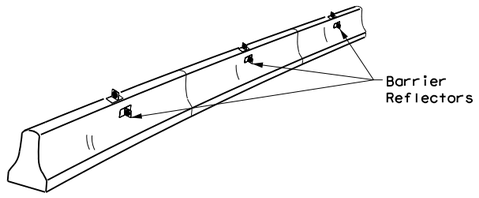
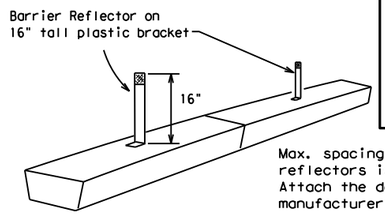
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

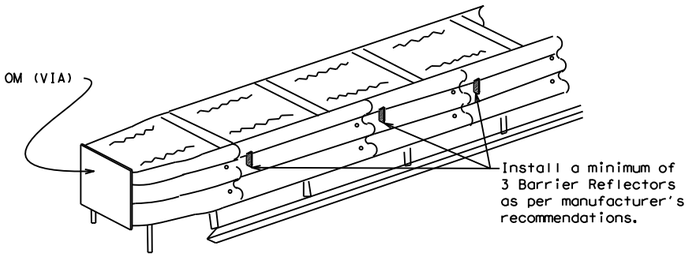


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)

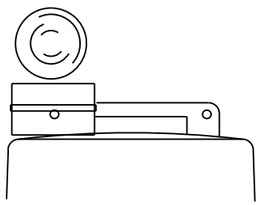


DELINEATION OF END TREATMENTS

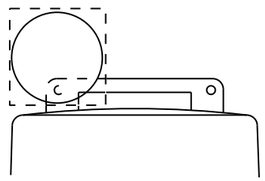
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

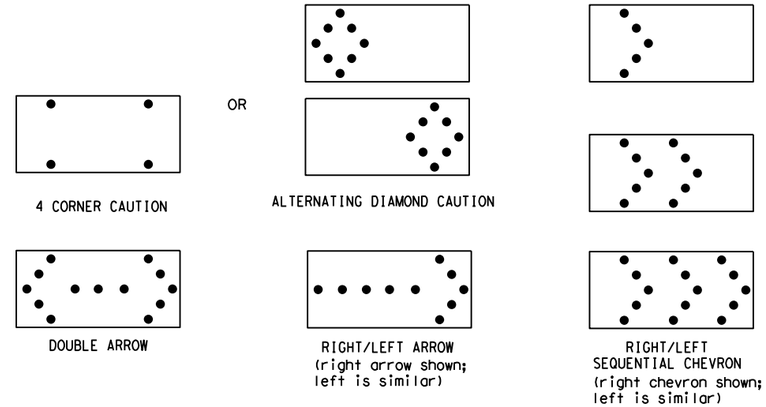
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		42

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

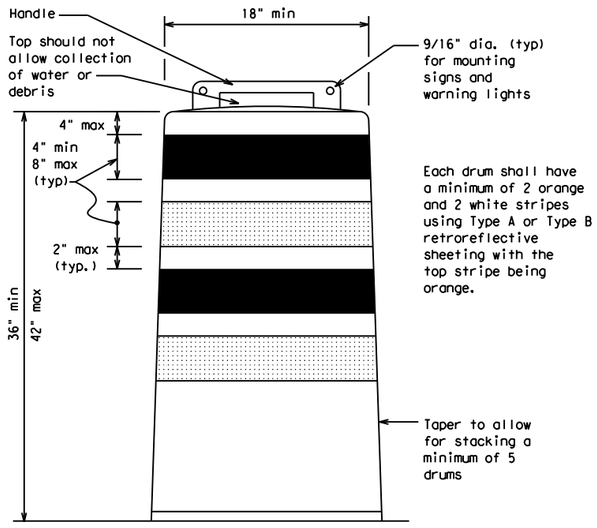
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

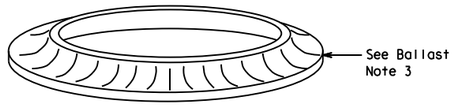
RETROREFLECTIVE SHEETING

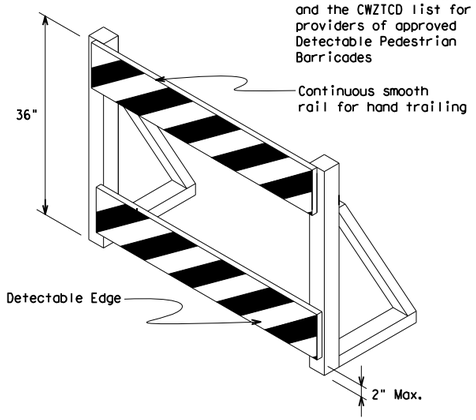
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

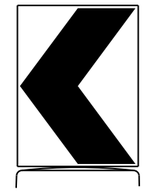




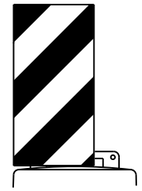


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	PHR	HIDALGO		43
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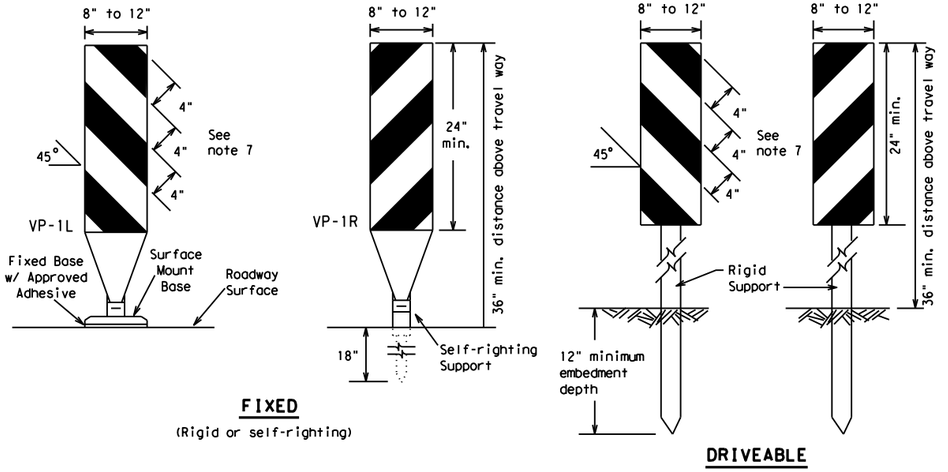
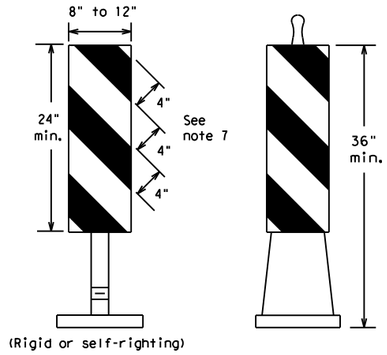


FIXED
(Rigid or self-righting)

DRIVEABLE

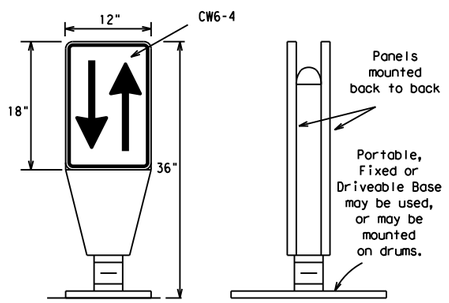


(Rigid or self-righting)

PORTABLE

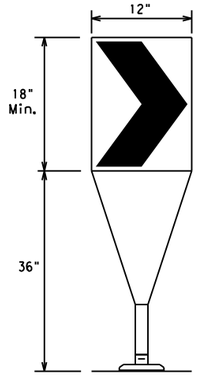
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



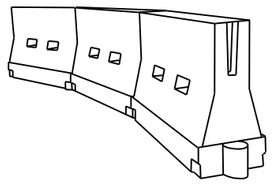
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
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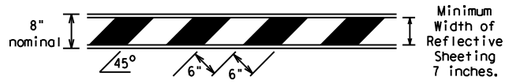
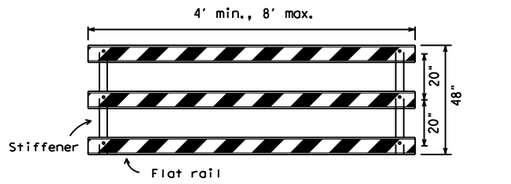
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



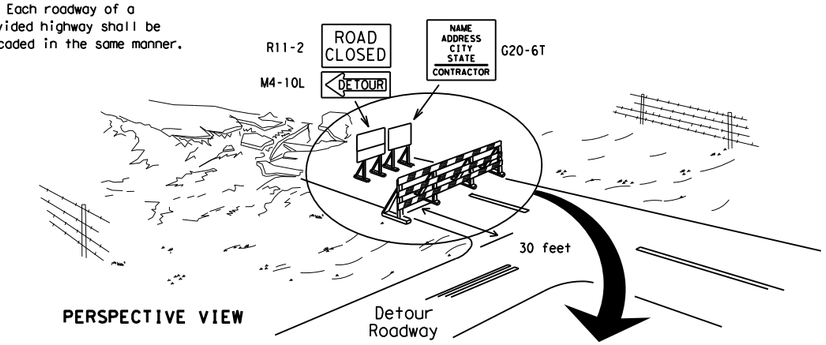
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

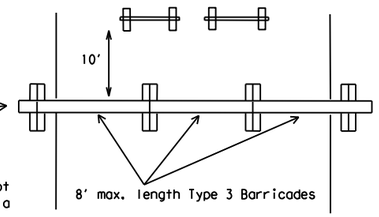
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

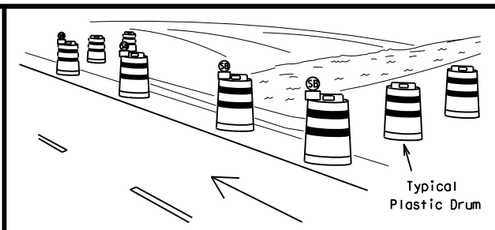
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

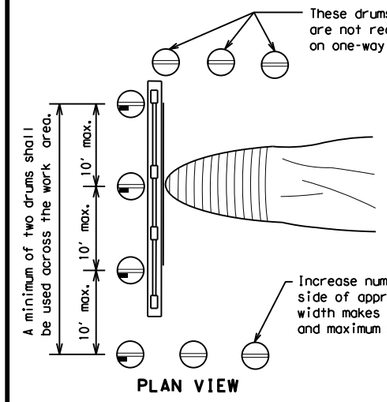
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



PLAN VIEW

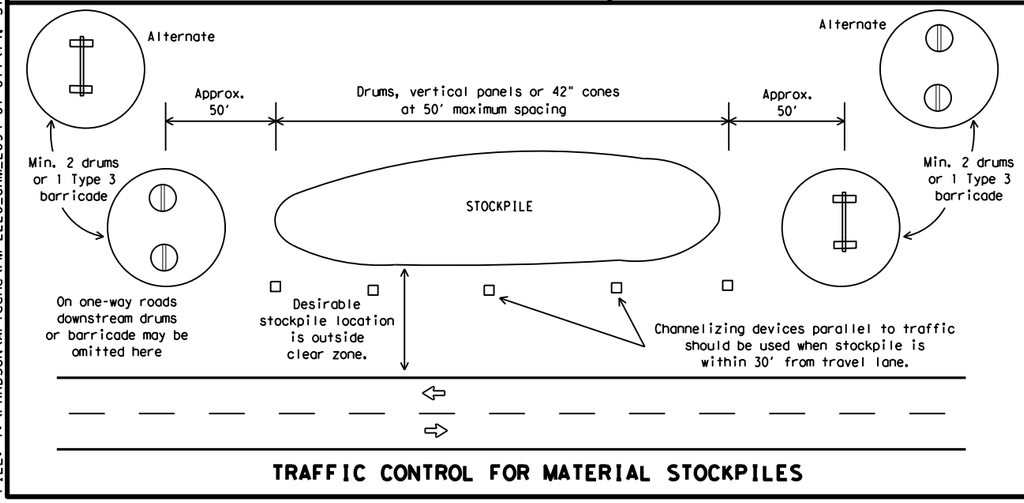
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	PHR	HIDALGO		45

104

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

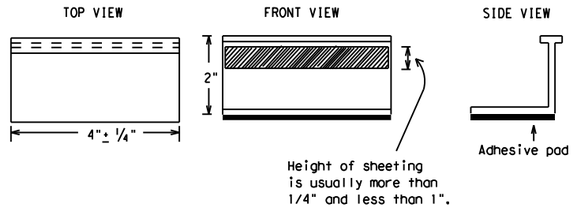
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	PHR	HIDALGO		46
11-02 8-14				

TCP

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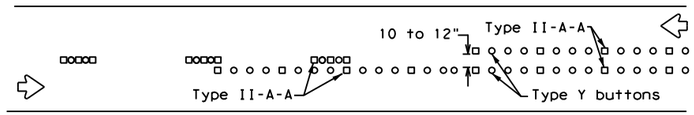
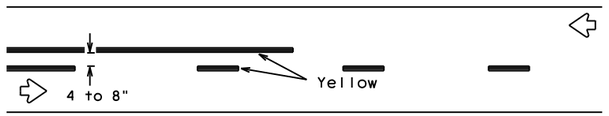
PAVEMENT MARKING PATTERNS

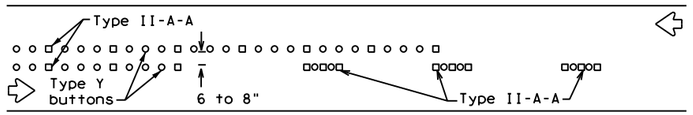
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



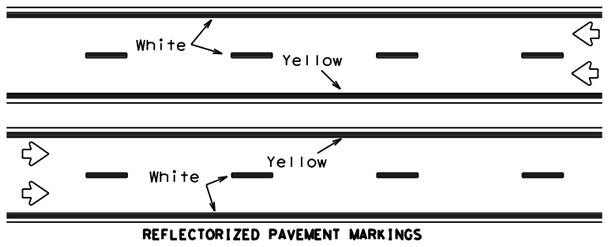
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



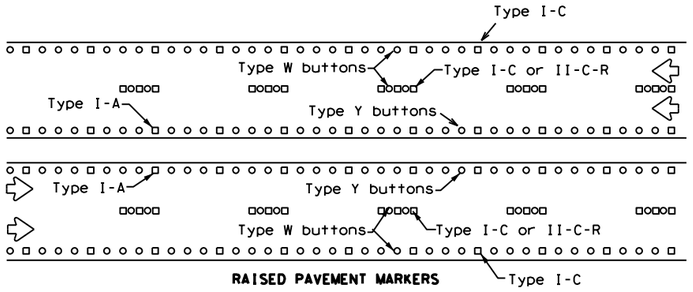
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



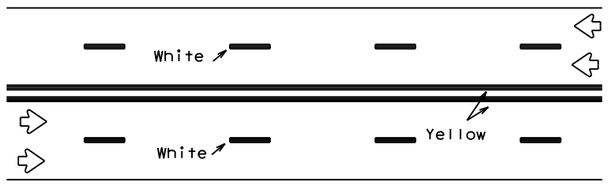
REFLECTORIZED PAVEMENT MARKINGS



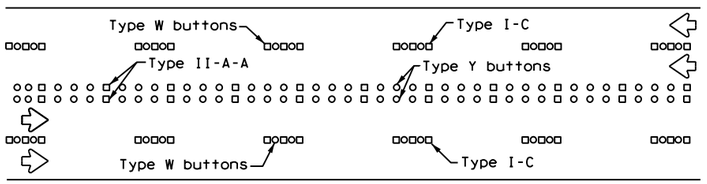
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



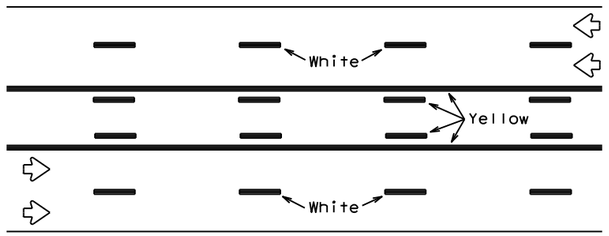
REFLECTORIZED PAVEMENT MARKINGS



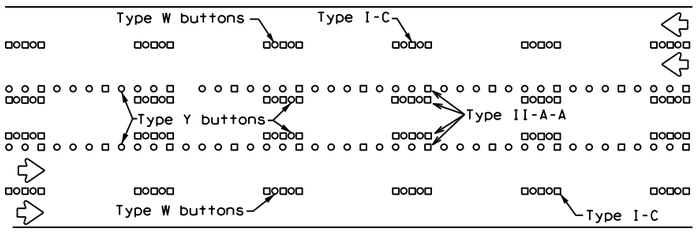
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

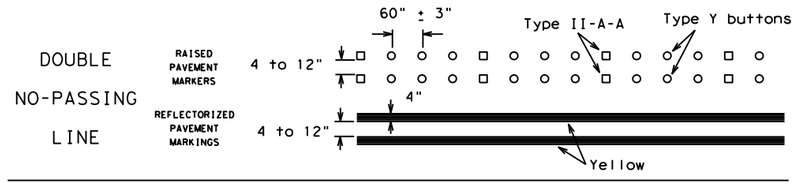
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

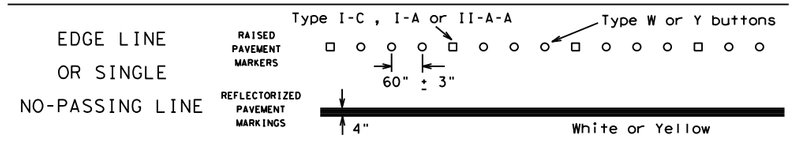
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

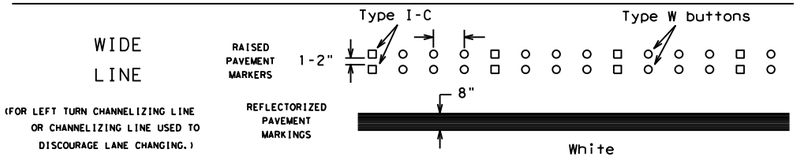


EDGE LINE OR SINGLE NO-PASSING LINE



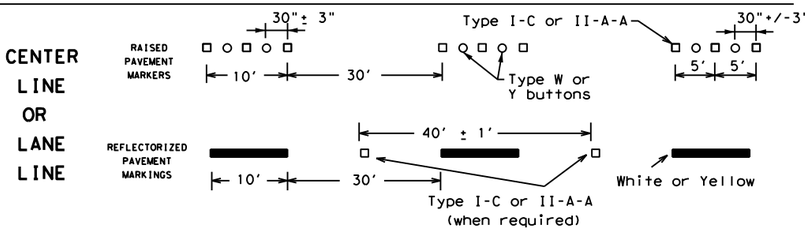
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

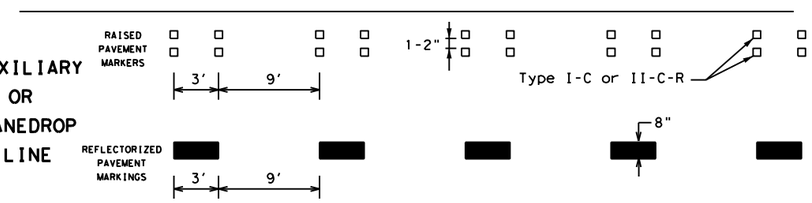


BROKEN LINES

CENTER LINE OR LANE LINE

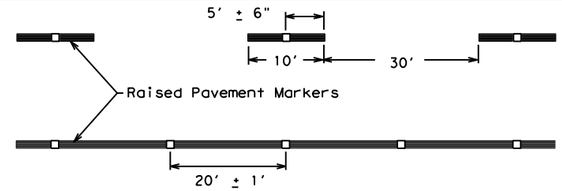


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	2094	01	071	FM 2220
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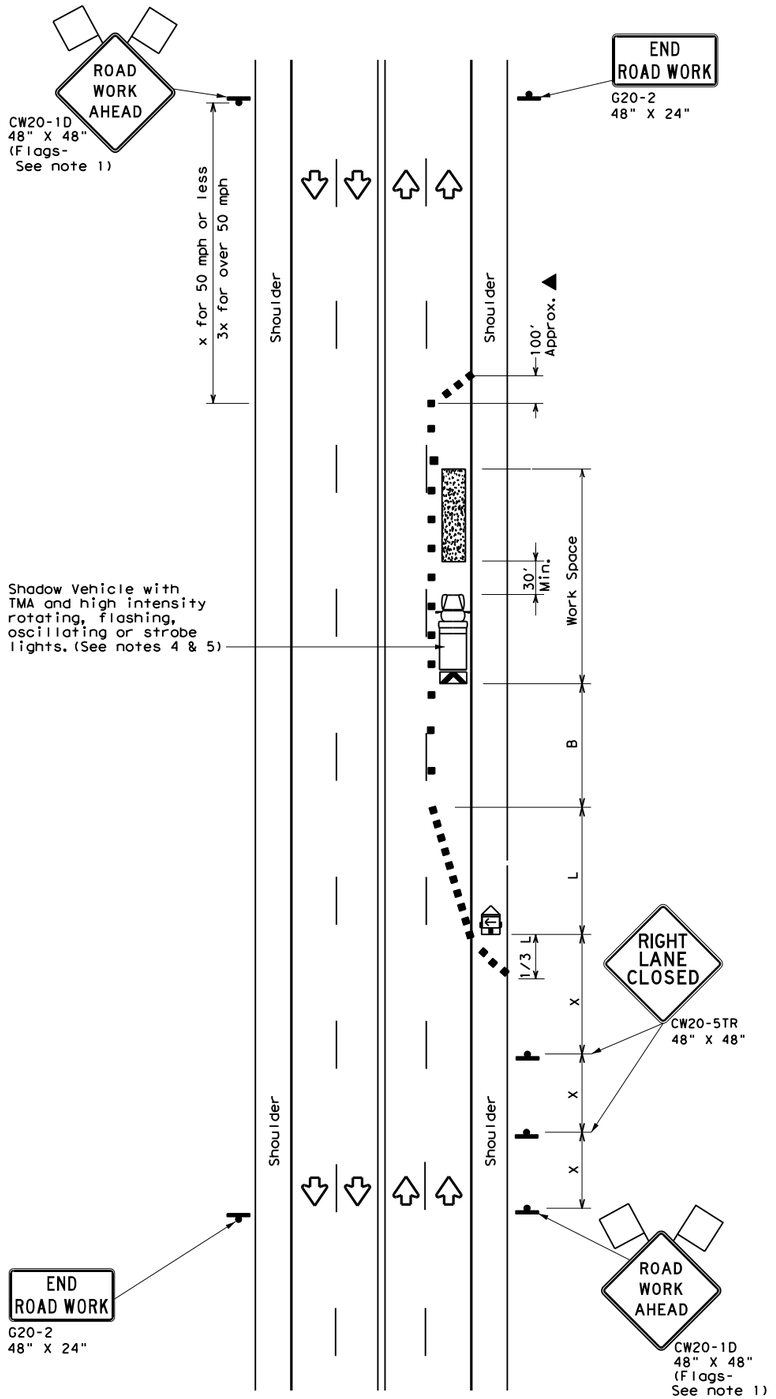
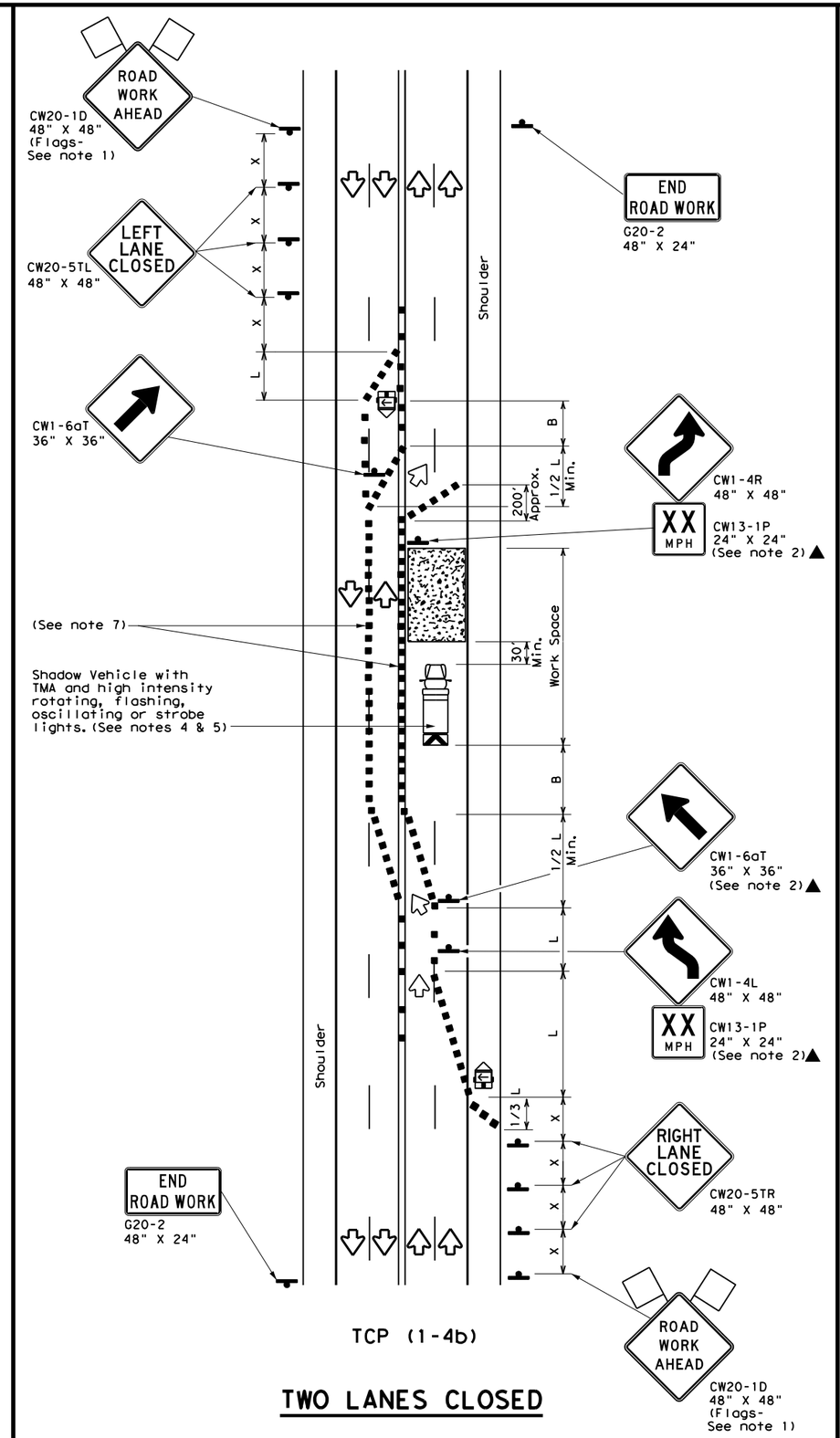


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	PHR	HIDALGO		48
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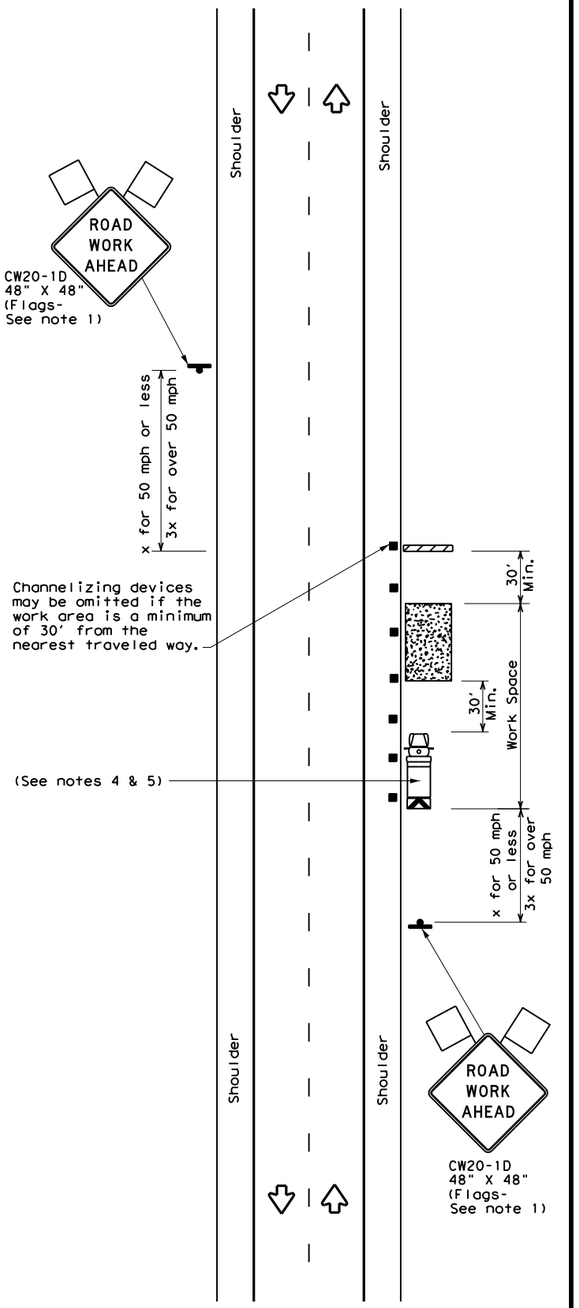
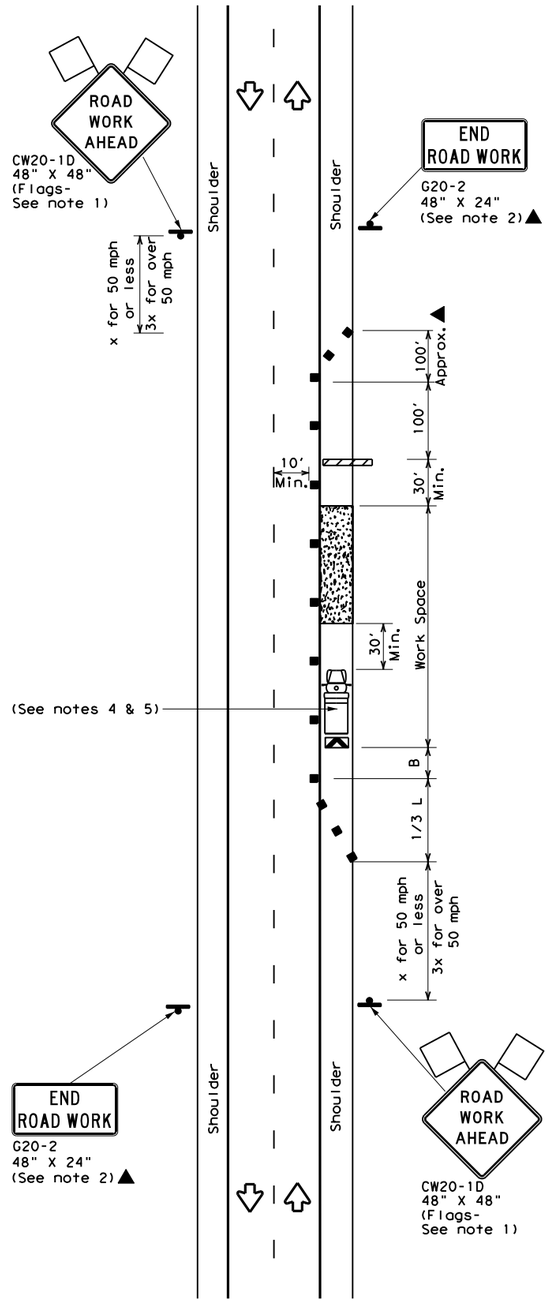


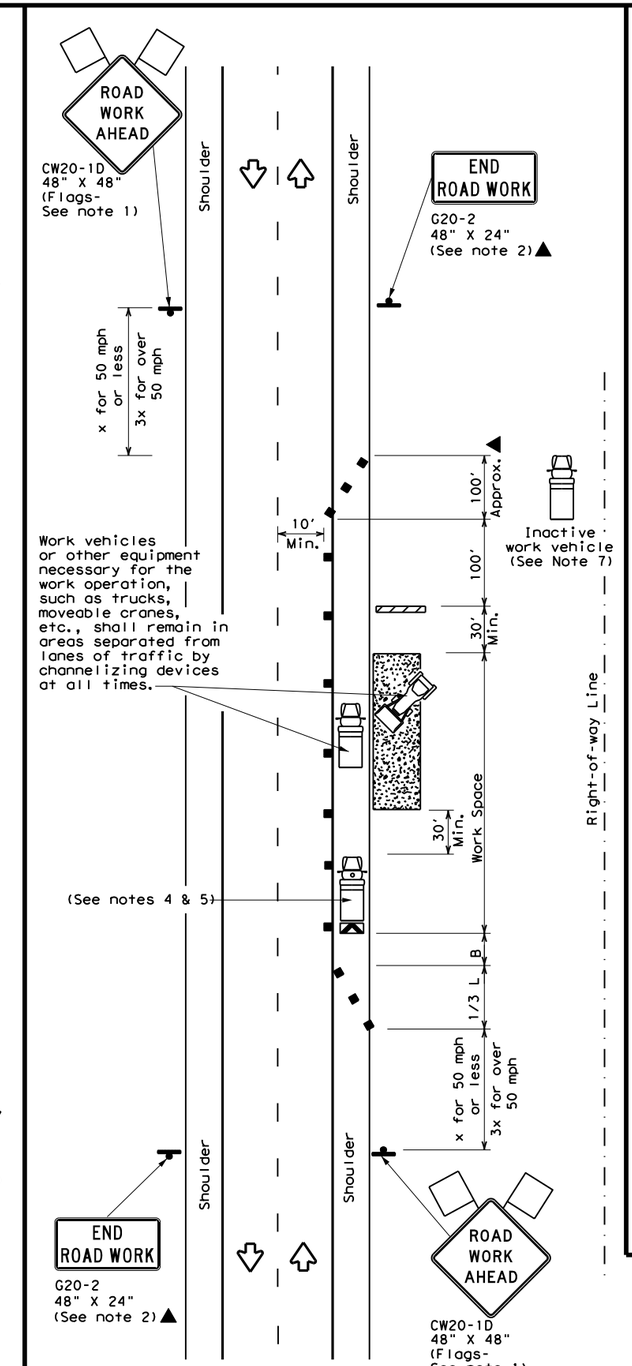
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
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8-95 2-12	PHR	HIDALGO		49
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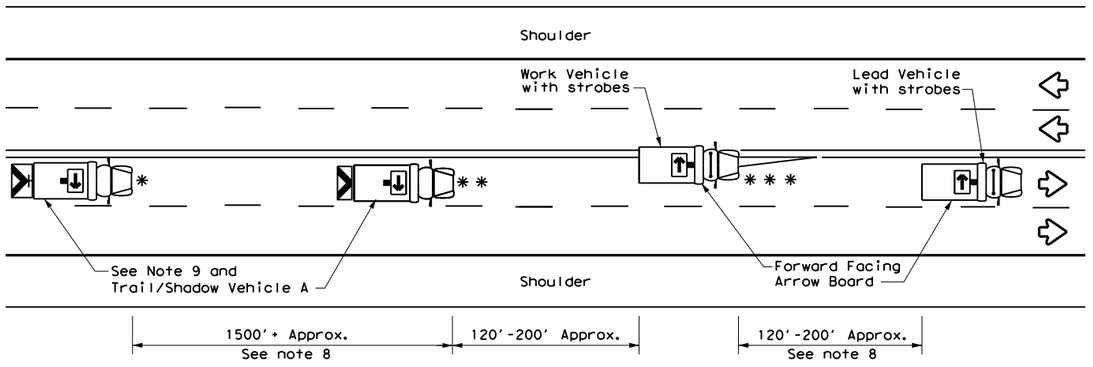
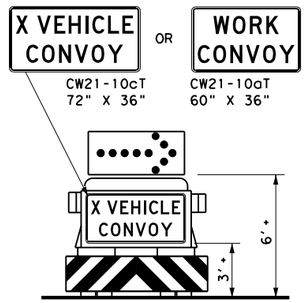


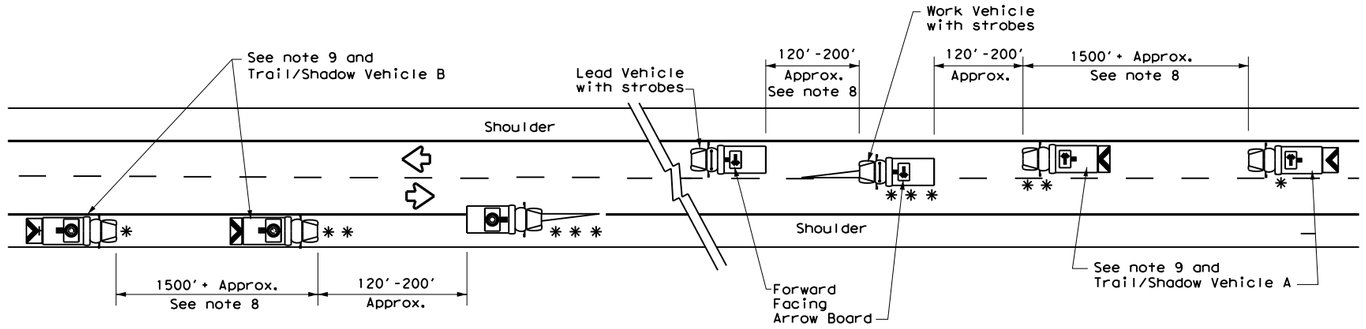
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

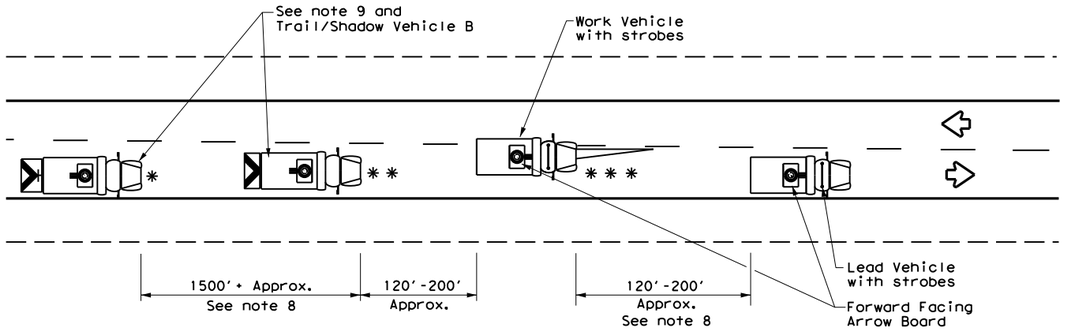


WORK ON SHOULDER

WORK ON TRAVEL LANE

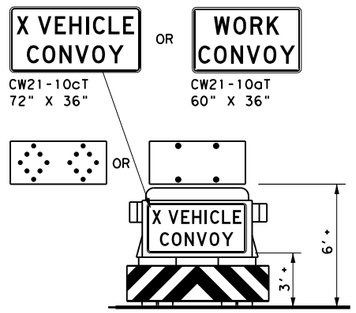
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

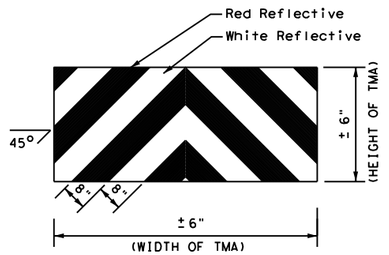
with Flashing Arrow Board in CAUTION display

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equipped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

FILE: tcp3-1.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
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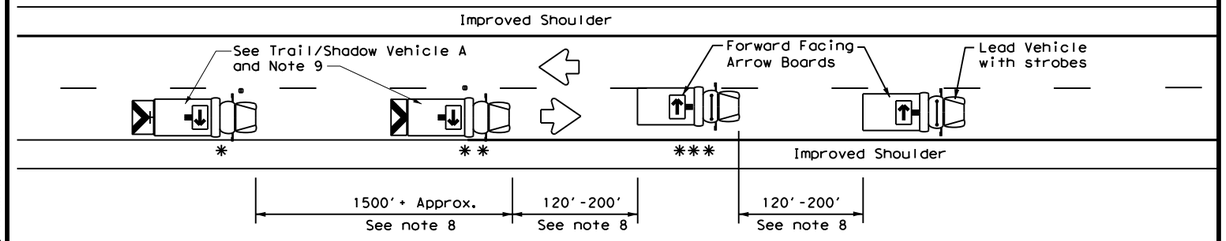
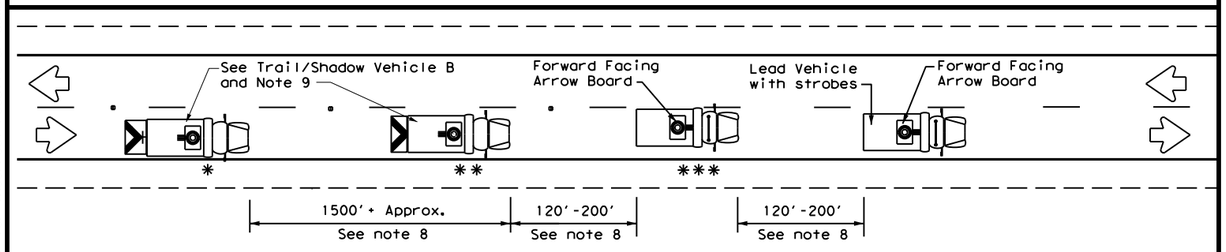


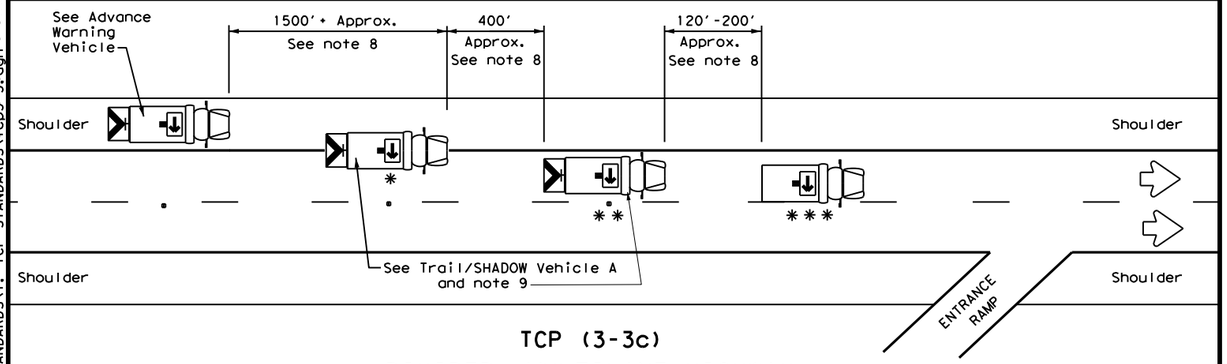
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



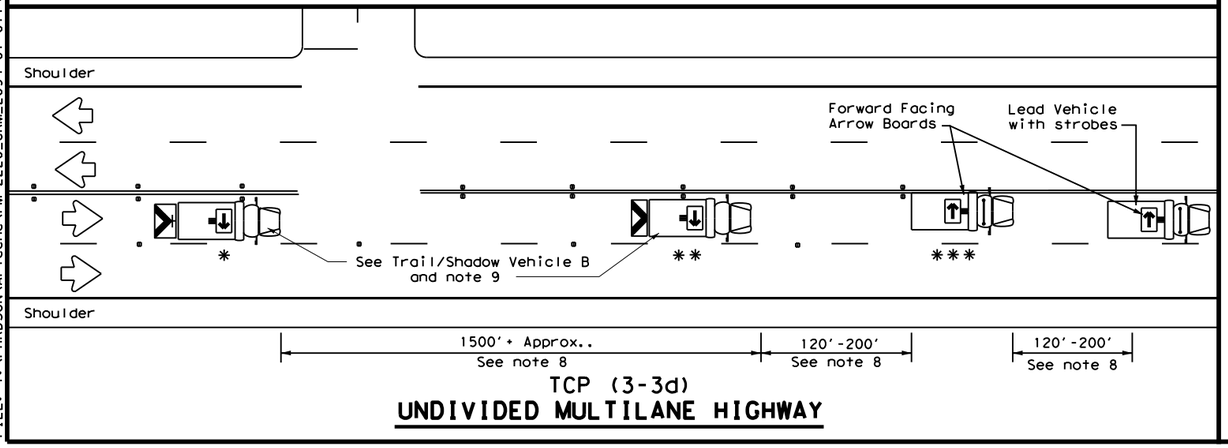
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



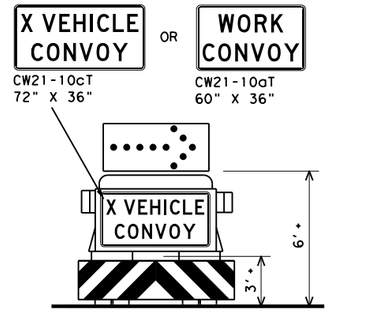
TCP (3-3c)

DIVIDED MULTILANE HIGHWAY



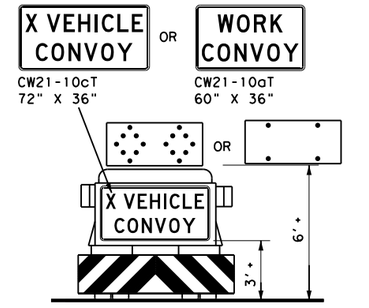
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



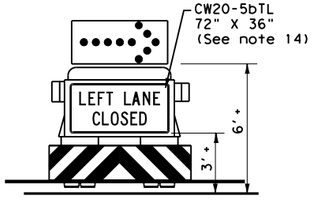
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

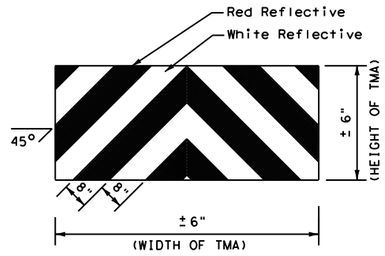


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

FILE: tcp3-3.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT September 1987	CONT	SECT	JOB	HIGHWAY
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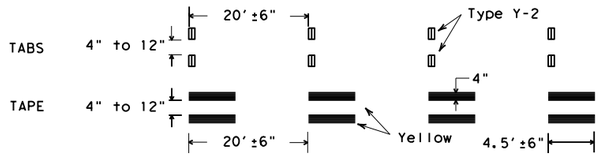
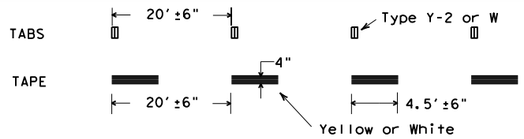
WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

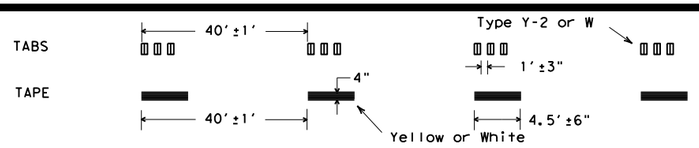


SINGLE NO-PASSING LINE or CHANNELIZATION LINE



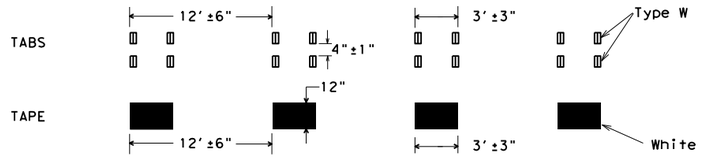
BROKEN LINES

(FOR CENTER LINE OR LANE LINE)

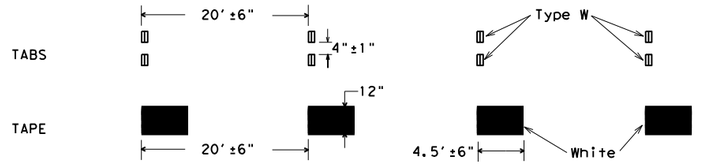


WIDE DOTTED LINES

(FOR LANE DROP LINES)



WIDE GORE MARKINGS



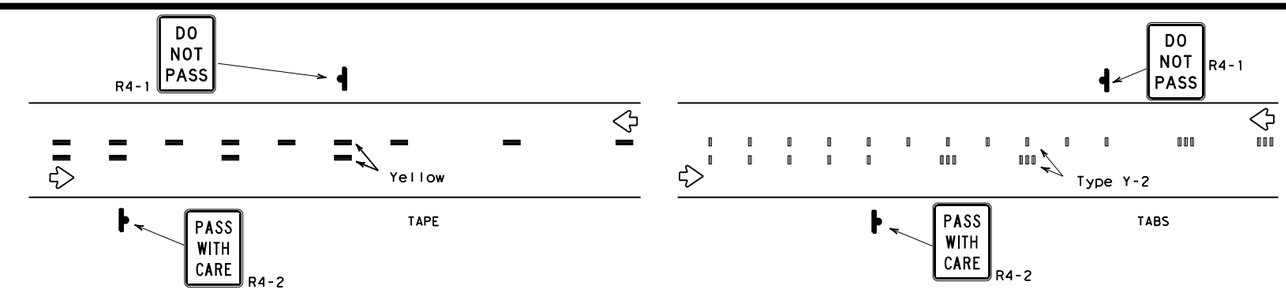
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

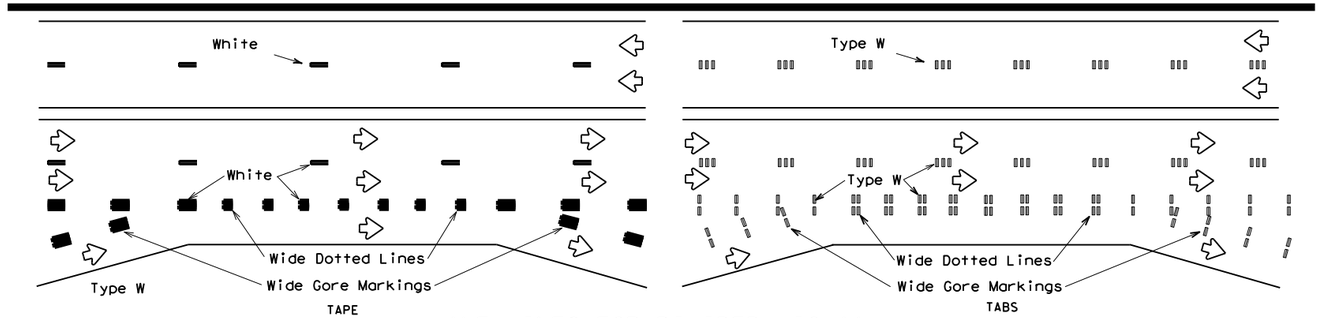
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

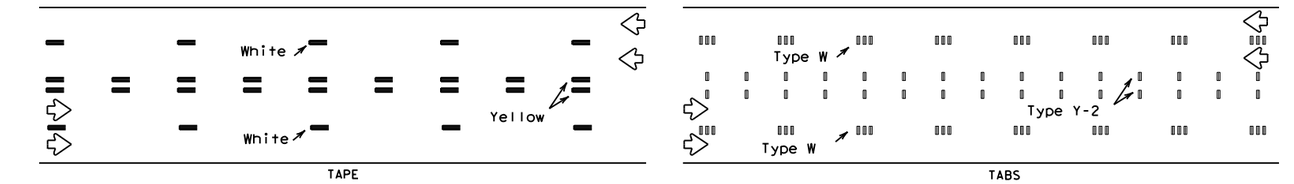
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



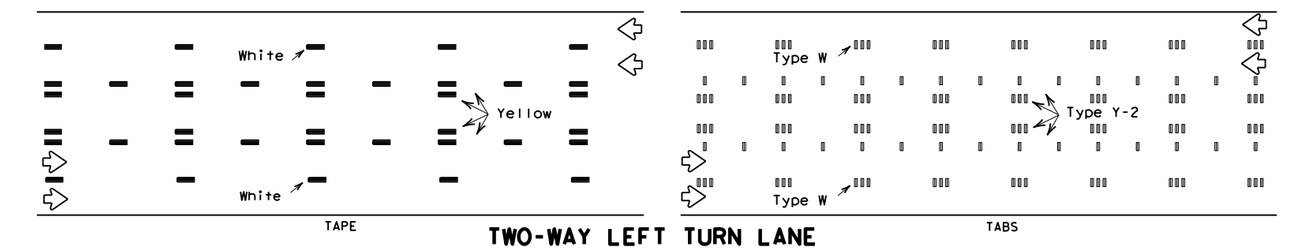
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



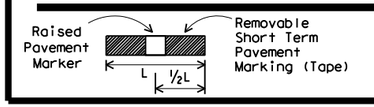
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

WZ(STPM)-13

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3-03		PHR	HIDALGO		52
7-13					

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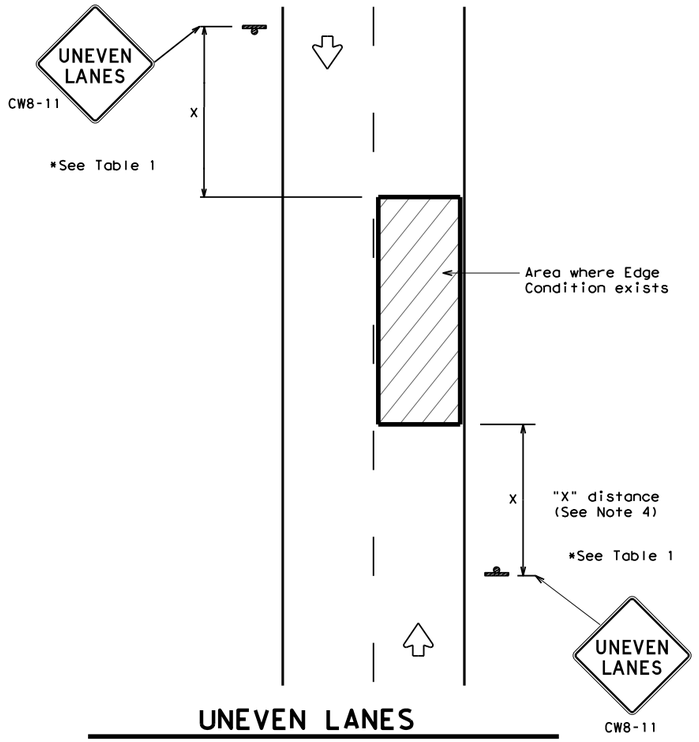
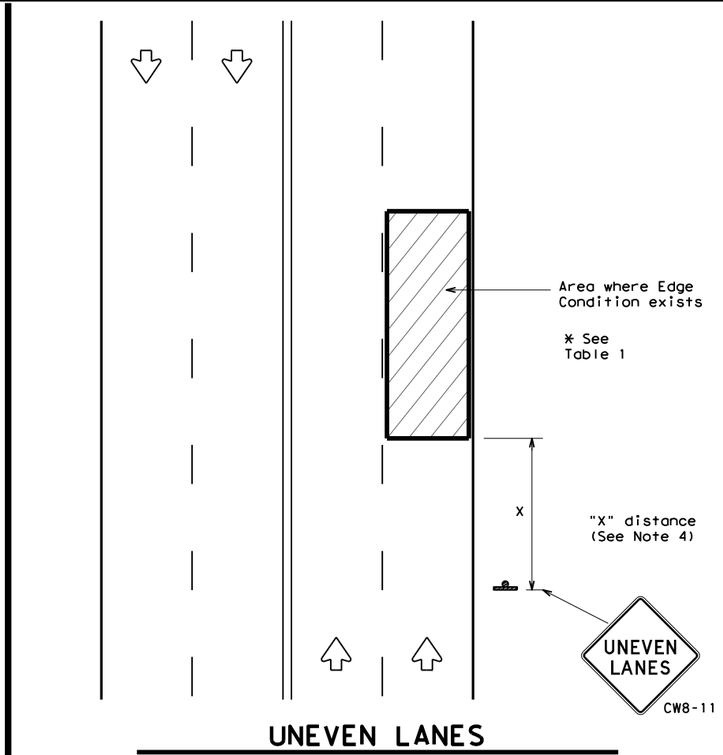
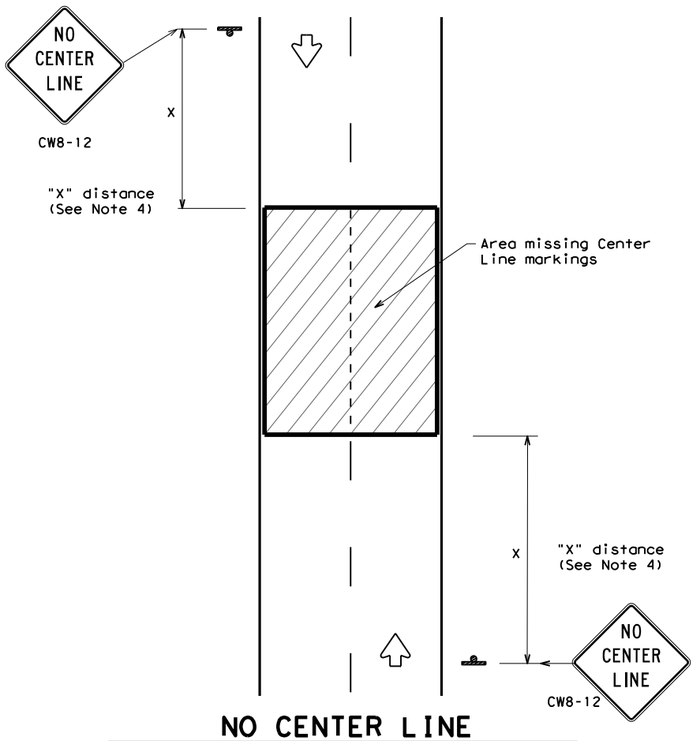


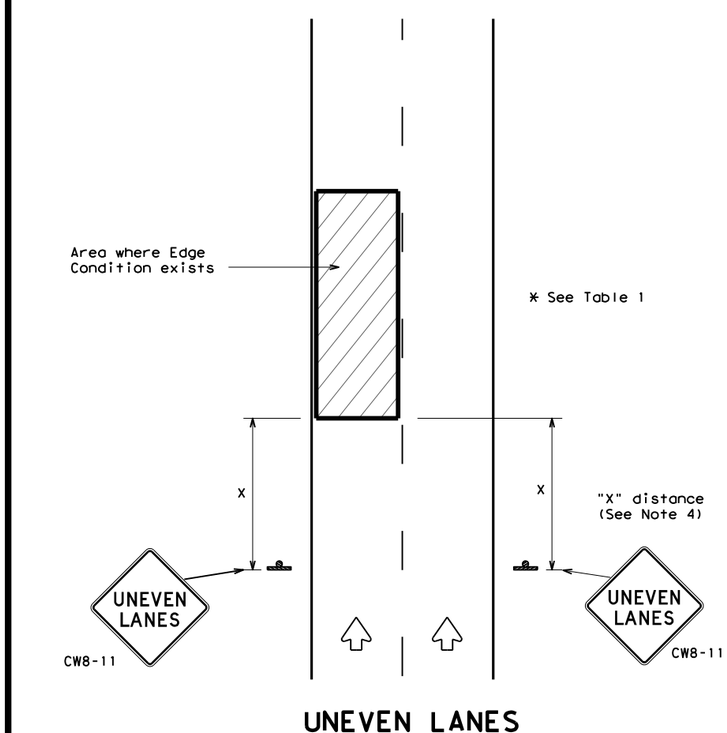
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

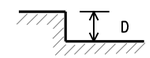
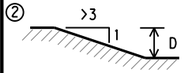
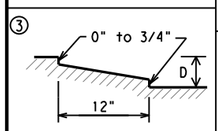
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

SIGNING FOR UNEVEN LANES

WZ(UL)-13

FILE: wzul-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 1992	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
8-95 2-98 7-13	DIST	COUNTY		SHEET NO.
1-97 3-03	PHR	HIDALGO		53

DATE: 2/27/2023 5:42:11 PM
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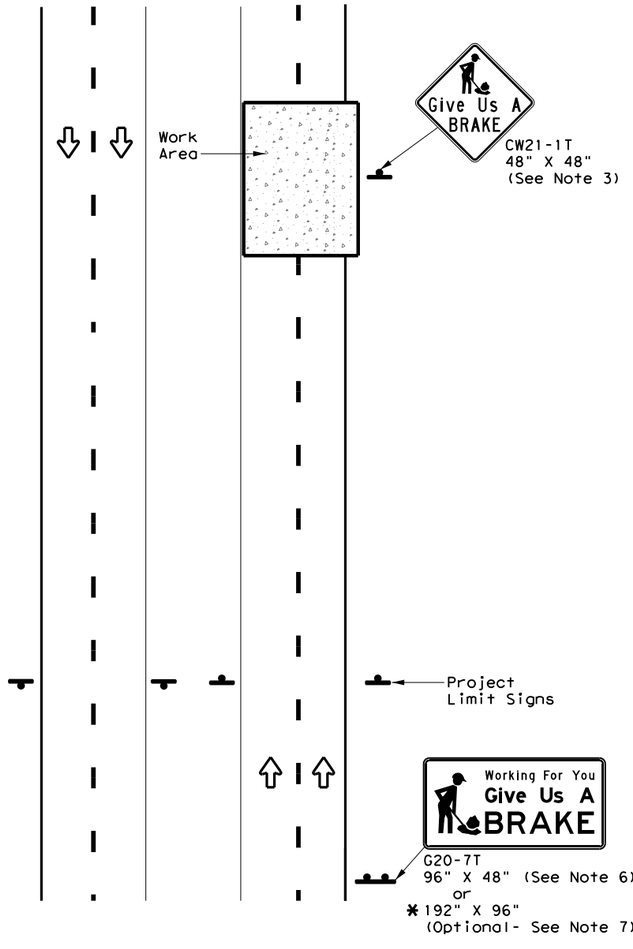
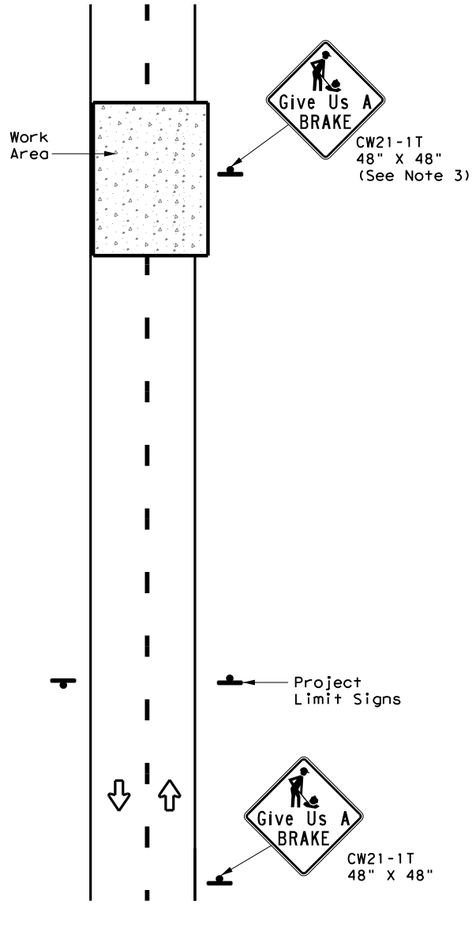


DIVIDED HIGHWAY



UNDIVIDED HIGHWAY

SIGNS ARE SHOWN FOR ONE DIRECTION OF TRAVEL

* When the optional larger WORKING FOR YOU GIVE US A BRAKE (G20-7T) 192" x 96" sign is required, the locations shall be noted elsewhere in the plans.

SUMMARY OF LARGE SIGNS

BACKGROUND COLOR	SIGN DESIGNATION	SIGN	SIGN DIMENSIONS	REFLECTIVE SHEETING	SQ FT	GALVANIZED STRUCTURAL STEEL			DRILLED SHAFT 24" DIA. (LF)
						Size	(LF) ①	(LF) ②	
Orange	G20-7T	Working For You Give Us A BRAKE	96" X 48"	Type B_{FL} or C_{FL}	32	▲	▲	▲	▲
Orange	G20-7T	Working For You Give Us A BRAKE	192" X 96"	Type B_{FL} or C_{FL}	128	W8x18	16	17	12

▲ See Note 6 Below

LEGEND	
	Sign
	Large Sign
	Traffic Flow

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PLYWOOD SIGN BLANKS	DMS-7100
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL}
BLACK	LEGEND & BORDERS	NON-REFLECTIVE ACRYLIC FILM

GENERAL NOTES

1. See BC and SMD sheets for additional sign support details.
2. Sign locations shall be approved by the Engineer.
3. For projects more than two miles in length, Give Us a BRAKE signs should be repeated halfway through the project. The Give Us a Brake (CW21-1T) may be used for this purpose.
4. Work zone speed limits are sometimes used in conjunction with GIVE US A BRAKE signing. See BC(3) for location and spacing of construction speed zone signing when required.
5. Give Us a Brake (CW21-1T) signs and supports shall be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling."
6. The 96" X 48" Working For You Give Us A BRAKE (G20-7T) may use a 1/2" or 5/8" plywood substrate or 0.125" aluminum sheeting substrate and may be supported by two 4" x 6" wood posts with drilled holes for breakaway as per BC(5) and will be subsidiary to Item 502.
7. The Working For You Give Us A BRAKE (G20-7T) 192" X 96" sign shall be paid for under the following specification items:
   Item 636 - Aluminum Signs
   Item 647 - Large Roadside Sign Supports and Assemblies.
   Item 416 - Drilled Shaft Foundations
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE "GIVE US A BRAKE" SIGNS

WZ(BRK)-13

FILE: wzbrk-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
6-96 5-98 7-13	DIST	COUNTY		SHEET NO.
8-96 3-03	PHR	HIDALGO		54

116

ROADWAY
COVER SHEET

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Pharr District Central Design

Texas Department of Transportation

FM 2220

ROADWAY COVER SHEET

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		55

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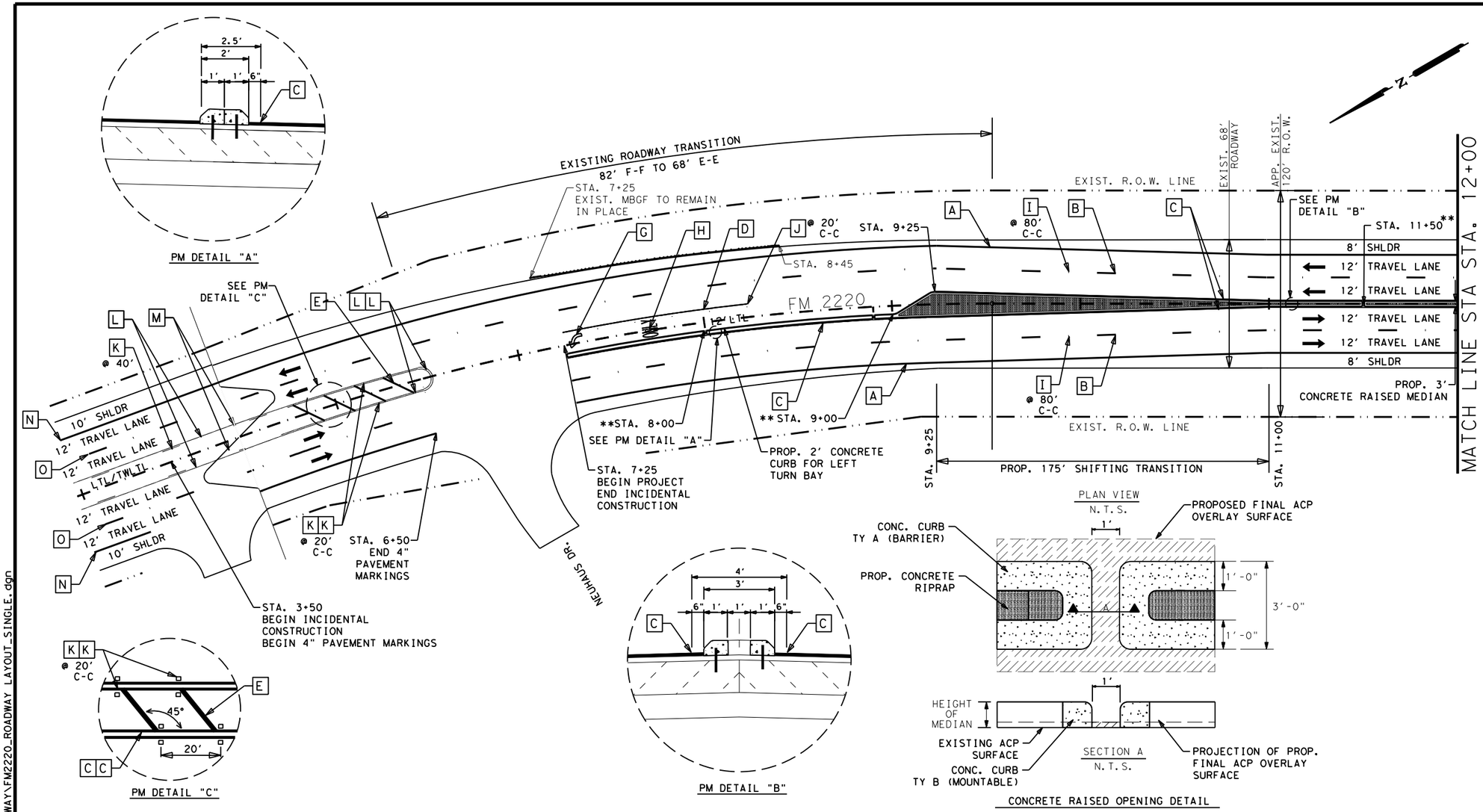

PM DETAIL "C"

PM DETAIL "B"

CONCRETE RAISED OPENING DETAIL

LEGEND:

- PROPOSED CONCRETE RAISED MEDIAN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- ** - CURB DRAIN SLOT
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER
- A REF PROF PAV MRK TY I(W)6"SLD(100MIL)
- B RE PM W/RET REQ TY I(W)6"BRK(100MIL)
- C RE PM W/RET REQ TY I(Y)6"SLD(100MIL)
- D RE PM W/RET REQ TY I(W)8"SLD(100MIL)
- E RE PM W/RET REQ TY I(Y)12"SLD(100MIL)
- F RE PM W/RET REQ TY I(Y)6"BRK(100MIL)
- G PREFAB PAV MRK TY C (W)(ARROW)
- H PREFAB PAV MRK TY C (W)(WORD)
- I REFL PAV MRKR TY II-C-R
- J REFL PAV MRKR TY I-C
- K REFL PAV MRKR TY II-A-A
- L RE PM W/RET REQ TY I(Y)4"SLD(100MIL)
- M RE PM W/RET REQ TY I(Y)4"BRK(100MIL)
- N REF PROF PAV MRK TY I(W)4"SLD(100MIL)
- O RE PM W/RET REQ TY I(W)4"BRK(100MIL)

GENERAL NOTES:

1. REFER TO PM STANDARDS FOR MORE INFORMATION.

PAVEMENT MARKING ITEMS														
666 6343	666 6306	666 6321	666 6036	666 6141	666 6318	668 6077	668 6085	672 6010	672 6007	672 6009	666 6315	666 6312	666 6342	666 6300
REF PROF PAV MRK TY I(W) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (6") (BRK) (LF)	RE PM W/RET REQ TY I (Y) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (8") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (12") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (6") (BRK) (LF)	PREFAB PAV MRK TY C(W) ARROW (EA)	PREFAB PAV MRK TY C(W) WORD (EA)	REFL PAV MRKR TY II-C-R (EA)	REFL PAV MRKR TY I-C (EA)	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y) (4") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (4") (BRK) (LF)	REF PROF PV MRK TY I (W) (4") (SLD) (LF)	RE PM W/RET REQ TY I (W) (4") (BRK) (LF)
975	290	680	100	18	-	1	1	23	5	18	760	80	600	160

ROADWAY ITEMS												
100 6002	134 6001	432 6004	432 6045	438 6009	529 6024	540 6001	540 6006	542 6001	542 6002	542 6004	544 6001	544 6003
PREPARING ROW (STA)	BACKFILL (TY A) (STA)	RIPRAP (8IN) (CY)	MOW STRIP (4") (CY)	CLEANING EXISTING JOINTS (LF)	CONC CURB. (MOUNTABLE) (LF)	MTL W-BM GD FENCE (TIM POST) (LF)	MTL BM GD-FEN TRANS (THRIE BM) (EA)	REMOVE METAL BEAM GUARD FENCE (LF)	REMOVE TERMINAL ANCHOR SECTION (EA)	REMOVE MTL BEAM GD FEN TRANS (EA)	GUARDRAIL END TREATMENT (INSTALL) (EA)	GUARDRAIL END TREATMENT (REMOVE) (EA)
8.5	5	30	-	-	950	-	-	-	-	-	-	-

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER

03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220 PROPOSED ROADWAY AND MEDIAN LAYOUT

SCALE: 1"=60' SHEET 1 OF 5

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		56

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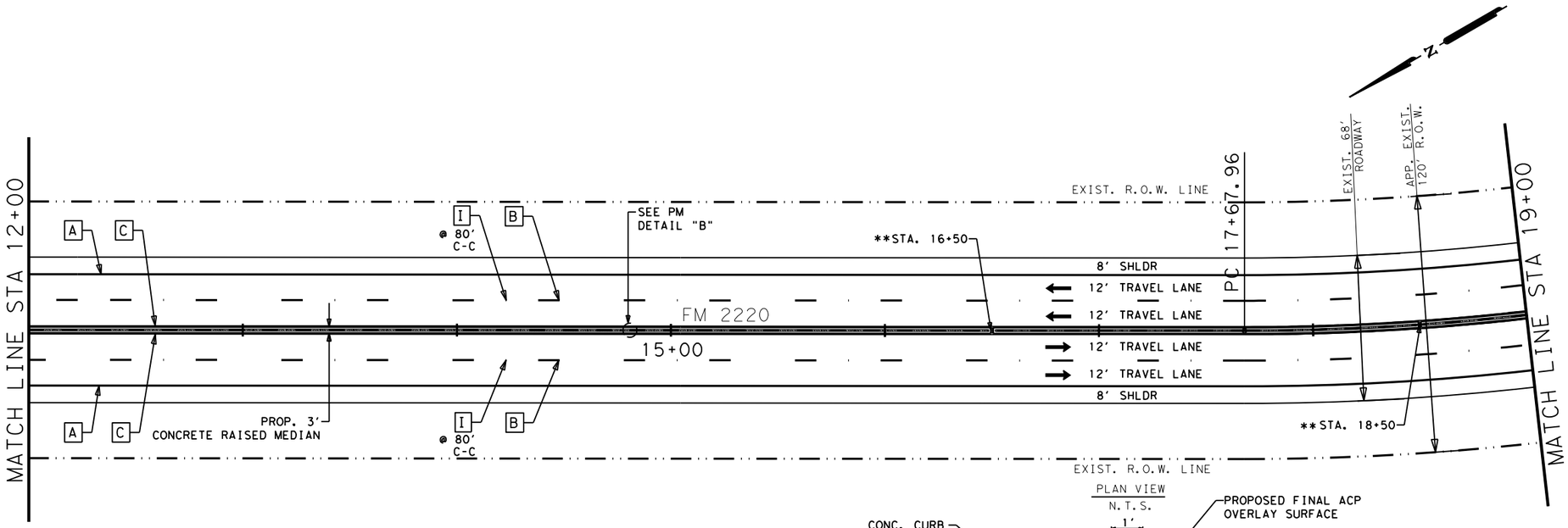

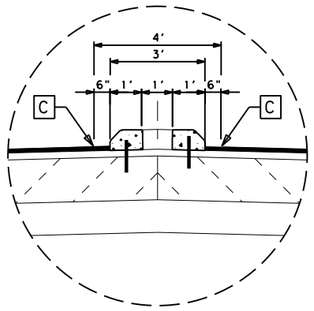

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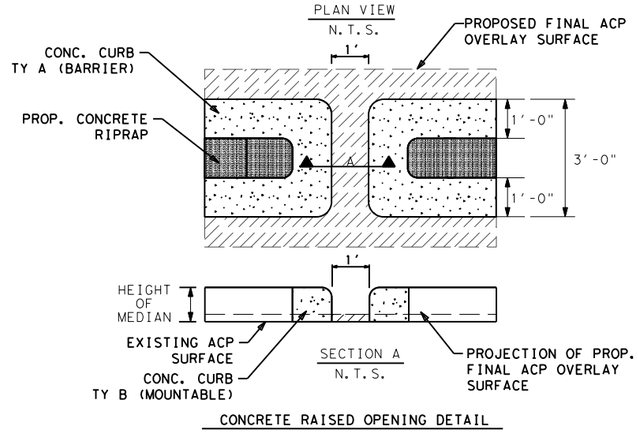

CONCRETE RAISED OPENING DETAIL

PAVEMENT MARKING ITEMS															
666	666	666	666	666	666	668	668	672	672	672	666	666	666	666
6343	6306	6321	6036	6141	6318	6077	6085	6010	6007	6009	6315	6312	6342	6300
REF PROF PAV MRK TY I(W) (6")(SLD) (LF)	RE PM W/RET REQ TY I (W)(6") (BRK) (LF)	RE PM W/RET REQ TY I (Y)(6") (SLD) (LF)	RE PM W/RET REQ TY I (W)(8") (SLD) (LF)	RE PM W/RET REQ TY I (Y)(12") (SLD) (LF)	RE PM W/RET REQ TY I (Y)(6") (BRK) (LF)	PREFAB PAV MRK TY C(W) ARROW (EA)	PREFAB PAV MRK TY C(W) WORD (EA)	REFL PAV MRKR TY II-C-R (EA)	REFL PAV MRKR TY I-C (EA)	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y)(4") (SLD) (LF)	RE PM W/RET REQ TY I (Y)(4") (BRK) (LF)	REF PROF PV MRK TY I (W)(4") (SLD) (LF)	RE PM W/RET REQ TY I (W)(4") (BRK) (LF)
1400	360	1400	-	-	-	-	-	18	-	-	-	-	-	-

ROADWAY ITEMS												
100	134	432	432	438	529	540	540	542	542	542	544	544
6002	6001	6004	6045	6009	6024	6001	6006	6001	6002	6004	6001	6003
PREPARING ROW (STA)	BACKFILL (TY A) (STA)	RIPRAP (8IN) (CY)	MOW STRIP (4") (CY)	CLEANING EXISTING JOINTS (LF)	CONC CURB. (MOUNTABLE) (LF)	MTL W-BM GD FENCE (TIM POST) (LF)	MTL BM GD-FEN TRANS (THRIE BM) (EA)	REMOVE METAL BEAM GUARD FENCE (LF)	REMOVE TERMINAL ANCHOR SECTION (EA)	REMOVE MTL BEAM GD FEN TRANS (EA)	GUARDRAIL END TREATMENT (INSTALL) (EA)	GUARDRAIL END TREATMENT (REMOVE) (EA)
7	7	17	-	-	1400	-	-	-	-	-	-	-

LEGEND:

- PROPOSED CONCRETE RAISED MEDIAN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- ** - CURB DRAIN SLOT
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER

- A REF PROF PAV MRK TY I(W)6"SLD(100MIL)
- B RE PM W/RET REQ TY I(W)6"BRK(100MIL)
- C RE PM W/RET REQ TY I(Y)6"SLD(100MIL)
- D RE PM W/RET REQ TY I(W)8"SLD(100MIL)
- E RE PM W/RET REQ TY I(Y)12"SLD(100MIL)
- F RE PM W/RET REQ TY I(Y)6"BRK(100MIL)
- G PREFAB PAV MRK TY C (W)(ARROW)
- H PREFAB PAV MRK TY C (W)(WORD)
- I REFL PAV MRKR TY II-C-R
- J REFL PAV MRKR TY I-C
- K REFL PAV MRKR TY II-A-A
- L RE PM W/RET REQ TY I(Y)4"SLD(100MIL)
- M RE PM W/RET REQ TY I(Y)4"BRK(100MIL)
- N RE PM W/RET REQ TY I(W)4"SLD(100MIL)
- O RE PM W/RET REQ TY I(W)4"BRK(100MIL)

GENERAL NOTES:

1. REFER TO PM STANDARDS FOR MORE INFORMATION.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER

03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220 PROPOSED ROADWAY AND MEDIAN LAYOUT

SCALE: 1"=60' SHEET 2 OF 5

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		57

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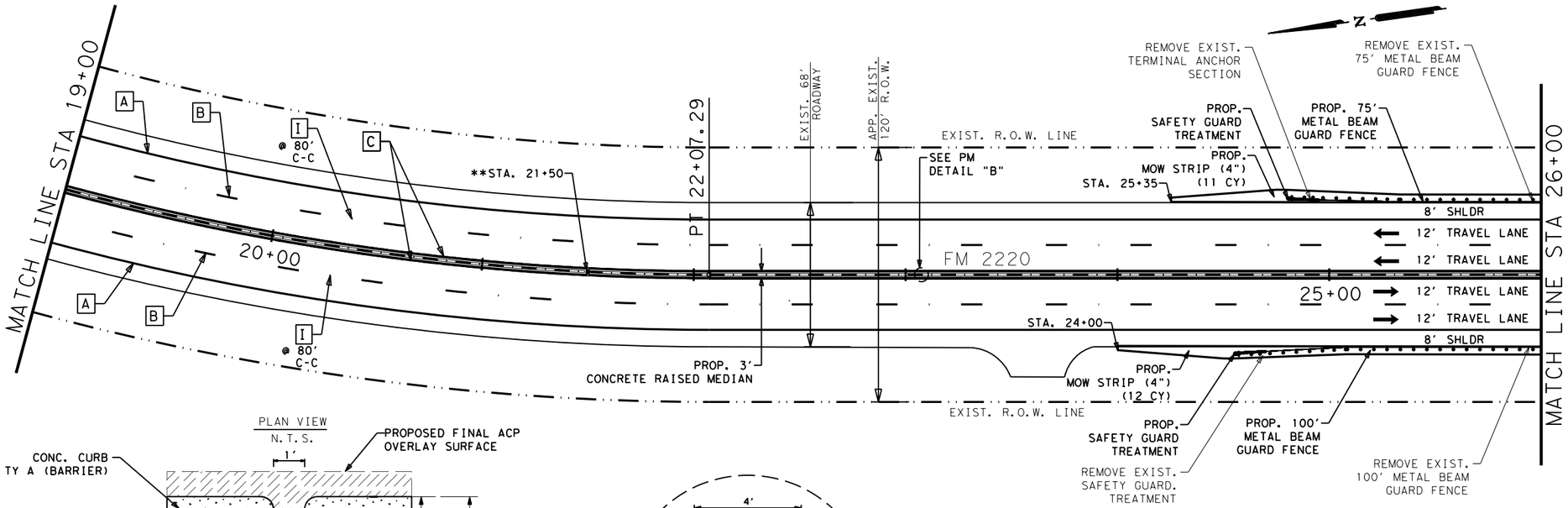
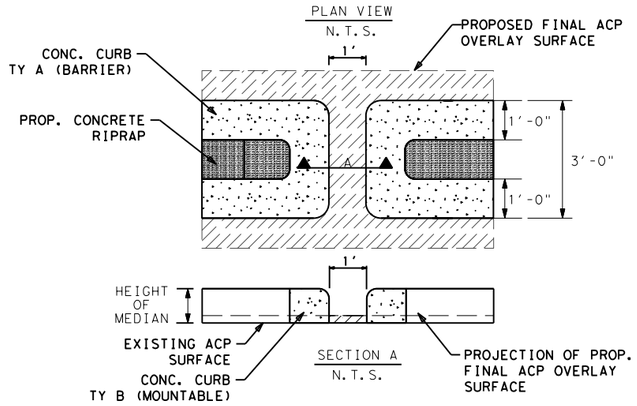
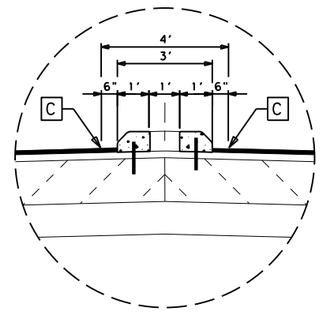




CONCRETE RAISED OPENING DETAIL



PM DETAIL "B"

LEGEND:

- PROPOSED CONCRETE RAISED MEDIAN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- ** - CURB DRAIN SLOT
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER
- A REF PROF PAV MRK TY I(W)6"SLD(100MIL)
- B RE PM W/RET REQ TY I(W)6"BRK(100MIL)
- C RE PM W/RET REQ TY I(Y)6"SLD(100MIL)
- D RE PM W/RET REQ TY I(W)8"SLD(100MIL)
- E RE PM W/RET REQ TY I(Y)12"SLD(100MIL)
- F RE PM W/RET REQ TY I(Y)6"BRK(100MIL)
- G PREFAB PAV MRK TY C (W)(ARROW)
- H PREFAB PAV MRK TY C (W)(WORD)
- I REFL PAV MRKR TY II-C-R
- J REFL PAV MRKR TY I-C
- K REFL PAV MRKR TY II-A-A
- L RE PM W/RET REQ TY I(Y)4"SLD(100MIL)
- M RE PM W/RET REQ TY I(Y)4"BRK(100MIL)
- N RE PM W/RET REQ TY I(W)4"SLD(100MIL)
- O RE PM W/RET REQ TY I(W)4"BRK(100MIL)

GENERAL NOTES:

1. REFER TO PM STANDARDS FOR MORE INFORMATION.

PAVEMENT MARKING ITEMS

666 6343	666 6306	666 6321	666 6036	666 6141	666 6318	668 6077	668 6085	672 6010	672 6007	672 6009	666 6315	666 6312	666 6342	666 6300
REF PROF PAV MRK TY I(W) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (6") (BRK) (LF)	RE PM W/RET REQ TY I (Y) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (8") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (12") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (6") (BRK) (LF)	PREFAB PAV MRK TY C(W) ARROW (EA)	PREFAB PAV MRK TY C(W) WORD (EA)	REFL PAV MRKR TY II-C-R (EA)	REFL PAV MRKR TY I-C (EA)	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y) (4") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (4") (BRK) (LF)	REF PROF PV MRK TY I (W) (4") (SLD) (LF)	RE PM W/RET REQ TY I (W) (4") (BRK) (LF)
1400	360	1400	-	-	-	-	-	18	-	-	-	-	-	-

ROADWAY ITEMS

100 6002	134 6001	432 6004	432 6045	438 6009	529 6024	540 6001	540 6006	542 6001	542 6002	542 6004	544 6001	544 6003
PREPARING ROW (STA)	BACKFILL (TY A) (STA)	RIPRAP (8IN) (CY)	MOW STRIP (4") (CY)	CLEANING EXISTING JOINTS (LF)	CONC CURB. (MOUNTABLE) (LF)	MTL W-BM GD FENCE (TIM POST) (LF)	MTL BM GD-FEN TRANS (THRIE BM) (EA)	REMOVE METAL BEAM GUARD FENCE (LF)	REMOVE TERMINAL ANCHOR SECTION (EA)	REMOVE MTL BEAM GD FEN TRANS (EA)	GUARDRAIL END TREATMENT (INSTALL) (EA)	GUARDRAIL END TREATMENT (REMOVE) (EA)
7	7	17	23	-	1400	175	-	175	1	-	2	1

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220
PROPOSED ROADWAY AND MEDIAN LAYOUT

SCALE: 1"=60' SHEET 3 OF 5

© 2023	CONT	SECT	JOB	HIGHWAY
	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		58

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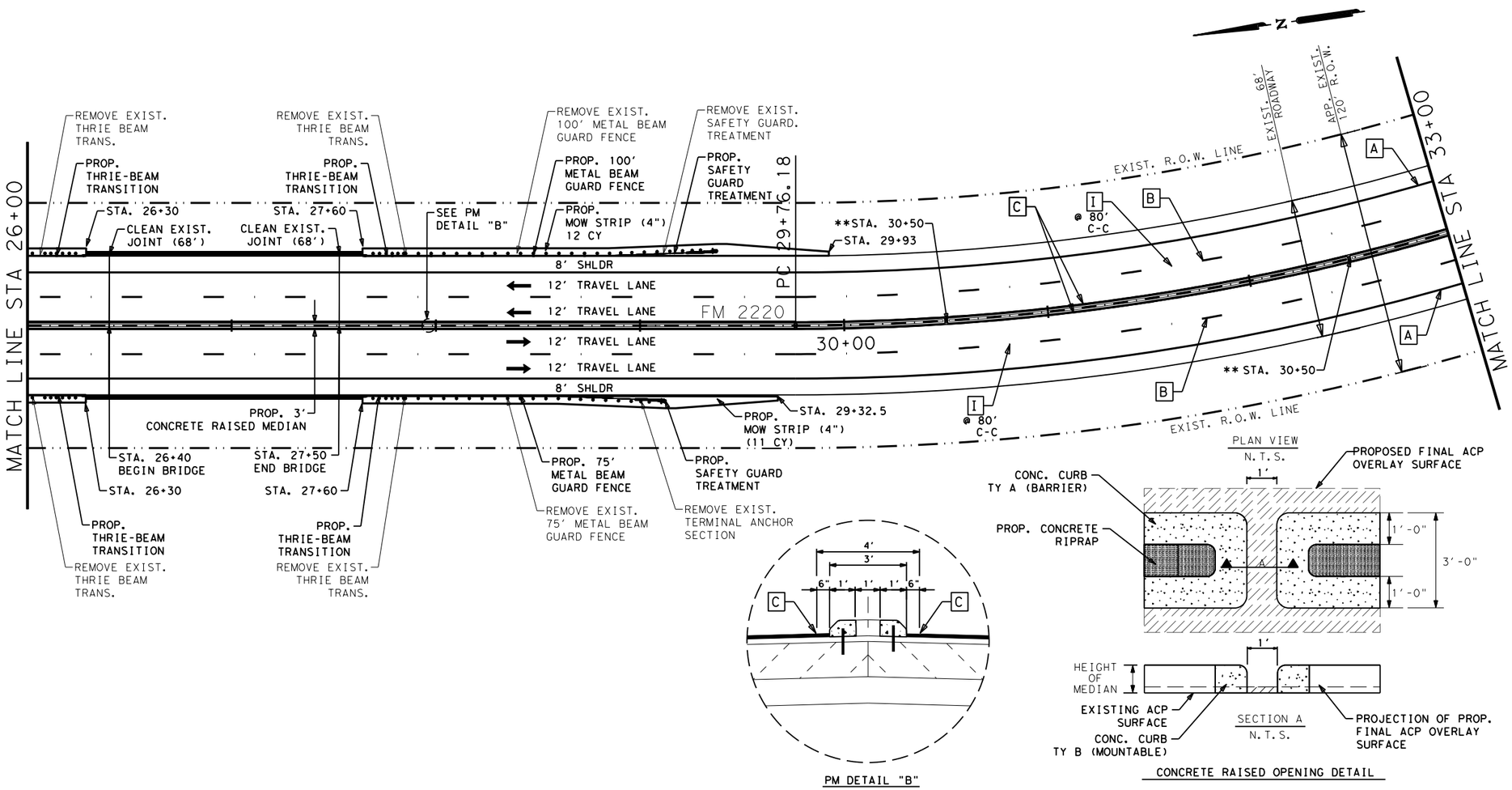

LEGEND:

- PROPOSED CONCRETE RAISED MEDIAN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- ** - CURB DRAIN SLOT
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER

A	REF PROF PAV MRK TY I(W)6"SLD(100MIL)
B	RE PM W/RET REQ TY I(W)6"BRK(100MIL)
C	RE PM W/RET REQ TY I(Y)6"SLD(100MIL)
D	RE PM W/RET REQ TY I(W)8"SLD(100MIL)
E	RE PM W/RET REQ TY I(Y)12"SLD(100MIL)
F	RE PM W/RET REQ TY I(Y)6"BRK(100MIL)
G	PREFAB PAV MRK TY C (W)(ARROW)
H	PREFAB PAV MRK TY C (W)(WORD)
I	REFL PAV MRKR TY II-C-R
J	REFL PAV MRKR TY I-C
K	REFL PAV MRKR TY II-A-A
L	RE PM W/RET REQ TY I(Y)4"SLD(100MIL)
M	RE PM W/RET REQ TY I(Y)4"BRK(100MIL)
N	RE PM W/RET REQ TY I(W)4"SLD(100MIL)
O	RE PM W/RET REQ TY I(W)4"BRK(100MIL)

GENERAL NOTES:

1. REFER TO PM STANDARDS FOR MORE INFORMATION.

PAVEMENT MARKING ITEMS

666 6343	666 6306	666 6321	666 6036	666 6141	666 6318	668 6077	668 6085	672 6010	672 6007	672 6009	666 6315	666 6312	666 6342	666 6300
REF PROF PAV MRK TY I(W) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (6") (BRK) (LF)	RE PM W/RET REQ TY I (Y) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (8") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (12") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (6") (BRK) (LF)	PREFAB PAV MRK TY C(W) ARROW (EA)	PREFAB PAV MRK TY C(W) WORD (EA)	REFL PAV MRKR TY II-C-R (EA)	REFL PAV MRKR TY I-C (EA)	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y) (4") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (4") (BRK) (LF)	REF PROF PV MRK TY I (W) (4") (SLD) (LF)	RE PM W/RET REQ TY I (W) (4") (BRK) (LF)
1400	360	1400	-	-	-	-	-	18	-	-	-	-	-	-

ROADWAY ITEMS

100 6002	134 6001	432 6004	432 6045	438 6009	529 6024	540 6001	540 6006	542 6001	542 6002	542 6004	544 6001	544 6003
PREPARING ROW (STA)	BACKFILL (TY A) (STA)	RIPRAP (8IN) (CY)	MOW STRIP (4") (CY)	CLEANING EXISTING JOINTS (LF)	CONC CURB, (MOUNTABLE) (LF)	MTL W-BM GD FENCE (TIM POST) (LF)	MTL BM GD-FEN TRANS (THRIE BM) (EA)	REMOVE METAL BEAM GUARD FENCE (LF)	REMOVE TERMINAL ANCHOR SECTION (EA)	REMOVE MTL BEAM GD FEN TRANS (EA)	GUARDRAIL END TREATMENT (INSTALL) (EA)	GUARDRAIL END TREATMENT (REMOVE) (EA)
7	7	17	23	136	1400	175	4	175	1	4	2	1

JOEL GARCIA
106398
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
03/01/2023

Pharr District Central Design

Texas Department of Transportation

FM 2220 PROPOSED ROADWAY AND MEDIAN LAYOUT

SCALE: 1"=60' SHEET 4 OF 5

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		59

DATE: 2/27/2023 5:44:13 PM
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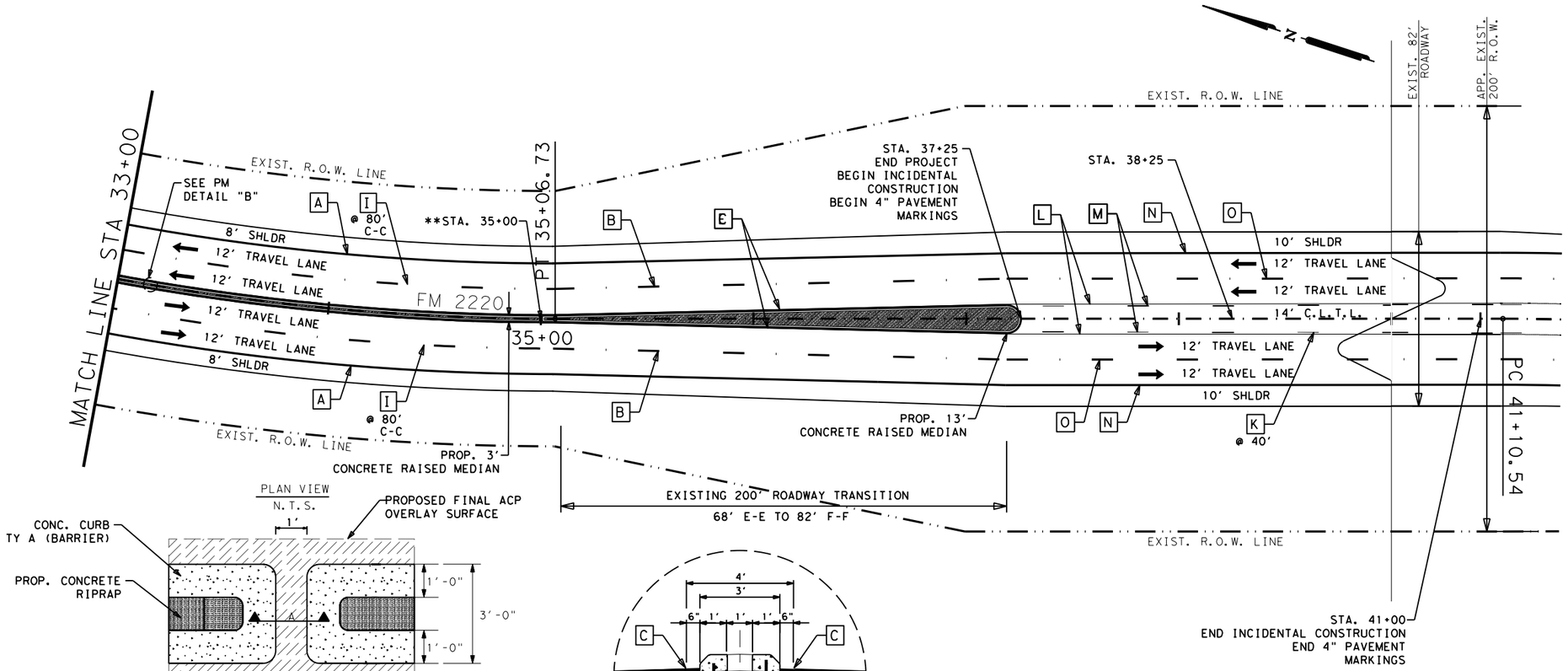
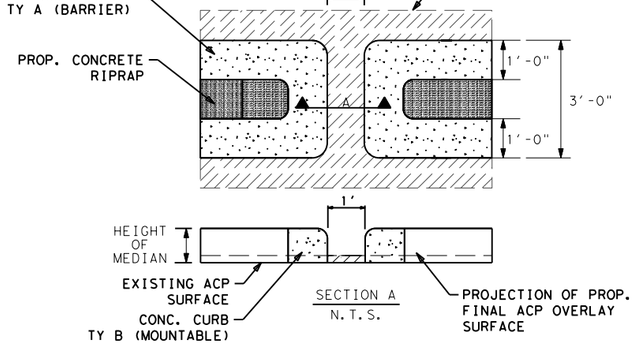
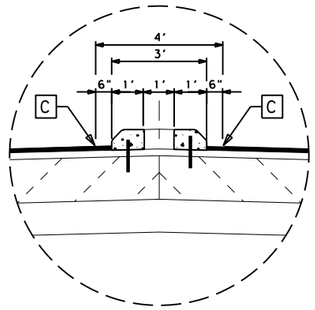




CONCRETE RAISED OPENING DETAIL



PM DETAIL "B"

LEGEND:

- PROPOSED CONCRETE RAISED MEDIAN
- DIRECTION OF TRAFFIC FLOW
- EXISTING R.O.W. LINE
- ** - CURB DRAIN SLOT
- T.L. - TRAVEL LANE
- R.O.W. - RIGHT OF WAY
- SHLDR. - SHOULDER
- A REF PROF PAV MRK TY I(W)6"SLD(100MIL)
- B RE PM W/RET REQ TY I(W)6"BRK(100MIL)
- C RE PM W/RET REQ TY I(Y)6"SLD(100MIL)
- D RE PM W/RET REQ TY I(W)8"SLD(100MIL)
- E RE PM W/RET REQ TY I(Y)12"SLD(100MIL)
- F RE PM W/RET REQ TY I(Y)6"BRK(100MIL)
- G PREFAB PAV MRK TY C (W)(ARROW)
- H PREFAB PAV MRK TY C (W)(WORD)
- I REFL PAV MRKR TY II-C-R
- J REFL PAV MRKR TY I-C
- K REFL PAV MRKR TY II-A-A
- L RE PM W/RET REQ TY I(Y)4"SLD(100MIL)
- M RE PM W/RET REQ TY I(Y)4"BRK(100MIL)
- N RE PM W/RET REQ TY I(W)4"SLD(100MIL)
- O RE PM W/RET REQ TY I(W)4"BRK(100MIL)

GENERAL NOTES:

1. REFER TO PM STANDARDS FOR MORE INFORMATION.

PAVEMENT MARKING ITEMS

666 6343	666 6306	666 6321	666 6036	666 6141	666 6318	668 6077	668 6085	672 6010	672 6007	672 6009	666 6315	666 6312	666 6342	666 6300
REF PROF PAV MRK TY I(W) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (6") (BRK) (LF)	RE PM W/RET REQ TY I (Y) (6") (SLD) (LF)	RE PM W/RET REQ TY I (W) (8") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (12") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (6") (BRK) (LF)	PREFAB PAV MRK TY C(W) ARROW (EA)	PREFAB PAV MRK TY C(W) WORD (EA)	REFL PAV MRKR TY II-C-R (EA)	REFL PAV MRKR TY I-C (EA)	REFL PAV MRKR TY II-A-A	RE PM W/RET REQ TY I (Y) (4") (SLD) (LF)	RE PM W/RET REQ TY I (Y) (4") (BRK) (LF)	REF PROF PV MRK TY I (W) (4") (SLD) (LF)	RE PM W/RET REQ TY I (W) (4") (BRK) (LF)
850	220	850	-	-	-	-	-	24	-	20	750	200	750	200

ROADWAY ITEMS

100 6002	134 6001	432 6004	432 6045	438 6009	529 6024	540 6001	540 6006	542 6001	542 6002	542 6004	544 6001	544 6003
PREPARING ROW (STA)	BACKFILL (TY A) (STA)	RIPRAP (8IN) (CY)	MOW STRIP (4") (CY)	CLEANING EXISTING JOINTS (LF)	CONC CURB, (MOUNTABLE) (LF)	MTL W-BM GD FENCE (TIM POST) (LF)	MTL BM GD-FEN TRANS (THRIE BM) (EA)	REMOVE METAL BEAM GUARD FENCE (LF)	REMOVE TERMINAL ANCHOR SECTION (EA)	REMOVE MTL BEAM GD FEN TRANS (EA)	GUARDRAIL END TREATMENT (INSTALL) (EA)	GUARDRAIL END TREATMENT (REMOVE) (EA)
8	5	36	-	-	870	-	-	-	-	-	-	

STATE OF TEXAS
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03/01/2023

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Texas Department of Transportation

FM 2220 PROPOSED ROADWAY AND MEDIAN LAYOUT

SCALE: 1"=60' SHEET 5 OF 5

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		60

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DATE: 2/27/2023
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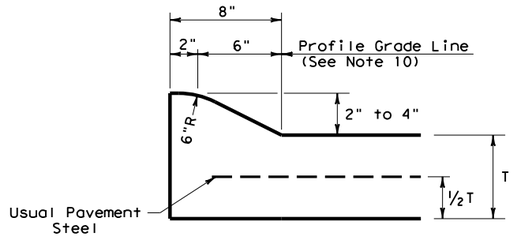
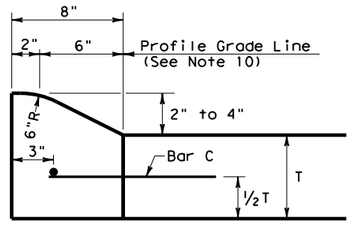
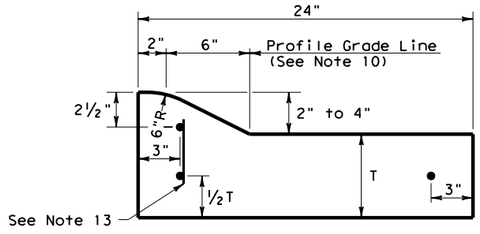


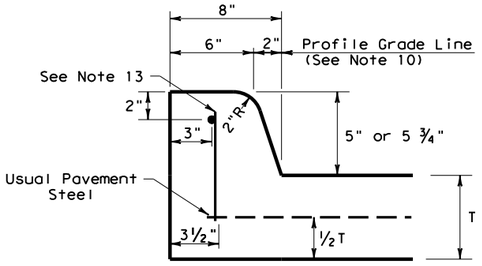
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



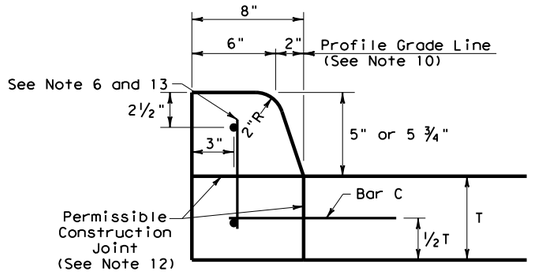
TYPE I CURB
2" - 4" HEIGHT



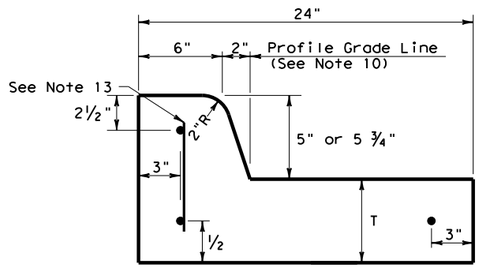
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



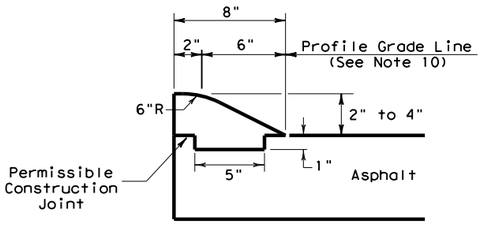
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



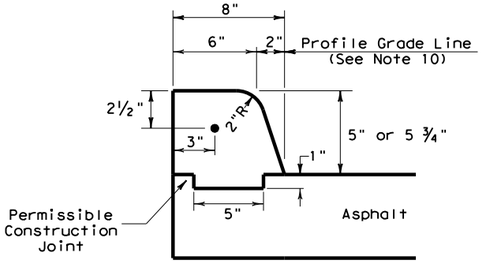
TYPE II CURB
5" - 5 ¾" HEIGHT



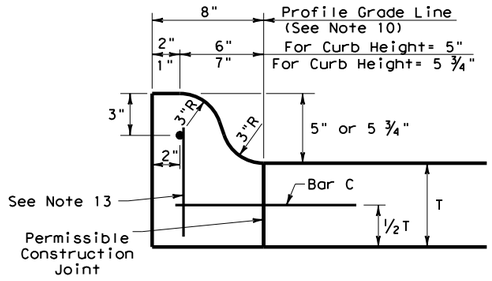
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



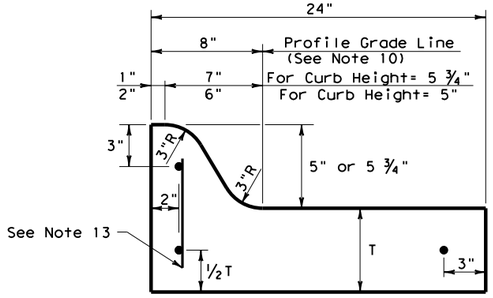
TYPE III CURB (KEYED)
2" - 4" HEIGHT



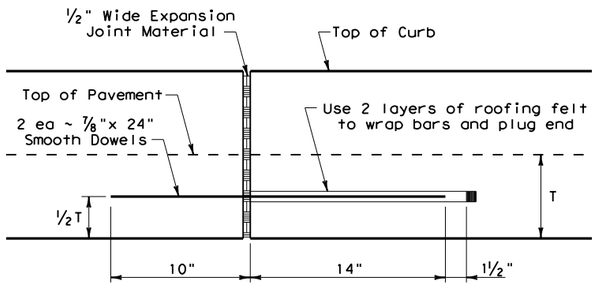
TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

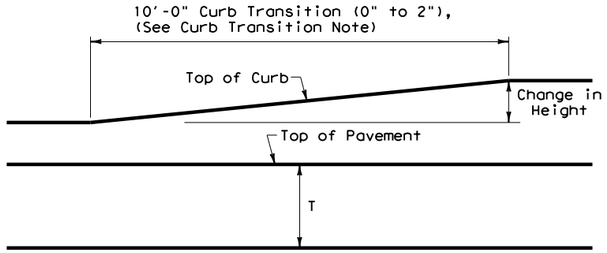


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

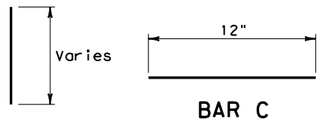
CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B placement as needed (typically at four ft. C-C) to support curb reinforcing steel during concrete placement.



BAR B

BAR C

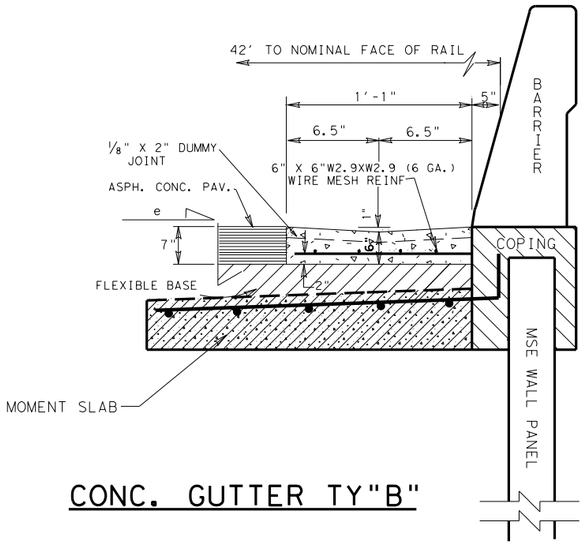
Texas Department of Transportation

Design Division Standard

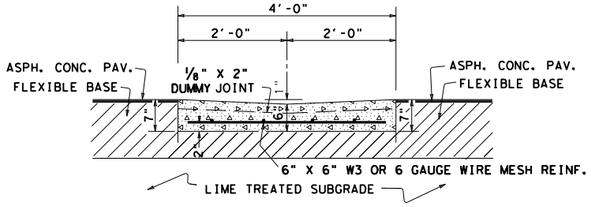
CONCRETE CURB AND CURB AND GUTTER

CCCG-22

FILE: cccg21.dgn	DN: TXDOT	CK: AN	DW: CS	CK: KM	
©TxDOT: JUNE 2022	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2094	01	071	FM 2220	
	DIST	COUNTY		SHEET NO.	
	PHR	HIDALGO		61	

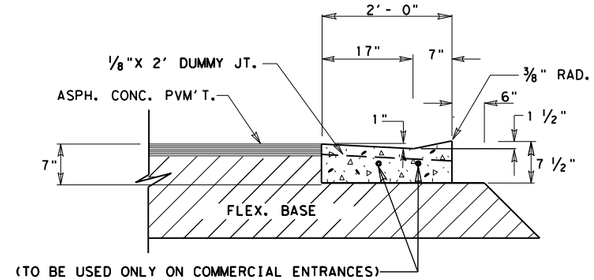


CONC. GUTTER TY"B"



4' CONC. VALLEY GUTTER (TY"A")

TO BE USED WHERE REQUIRED TO CARRY DRAINAGE WATER ACROSS SIDE STREETS



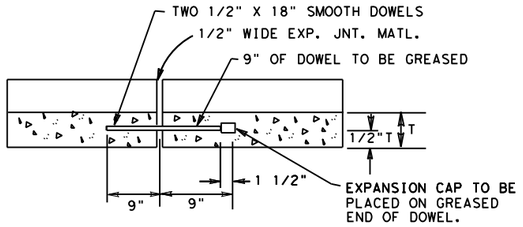
(TO BE USED ONLY ON COMMERCIAL ENTRANCES)
2-NO. 5 LONGITUDINAL REINF. BAR REINF. STEEL TO BE MADE PART OF ITEM "CONC. CURB & GUTTER." THE LENGTH OF REINFORCING STEEL WILL BE THE WIDTH OF THE PROP. COMMERCIAL ENTRANCE PLUS FOUR FEET.

CONC. GUTTER

NOTE:

CONCRETE GUTTER TO BE USED ONLY WHERE PERMITTED BY TEXAS DEPARTMENT OF TRANSPORTATION REGULATIONS FOR ACCESS DRIVEWAYS.

2' VALLEY GUTTER SHALL BE PAID FOR AS CONC. CURB AND GUTTER . CONCRETE CURB & GUTTER & CONCRETE CURB SHALL BE MEASURED FOR PAYMENT ALONG FACE OF CURB AT FLOW LINE.

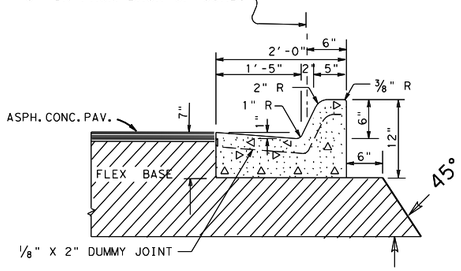


DETAIL EXPANSION JOINT

LONGITUDINAL SECTION THRU CURB AND/OR C&G. REINFORCING STEEL (WHEN USED) SHALL NOT CROSS EXPANSION JOINTS. STEEL SHALL BE TERMINATED 3" ± 1" FROM FACE OF THE JOINT.

1/2" PREMOLDED EXPANSION JOINT MATERIAL SHALL BE INSTALLED WHERE CONC. CURB & GUTTER ABUTS CONC. CURB, OR WHERE CONC. CURB & GUTTER OR CONC. CURB ABUT INLETS, BRIDGE WINGWALLS, BRIDGE ABUTMENTS AND/OR ANY OTHER LOCATIONS SPECIFIED BY THE ENGINEER. MAX. SPACING = 105'

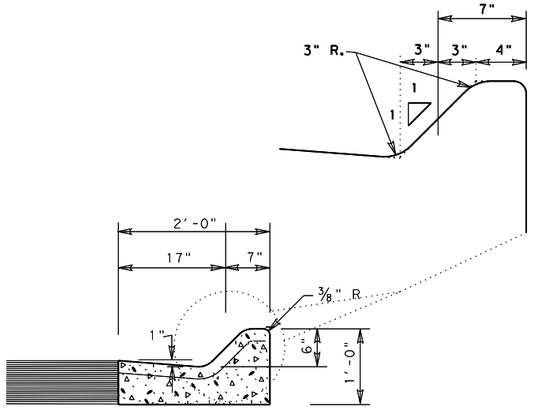
ALL HORIZONTAL DIMENSIONS AND RADII SHOWN ON PLANS, RELATING TO CURB & GUTTER, ARE TO A POINT 6" IN FROM BACK OF CURB.



CONC. CURB & GUTTER TY "A" (BARRIER)

NOTE:
EXPANSION JOINTS

1/2" PREMOLDED EXPANSION JOINT MATERIAL SHALL BE INSTALLED WHERE CONC. CURB & GUTTER ABUTS CONC. CURB, OR WHERE CONC. CURB & GUTTER OR CONC. CURB ABUT INLETS, BRIDGE WINGWALLS, BRIDGE ABUTMENTS AND/OR ANY OTHER LOCATIONS SPECIFIED BY THE ENGINEER. MAX. SPACING = 105'

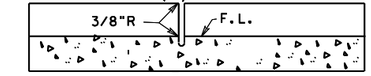


CONC. CURB & GUTTER TY. "B" (MOUNTABLE)

NOTE:
WHERE PROPOSED CURB & GUTTER IS TO BE CONNECTED TO EXIST. CURB & GUTTER IT SHOULD BE DONE AT THE EXIST. GUTTER FLOW LINE ELEVATION.

1/2" PREMOLDED EXPANSION JOINT MATERIAL SHALL BE INSTALLED WHERE CONC. CURB & GUTTER ABUTS CONC. CURB, OR WHERE CONC. CURB & GUTTER OR CONC. CURB ABUT INLETS, BRIDGE WINGWALLS, BRIDGE ABUTMENTS AND/OR ANY OTHER LOCATIONS SPECIFIED BY THE ENGINEER. MAX. SPACING = 105'

JOINTS MAY BE FORMED WITH 1/8" METAL PLATES NO FILLER REQUIRED. USUAL SPACING 10' O.C., MAX. SPACING 15' O.C.



DETAIL DUMMY JOINT

NOTE:
DUMMY JOINTS TO BE USED ON CURB & CUTTER, CONC. MEDIAN AND ALL TYPE OF VALLEY GUTTERS JOINTS TO BE LOCATED BY THE ENGINEER.

PHARR DISTRICT STANDARD

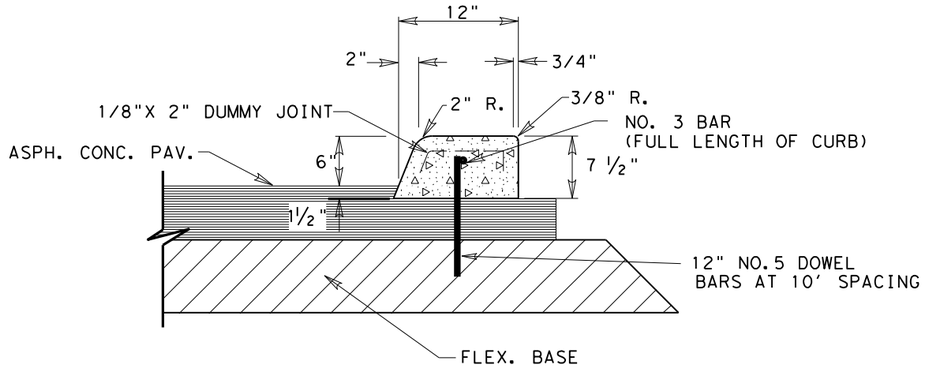
TEXAS DEPARTMENT OF TRANSPORTATION

CURB & GUTTER DETAILS

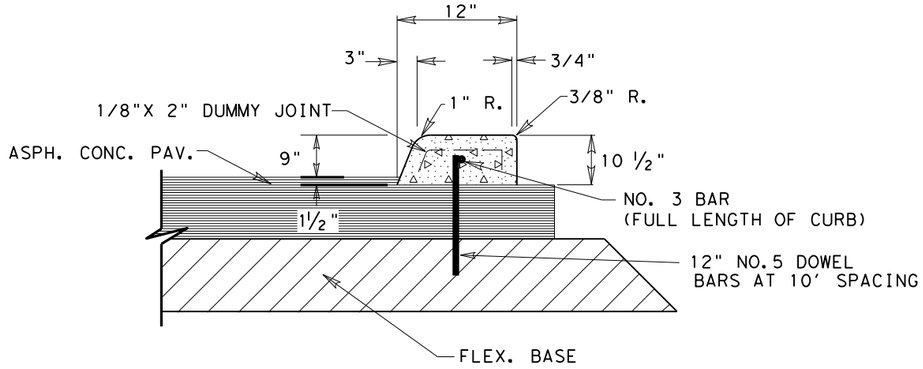
REV. 4/02

C&G. DGN

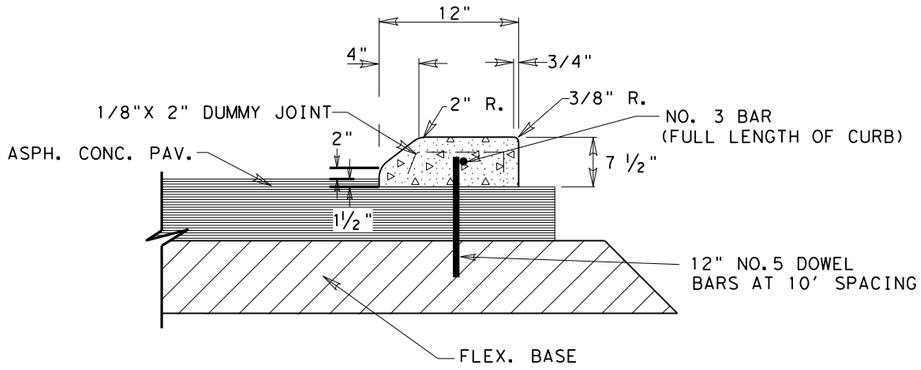
FED. RD. DIV. NO.	STATE AID PROJECT NO.		FILE NO.			SHEET NO.
6						62
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	HIDALGO	2094	01	071	FM 2220



CONC. CURB TY "A" (BARRIER)



CONC. CURB TY "C" (BARRIER)



CONC. CURB TY "B" (MOUNTABLE)

PHARR DISTRICT STANDARD

TEXAS DEPARTMENT OF TRANSPORTATION

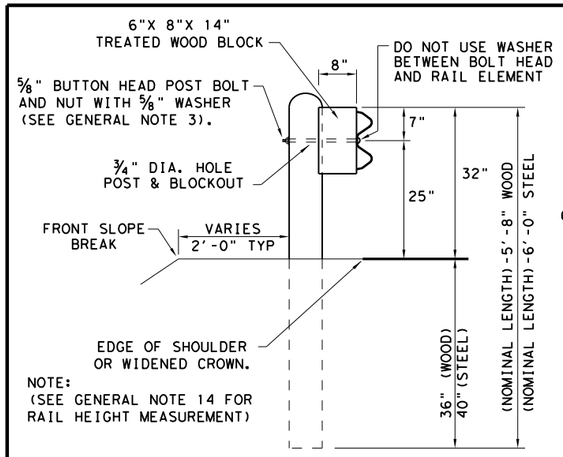
CONCRETE CURB DETAILS

REV. 6/04

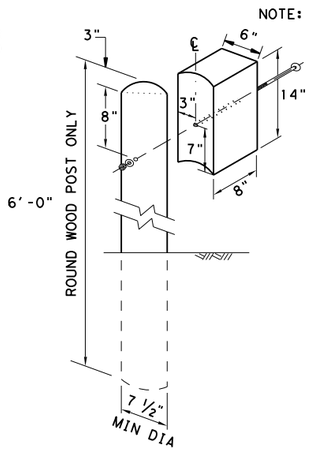
CURB.DGN

FED.RD. DIV.NO.	STATE AID PROJECT NO.		FILE NO.			SHEET NO.
6						63
STATE	STATE DIST. NO.	COUNTY	CONT.	SECT.	JOB	HIGHWAY NO.
TEXAS	21	HIDALGO	2094	01	071	FM 2220

DATE: 2/27/2023
FILE: T:\PHRDSGN\Arleene\FM 2220_CRM_2094-01-071\14. STANDARDS\2. ROADWAY STANDARDS\gf3119.dgn

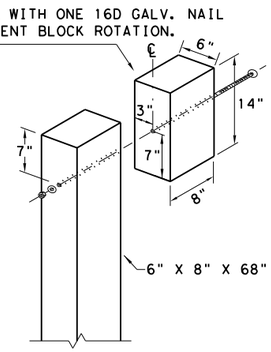


TYPICAL POST PLACEMENT

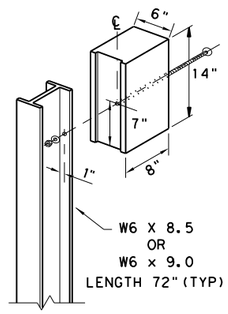


WOOD BLOCK TO ROUND WOOD POST

NOTE: TOENAIL WITH ONE 16D GALV. NAIL TO PREVENT BLOCK ROTATION.

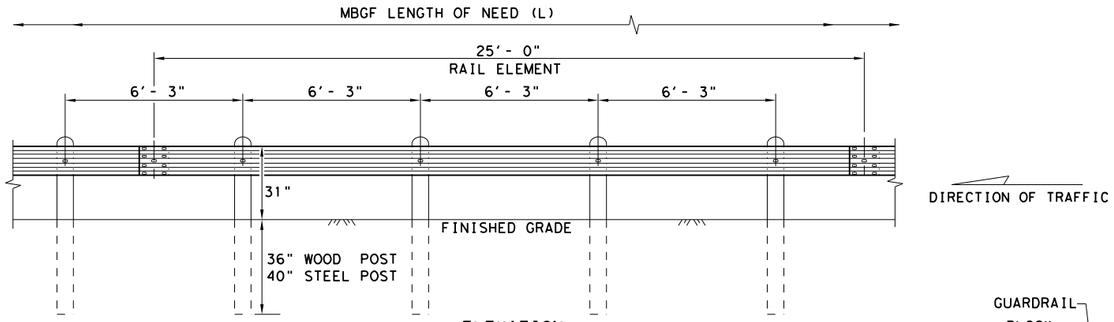


WOOD BLOCK TO RECTANGULAR WOOD POST



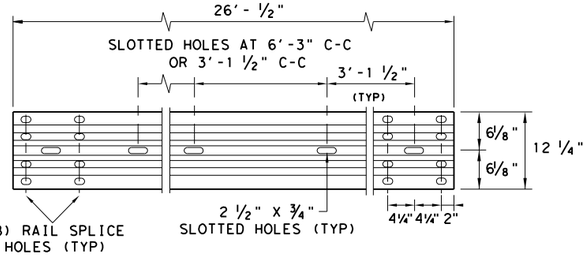
ROUTED WOOD BLOCK TO I-BEAM STEEL POST

NOTE: ** "WOOD" INDICATES DIMENSIONS FOR BOTH ROUND AND RECTANGULAR WOOD POST SYSTEMS.



ELEVATION
MID-SPAN RAIL SPLICE

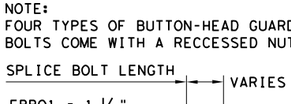
SHOWING A 25'- 0" SECTION OF W-BEAM RAIL. (SEE GENERAL NOTE 2)



ELEVATION 25'- 0" (NOM.) W-BEAM SECTION

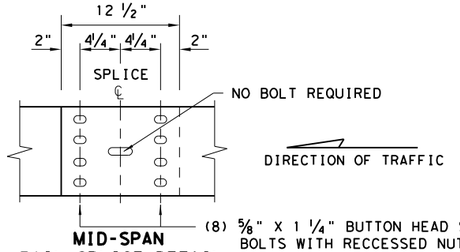
NOTES: SEE GENERAL NOTE 2 FOR ALLOWABLE RAIL TYPES.
SEE RAIL SPLICE DETAIL FOR REQUIRED HARDWARE.

NOTE:
FOUR TYPES OF BUTTON-HEAD GUARD RAIL BOLTS COME WITH A RECCESSED NUT.



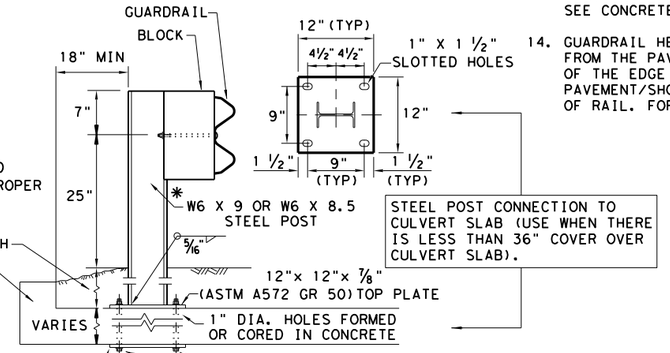
BUTTON HEAD BOLT

NOTE: SEE GENERAL NOTE 3 FOR SPLICE & POST BOLT DETAILS.



MID-SPAN RAIL SPLICE DETAIL

NOTE: GF(31), MID-SPAN RAIL SPLICES ARE REQUIRED WITH 6'-3" POST SPACINGS.



*POST(S) MAY REQUIRE FIELD MODIFICATION TO ENSURE PROPER GUARDRAIL HEIGHT.

STEEL POST CONNECTION TO CULVERT SLAB (USE WHEN THERE IS LESS THAN 36" COVER OVER CULVERT SLAB).

LOW FILL CULVERT POST

NOTE: TWO INSTALLATION OPTIONS.

1. BOLT-THROUGH OPTION: REQUIRES A 6" MIN. SLAB THICKNESS. ⅞" DIA (ASTM A449) HEAVY HEX BOLTS WITH TWO HARDENED WASHER EACH AND HEAVY HEX NUTS.
   NOTE: BOLT LENGTH = SLAB PLUS 2 ¼" MIN.

2. EPOXY ANCHOR OPTION: THIS OPTION MAY ONLY BE USED IF THE CULVERT SLAB IS 9" MIN. THICK. THREADED ANCHOR RODS MUST BE ⅞" DIA. ASTM A449 OR A193 GRADE B7 WITH HEAVY HEX NUT, AND ONE HARDENED WASHER EACH. EMBED ANCHOR RODS 6" WITH HILTI HIT RE 500 EPOXY ADHESIVE. OTHER TYPE III CLASS C EPOXY ADHESIVES MEETING THE REQUIREMENTS OF DMS-6100, "EPOXIES AND ADHESIVES", MAY BE USED IF IT CAN BE DEMONSTRATED THAT THEY MEET OR EXCEED THE STRENGTH OF HILTI HIT RE 500 WITH THE SAME EMBEDMENT DEPTH AND THREADED ROD DIA. FOLLOW THE MANUFACTURER'S REQUIREMENTS FOR INSTALLING EPOXIED THREADED RODS. EXTEND RODS ¼" MIN. BEYOND NUT.

NOTE: CULVERTS OF 25 FT. OR LESS, SEE GF(31)LS STANDARD FOR "LONG SPAN" OPTION.

NOTE: TRANSISTIONS TO BRIDGE RAILS OR TRAFFIC BARRIERS.
SEE GF(31)TL3 TR STANDARD FOR HIGH-SPEED TL-3 TRANSITIONS.
SEE GF(31)TL2 TR STANDARD FOR LOW-SPEED TL-2 TRANSITIONS.

GENERAL NOTES

1. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST, OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. THE EXACT POSITION OF MBGF SHALL BE SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. STEEL POSTS TO BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING."
2. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540,"METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED IN THE PLANS. THE CONTRACTOR MAY FURNISH RAIL ELEMENTS OF 25'- 0", OR 12'- 6" (NOM.) LENGTHS. RAIL ELEMENTS MAY HAVE SLOTTED HOLES AT 3'-1 ½" C-C OR 6'-3" C-C. A SPECIAL LENGTH OF RAIL MAY BE MANUFACTURED TO ACCOMMODATE THE DOWNSTREAM ANCHOR TERMINAL (DAT) AND THE TRANSITION SECTIONS OF GUARDRAIL.
3. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
4. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445,"GALVANIZING." FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
5. CROWN SHALL BE WIDENED TO ACCOMMODATE THE METAL BEAM GUARD FENCE.
6. THE LATERAL APPROACH TO THE GUARD FENCE, SHALL HAVE A MAXIMUM SLOPE OF 1V:10H.
7. IF SHOWN ELSEWHERE IN THE PLANS OR AS DIRECTED BY THE ENGINEER, THE GUARD FENCE MAY BE FLARED AT A RATE OF 25:1 OR FLATTER.
8. UNLESS OTHERWISE SHOWN IN THE PLANS, GUARD FENCE PLACED IN THE VICINITY OF CURBS SHALL BE POSITIONED SO THAT THE FACE OF CURB IS LOCATED DIRECTLY BELOW OR BEHIND THE FACE OF THE RAIL. RAIL PLACED OVER CURBS SHALL BE INSTALLED SO THAT THE POST BOLT IS LOCATED APPROXIMATELY 25 INCHES ABOVE THE GUTTER PAN OR EDGE OF SHOULDER.
9. APPLICATIONS IN SOLID ROCK ARE ONLY ALLOWED WITH STEEL POSTS. IF SOLID ROCK IS ENCOUNTERED WITHIN 0 TO 18" OF THE FINISHED GRADE, DRILL A 24" DIA. HOLE, 24" INTO THE ROCK. IF SOLID ROCK IS ENCOUNTERED BELOW 18", DRILL A 12" DIA. HOLE, 12" INTO THE ROCK OR TO THE STANDARD EMBEDMENT DEPTH, WHICHEVER MAYBE LESS. ANY EXCESS POST LENGTH, AFTER MEETING THESE DEPTHS, MAY BE FIELD CUT TO ENSURE PROPER GUARDRAIL MOUNTING HEIGHT. BACKFILL WITH COARSE AGGREGATE MATERIAL.
10. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
11. SPECIAL FABRICATION WILL BE REQUIRED AT INSTALLATION LOCATIONS HAVING A CURVATURE OF LESS THAN 150 FT. RADIUS.
12. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210,"COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. THE CONSTRUCTION DIVISION, TXDOT MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210 ONLY PRODUCERS ON THE MPL MAY FURNISH COMPOSITE MATERIAL BLOCKS.
13. FOR THE LOW FILL CULVERT OPTION, POSTS LOCATED PARTIALLY OR WHOLLY BETWEEN PRECAST BOX CULVERT UNITS, THE USE OF A CAST-IN-PLACE CONCRETE CLOSURE BETWEEN BOXES IS REQUIRED. THE LENGTH OF THE CAST-IN-PLACE CONCRETE CLOSURE SHALL ACCOMMODATE THE PLACEMENT OF THE LOW FILL CULVERT OPTION. SEE CONCRETE CLOSURE DETAILS ON BRIDGE STANDARD SCP-MD.
14. GUARDRAIL HEIGHT MEASUREMENT: WHEN THE GUARDRAIL IS LOCATED ABOVE PAVEMENT, MEASURE THE HEIGHT FROM THE PAVEMENT TO THE TOP OF THE W-BEAM RAIL. WHEN THE GUARDRAIL IS LOCATED UP TO 2 FT. OFF OF THE EDGE OF PAVEMENT OR FOR A PAVEMENT OVERLAY, USE A 10-FOOT STRAIGHTEDGE TO EXTEND THE PAVEMENT/SHOULDER SLOPE TO THE BACK OF RAIL, MEASURE FROM THE BOTTOM OF STRAIGHTEDGE TO THE TOP OF RAIL. FOR GUARDRAIL LOCATED DOWN A 10:1 SLOPE, MEASURE FROM THE NOMINAL TERRAIN.

Texas Department of Transportation — Design Division Standard

METAL BEAM GUARD FENCE
TL-3 MASH COMPLIANT
GF(31)-19

FILE: gf3119.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		64

DATE: 2/27/2023
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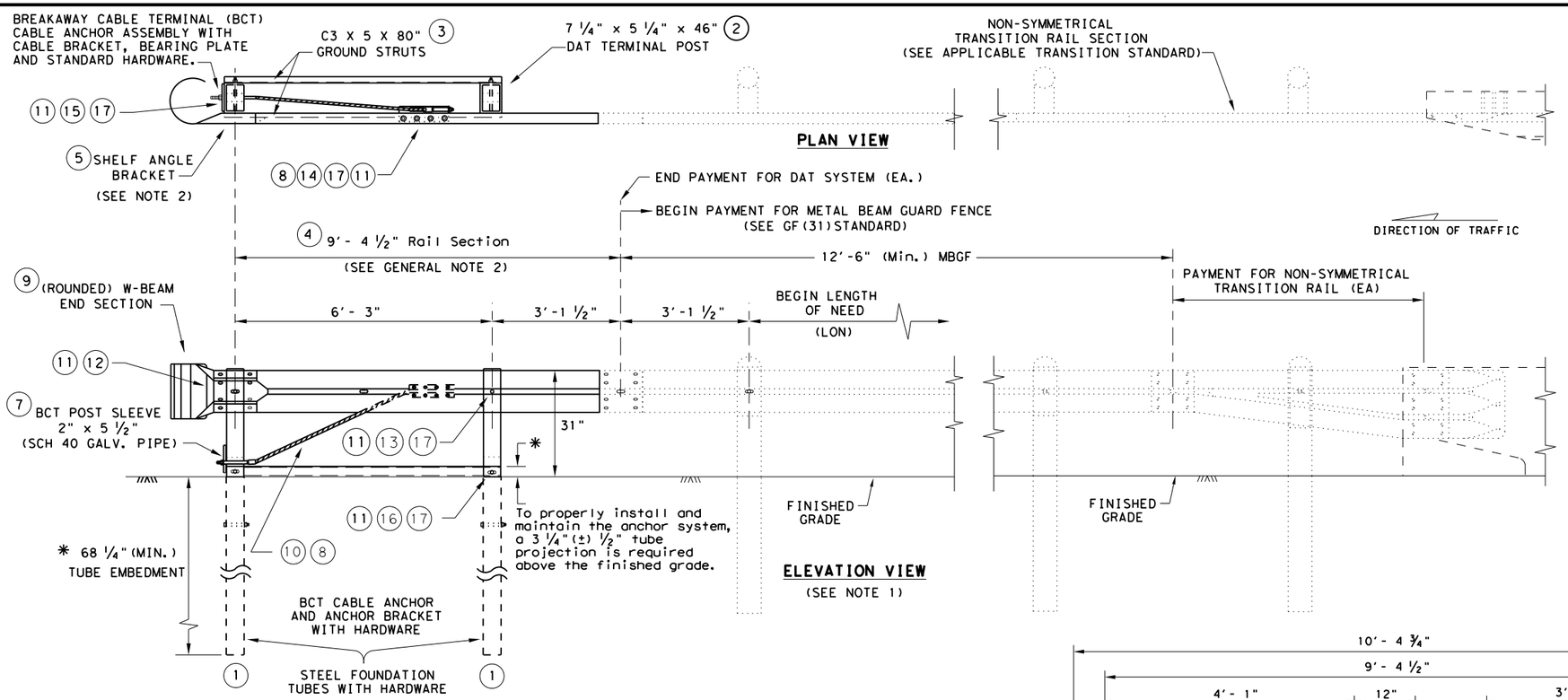


DOWNSTREAM ANCHOR TERMINAL (DAT)

NOTE: ONLY FOR DOWNSTREAM USE, WHEN LOCATED OUTSIDE THE HORIZONTAL CLEARANCE AREA OF OPPOSING TRAFFIC.

GENERAL NOTES

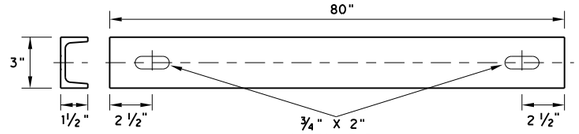
1. THE DETAIL SHOWN IS THE MINIMUM LENGTH OF NEED (LON) FOR A DOWNSTREAM ANCHOR TERMINAL (DAT) CONNECTED TO A CONCRETE RAIL.
2. THE RAIL SECTION AT THE END POST IS SUPPORTED BY THE SHELF ANGLE BRACKET. THE RAIL ELEMENT IS NOT ATTACHED TO THE END POST.
3. THE FOUNDATION TUBES SHALL NOT PROJECT MORE THAN 3 3/4" ABOVE THE FINISHED GRADE.
4. ALL HARDWARE FOR DAT SHALL BE ASTM A307 UNLESS OTHERWISE SHOWN.
5. REFER TO GF(31) SHEET FOR TERMINAL CONNECTION DETAILS.

MOW STRIP INSTALLATION

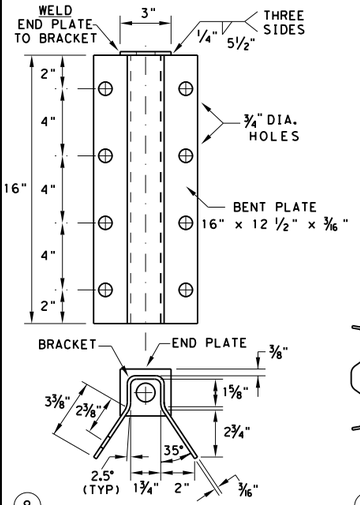
IF A MOW STRIP IS REQUIRED WITH THE DAT INSTALLATION THE LEAVE-OUT AREA AROUND THE STEEL FOUNDATION TUBES AND THE TWO CHANNEL STRUTS MAY BE OMITTED. THIS WILL REQUIRE A FULL POUR AT THE FOUNDATION TUBES.

#	(DAT) PARTS LIST	QTY
(1)	STEEL FOUNDATION TUBE	2
(2)	DAT TERMINAL POST	2
(3)	CHANNEL STRUT	2
(4)	TERMINAL RAIL ELEMENT	1
(5)	SHELF ANGLE BRACKET	1
(6)	BCT BEARING PLATE	1
(7)	BCT POST SLEEVE	1
(8)	GUARDRAIL ANCHOR BRACKET	1
(9)	(ROUNDED) W-BEAM END SECTION	1
(10)	BCT CABLE ANCHOR	1
(11)	RECESSED NUT, GUARDRAIL	20
(12)	1 1/4" BUTTON HEAD BOLT	4
(13)	10" BUTTON HEAD BOLT	2
(14)	5/8" X 2" HEX HEAD BOLT	8
(15)	5/8" X 8" HEX HEAD BOLT	4
(16)	5/8" X 10" HEX HEAD BOLT	2
(17)	5/8" FLAT WASHER	18

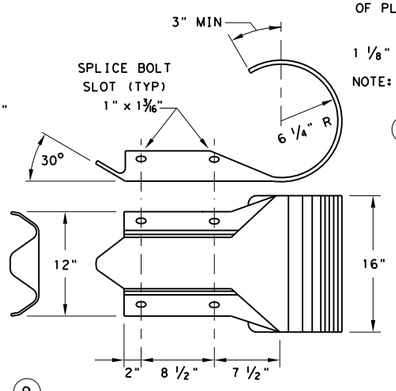
(4) TERMINAL RAIL ELEMENT FOR DAT



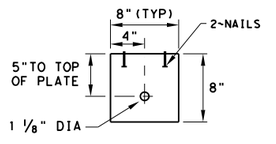
(3) CHANNEL STRUT
C3 X 5 X 80", GRADE A36



(8) GUARDRAIL ANCHOR BRACKET

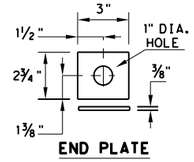


(9) W-BEAM END SECTION (ROUNDED) (12 GA.)

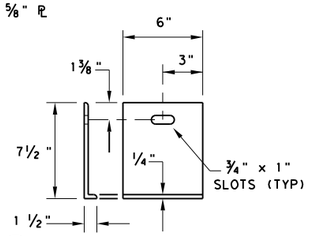


NOTE: DRIVE NAILS AND BEND OVER TO PREVENT PLATE ROTATION

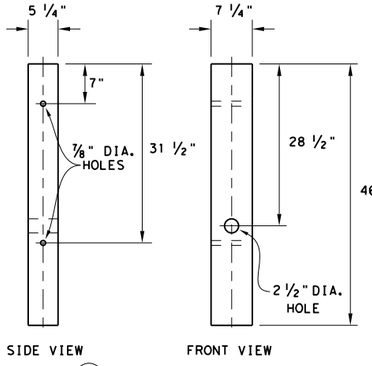
(6) BEARING PLATE
8"x 8"x 5/8" PL



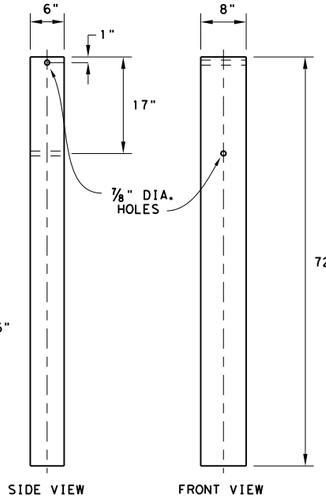
END PLATE



(5) SHELF ANGLE BRACKET



(2) TERMINAL POST
7 1/4"x 5 1/4"x 46" WOOD POST



(1) STEEL FOUNDATION TUBE
6"x 8"x 1/8" x 72" STEEL TUBE

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE
(DOWNSTREAM ANCHOR TERMINAL)
TL-3 MASH COMPLIANT

GF(31)DAT-19

FILE: gf31dat19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		65

DATE: 2/27/2023
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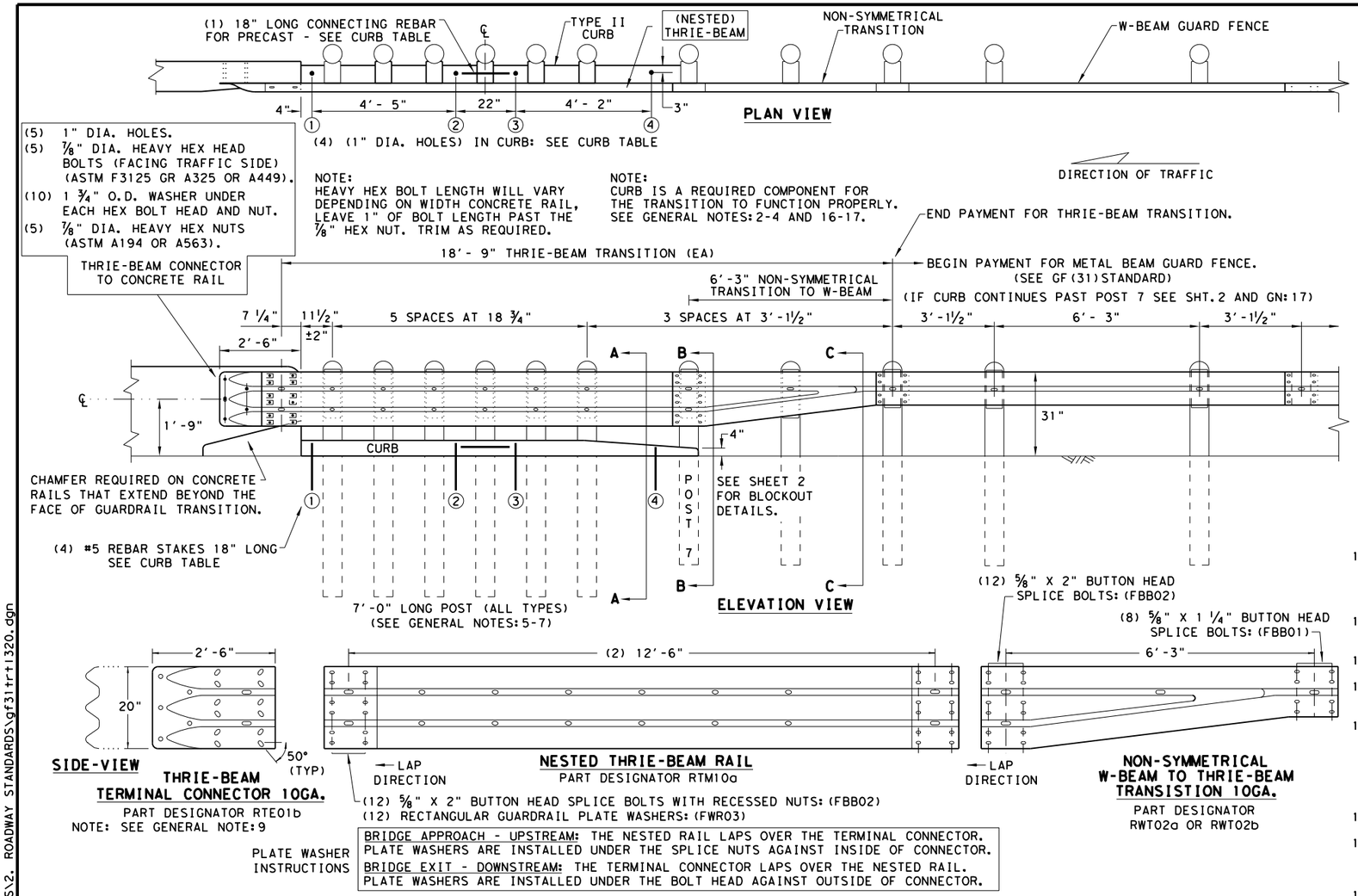


GENERAL NOTES

1. CONTACT THE DESIGN DIVISION FOR DRAINAGE CUT OUT OPTIONS NEEDED WITHIN THE CURB SECTION OF THE THRIE-BEAM TRANSITION. (512) 416-2678
2. CONCRETE CURB MAY BE CAST-IN-PLACE OR PRECAST AS SHOWN ON THIS SHEET. WHEN USED IN CONJUNCTION WITH THE THRIE-BEAM TRANSITIONS, CURB SHALL BE TYPE II (5- ¾" HEIGHT); SEE CURRENT CCCG STANDARD SHEET FOR FURTHER DETAILS. IF OTHER CURB HEIGHTS ARE SHOWN IN THE PLANS IN CONJUNCTION WITH THE TRANSITION, THE CURB HEIGHT MAY BE FROM 4" TO 8" WITH A RELATIVELY VERTICAL FACE. CONCRETE CURB SHALL BE CONTINUOUS TO THE SEVENTH POST UNLESS OTHERWISE SHOWN IN THE PLANS. SEE GENERAL NOTE: 17 FOR CIRCUMSTANCES WHERE CURB CONTINUES PAST POST 7.
3. CONCRETE CURB TYPE II SUBSIDIARY TO "METAL BEAM GUARD FENCE TRANSITION". IF NO ADDITIONAL CURB IS INDICATED BEYOND THE TRANSITION, THEN ANY CURB HEIGHT GREATER THAN 4" WILL BE TAPERED DOWN BEGINNING AT THE LAST 7 FT. POST TO A MAXIMUM HEIGHT OF 4" AT POST 7. IF SHOWN ELSEWHERE IN THE PLANS, ADDITIONAL CURB UNDERNEATH GUARDRAIL WILL BE PAID FOR BY THE LINEAR FOOT.
4. UNLESS OTHERWISE SHOWN IN THE PLANS, TRANSITIONS SHALL BE PLACED WITH THE BLOCKOUT FACE IN FRONT OF OR DIRECTLY ABOVE THE CURB FACE. SEE SECTION A-A.
5. FOR ROUND WOOD POST SYSTEMS, ALL ROUND WOOD POSTS SHALL BE 7 ½" DIA. MINIMUM THROUGHOUT THE THRIE-BEAM TRANSITION.
6. THE TYPE OF POST (ROUND WOOD POST, RECTANGULAR WOOD POST OR STEEL POST) WILL BE AS SHOWN IN THE PLANS. REFER TO GF(31) STANDARD SHEET.
7. THE POST LENGTH SHALL BE MARKED ON ALL 7'- 0" LONG POSTS BY THE MANUFACTURER. THE MARK SHALL BE LOCATED WITHIN THE TOP 1 FT. REGION OF THE POST, AT LEAST ⅝" IN HEIGHT, AND VISIBLE AFTER INSTALLATION. WOODEN POSTS SHALL BE MARKED WITH A BRAND, AND STEEL POSTS WITH A STENCIL BEFORE GALVANIZING.
8. POSTS SHALL NOT BE SET IN CONCRETE, OF ANY DEPTH.
9. RAIL ELEMENTS SHALL MEET THE REQUIREMENTS OF ITEM 540, "METAL BEAM GUARD FENCE" EXCEPT AS MODIFIED ON THE PLANS. THE THRIE-BEAM TERMINAL CONNECTOR AND THE THRIE-BEAM TRANSITION TO W-BEAM SHALL BE OF THE SAME MATERIAL, BUT SHALL NOT BE LESS THAN 10 GAUGE. CONTRACTOR SHALL VERIFY THAT THE LOCATIONS OF BOLT HOLES MATCH THOSE IN THE THRIE-BEAM TERMINAL CONNECTOR PRIOR TO ORDERING MATERIALS.
10. BUTTON HEAD "POST BOLTS & NUTS" SHALL MEET THE REQUIREMENTS OF (ASTM A307), AND SHALL BE OF SUFFICIENT LENGTH TO EXTEND THROUGH THE FULL THICKNESS OF THE NUT AND ⅝" WASHER (FWC16a) AND NOT MORE THAN 1" BEYOND IT. TRIM REMAINING BOLT LENGTH TO MEET REQUIRED LENGTH.
11. FITTINGS (BOLTS, NUTS, AND WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
12. CROWN SHALL BE WIDENED TO ACCOMMODATE TRANSITIONS.
13. WHERE SOLID ROCK IS ENCOUNTERED, CONTACT THE DESIGN DIVISION FOR ADDITIONAL GUIDANCE. (512) 416-2678
14. UNLESS OTHERWISE SHOWN IN THE PLANS, A COMPOSITE MATERIAL BLOCK THAT MEETS THE REQUIREMENTS OF DMS-7210, "COMPOSITE MATERIAL POSTS AND BLOCKS FOR METAL BEAM GUARD FENCE" MAY BE SUBSTITUTED FOR BLOCKS OF SIMILAR DIMENSIONS. TXDOT'S MATERIALS AND TESTS DIVISION MAINTAINS A MATERIAL PRODUCER LIST (MPL) FOR PRODUCERS OF MATERIALS CONFORMING TO DMS-7210. ONLY PRODUCERS ON THE MPL CAN FURNISH COMPOSITE MATERIAL BLOCKS.
15. REFER TO GF(31) STANDARD SHEET & BRIDGE RAILING DETAILS FOR ADDITIONAL DETAILS.
16. THE INSTALLATION OF THE TYPE II CURB IS CRITICAL FOR THE PERFORMANCE OF THE THRIE-BEAM TRANSITION SYSTEM. THE CURB PREVENTS (VEHICLE WHEEL SNAGGING) AT THE CONCRETE RAIL AND IS REQUIRED TO MEET MASH CRASH TEST CRITERIA.
17. IF CURB EXTENDS BEYOND POST 7, 25' OF NESTED W-BEAM GUARDRAIL SHALL BE INSTALLED BEYOND THE PAY LIMITS OF THRIE-BEAM TRANSITION SECTION, (SEE SHT.2). PAYMENT FOR THIS 25' SECTION WILL BE BY LINEAR FOOT, PAY ITEM "0540 6XXX MTL W-BEAM GD FEN (NESTED) (TIM POST)" OR "540 6XXX MTL W-BEAM GD FEN (NESTED) (STEEL POST)" AS APPLICABLE FOR POST TYPE. SEE SHT.2 FOR ADDITIONAL INFORMATION.

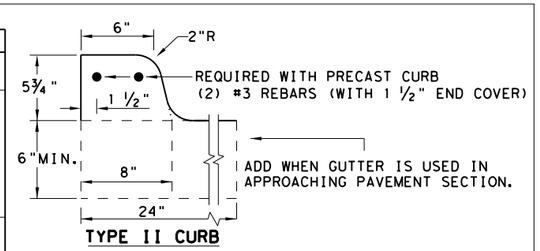
THRIE-BEAM TERMINAL - CURB TABLE

PRECAST CURB FULL LENGTH EQUALS 12'- 2"
THE PRECAST CURB MAY BE FORMED INTO TWO SECTIONS.

CURB (1) LENGTH 5'- 8"
CURB (2) LENGTH 6'- 6"
TAPER CURB (2) TO A HEIGHT OF 4" AT POST 7

CONNECTING PRECAST CURB SECTIONS (1) & (2):
FORM OR CORE 1" DIA. HOLE 9" LONG INTO EACH CURB END. USE (1) #5 GR.60 REBAR 18" LONG TO CONNECT BOTH CURBS.

SECURING PRECAST OR CAST-IN-PLACE TO FINISHED GRADE *:
FORM OR CORE (4) 1" DIA. HOLES, SEE PLAN AND ELEVATION VIEWS FOR HOLE LOCATIONS. DRIVE (4) #5 GR.60 REBAR STAKES 18" LONG INTO THE GROUND AND ½" BELOW TOP OF CURB.
FILL HOLES WITH APPROVED GROUT MIXTURE.



TYPE II CURB

NOTE: OPTIONS FOR TYPE II CURB:
1. PRECAST
2. CAST-IN-PLACE

* NOTES: NOT NEEDED FOR CAST-IN-PLACE.
SEE TYPE II CURB DETAIL FOR REBAR AND COVER REQUIREMENTS.
PERCUSSION DRILLING IS NOT PERMITTED WITH:
TYPE II CURB, BRIDGE RAIL OR CONCRETE TRAFFIC RAIL.

TYPE II CURB DETAILS

HIGH-SPEED TRANSITION

SHEET 1 OF 2

Texas Department of Transportation | Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31tr1320.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		66

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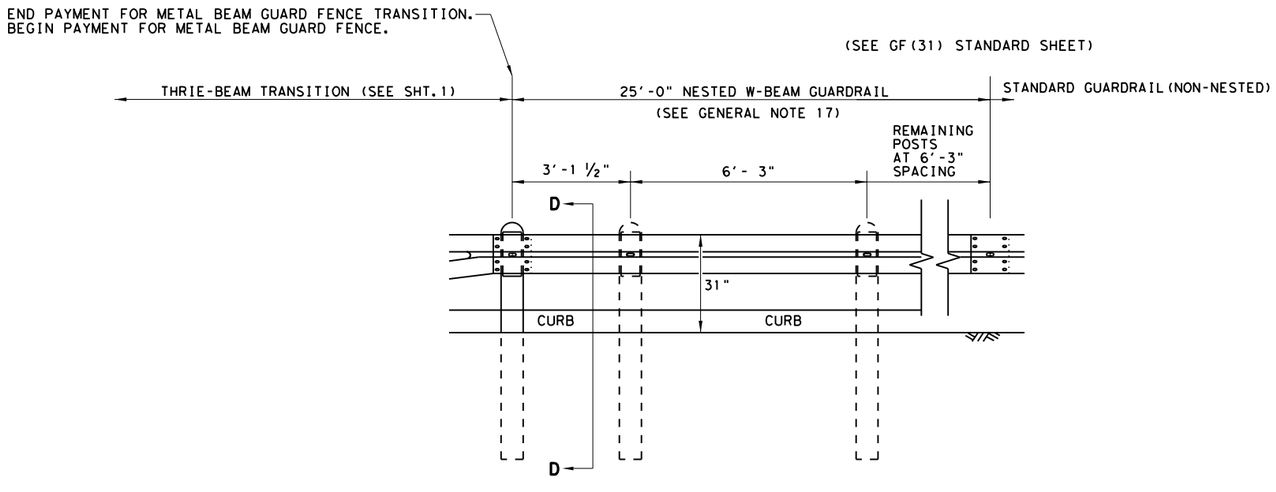
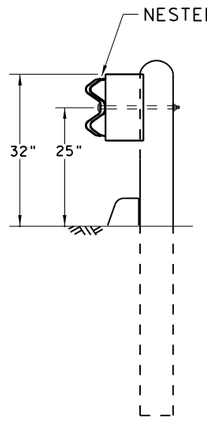
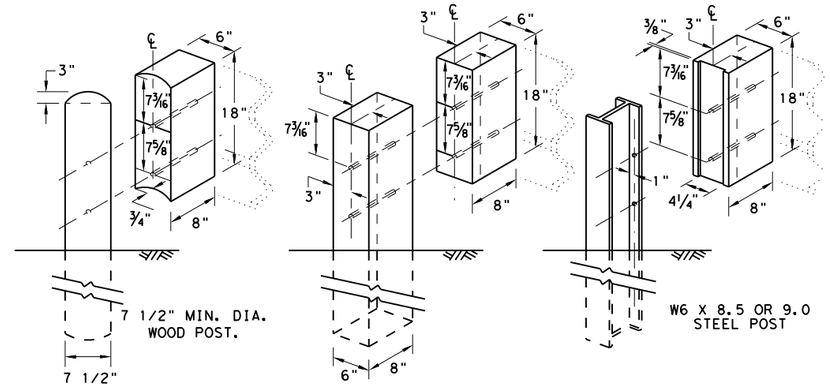
REQUIRED ALTERNATIVE FOR CONTINUOUS CURB EXTENDING PAST POST 7 (SEE SHT. 1 GENERAL NOTE 17)



ELEVATION VIEW



SECTION D-D



THRIE BEAM TRANSITION BLOCKOUT DETAILS

HIGH-SPEED TRANSITION

SHEET 2 OF 2

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE THRIE-BEAM TRANSITION TL-3 MASH COMPLIANT

GF(31)TR TL3-20

FILE: gf31trt1320.dgn	DN: TxDOT	CK: KM	DW: KM	CK: CGL/AG	
©TxDOT: NOVEMBER 2020	CONT	SECT	JOB	HIGHWAY	
REVISIONS	2094	01	071	FM 2220	
	DIST	COUNTY		SHEET NO.	
	PHR	HIDALGO		67	

DATE: 2/27/2023
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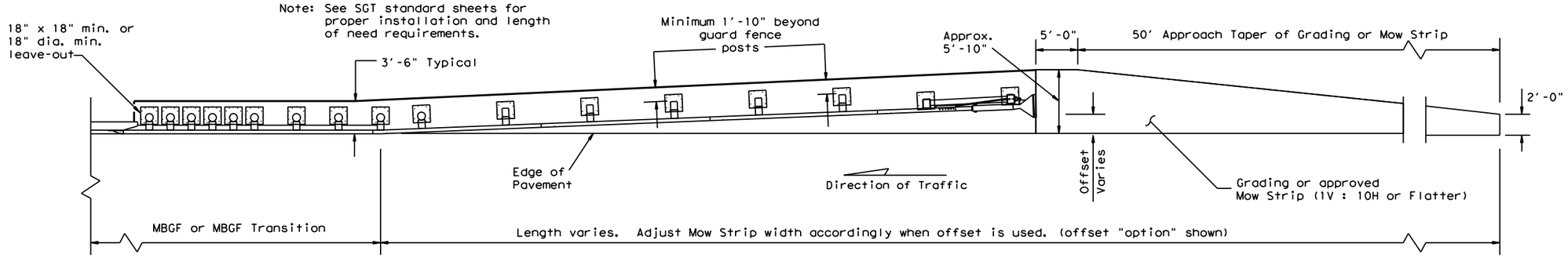
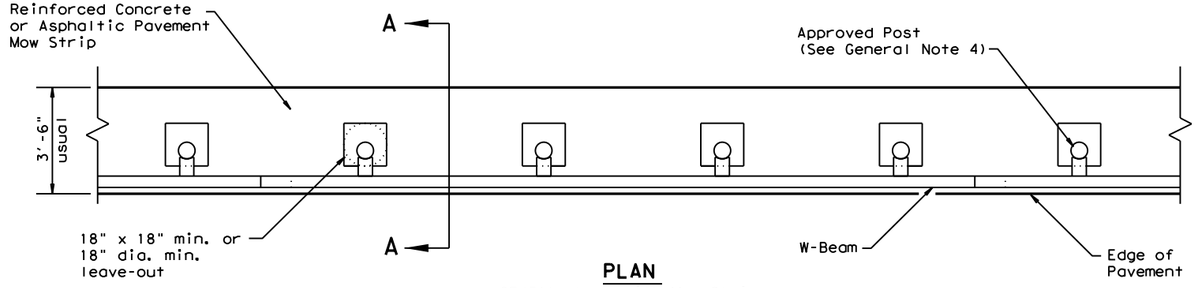
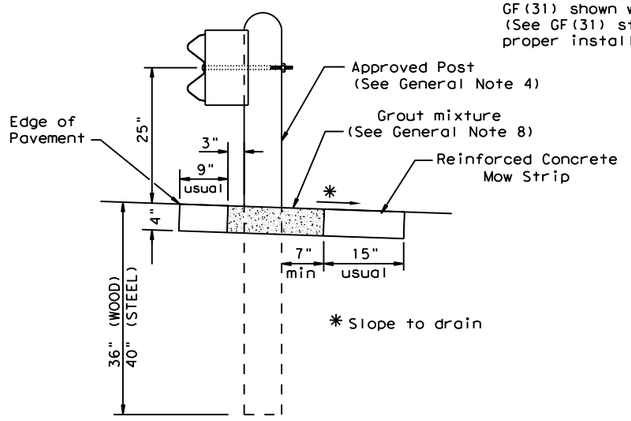


GRADING AND MOW STRIP AT GUARDRAIL END TREATMENTS



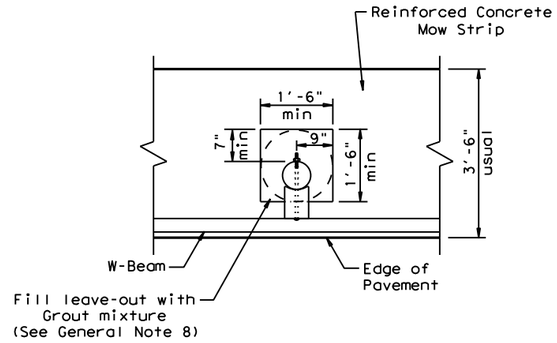
PLAN

GF(31) shown with Mow Strip
(See GF(31) standard sheet for proper installation)



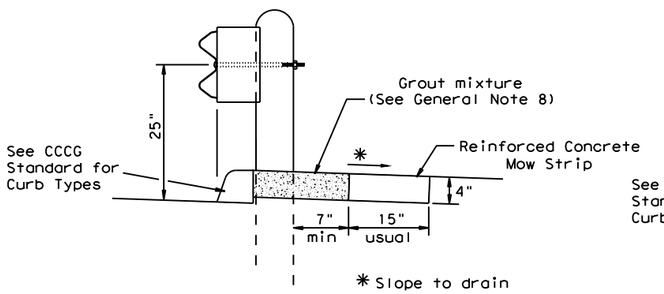
SECTION A-A

Typical



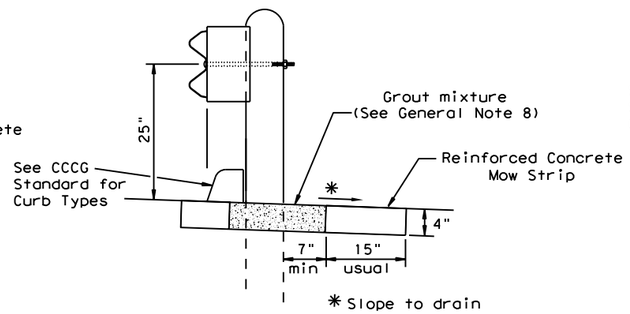
MOW STRIP DETAIL

Reinforced Concrete Mow Strip
with 18" x 18" Square or
18" Dia. minimum leave-out.



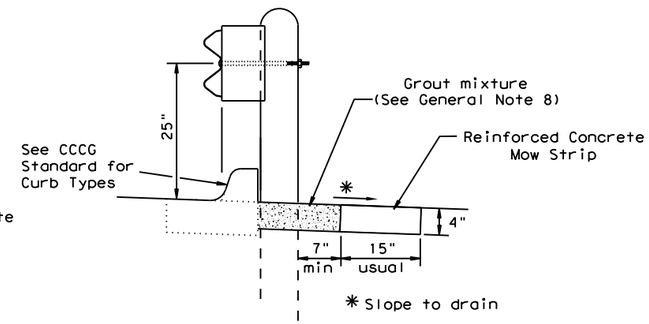
CURB OPTION (1)

This option will increase the post embedment throughout the system.



CURB OPTION (2)

Curb shown on top of mow strip



CURB OPTION (3)

Note: Site Condition(s)

Site conditions may exist where grading is required for the proper installation of metal guard fence and end treatments.

Approach grading or mow strip may be decreased or eliminated, as directed by the Engineer.

GENERAL NOTES

1. This mow strip design is for use with metal beam guard fence, guard fence transitions, and guard fence end treatments. See applicable GF(31) MBGF or GF(31) Transition Standard sheet for additional information.
2. Mow strips shall be reinforced concrete with (wire mesh or synthetic fiber), as shown on the plans and will be paid for under the pertinent bid item. Reinforced concrete shall be placed in accordance with Item 432, "Riprap." The use of the synthetic fiber in lieu of steel reinforcing is acceptable, provided the fiber producer is on the Department Material Producer List (MPL), maintained by TxDOT, Construction Division.
3. The leave-out behind the post shall be a minimum of 7".
4. Only steel (W6 x 8.5 or W6 x 9.0), or 7 ½" Dia. round wood posts are acceptable for use in the mow strip. See GF(31) Standard for additional details.
5. Other curb placement options may be used. Curbs are not considered part of the mow strip and will be paid for under other pertinent bid item.
6. Thickness of the mow strip will be 4".
7. The limits of payment for reinforced concrete will include leave-outs for the posts.
8. The leave-outs shall be filled with a Grout mixture consisting of: 2719 pounds sand, 188 pounds Type 1 or II cement, and 550 pounds of water per cubic yard, with a 28-day compressive strength of approximately 230 psi or less. Provide grout with a consistency that will flow into and completely fill all voids. Due to auger size, larger leave-out dimensions are acceptable from both an impact performance and maintenance repair standpoint (Suggested Maximum leave-out of 20"). Payment for furnishing and placing the grout mixture will be subsidiary to the pay item of riprap mow strip.

Texas Department of Transportation

Design Division Standard

METAL BEAM GUARD FENCE (MOW STRIP) TL-3 MASH COMPLIANT

GF(31)MS-19

FILE: gf31ms19.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CGL/AG
©TxDOT: NOVEMBER 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
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	PHR	HIDALGO		68

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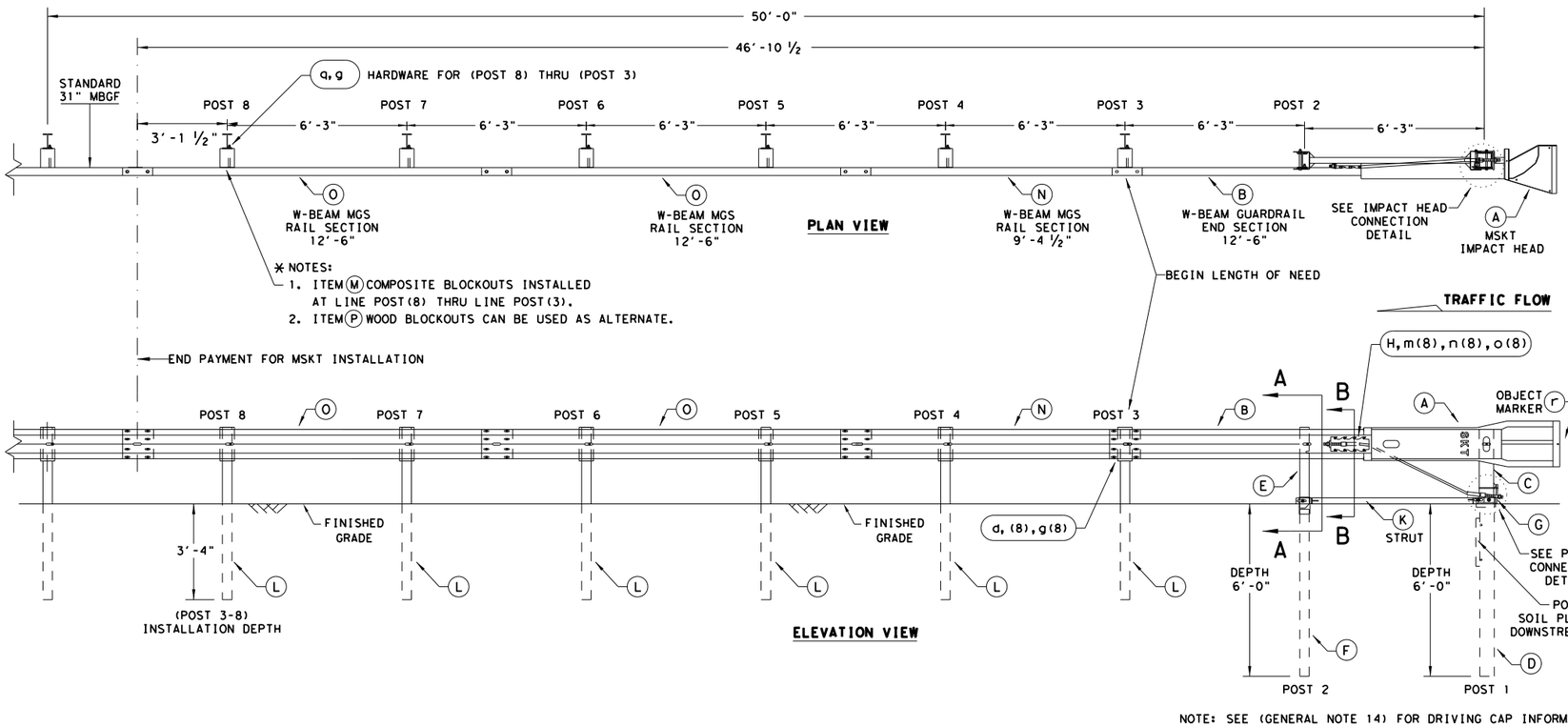


NOTE: SEE (GENERAL NOTE 14) FOR DRIVING CAP INFORMATION.

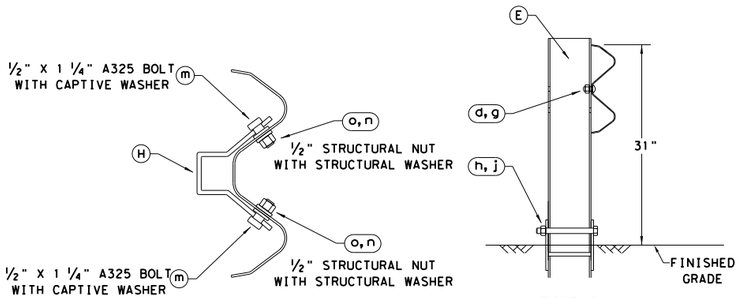
GENERAL NOTES

1. FOR SPECIFIC INFORMATION REGARDING INSTALLATION AND TECHNICAL GUIDANCE OF THE SYSTEM, CONTACT: ROAD SYSTEMS, INC. (432)263-2435. 3616 OLD HOWARD COUNTY AIRPORT, BIG SPRING, TX 79720
2. FOR INSTALLATION, REPAIR AND MAINTENANCE REFER TO THE; MSKT END TERMINAL, PRODUCT DESCRIPTION ASSEMBLY MANUAL (PUBLICATION~062717).
3. APPLY HIGH INTENSITY REFLECTIVE SHEETING, "OBJECT MARKER" ON THE FRONT FACE OF THE DEVICE PER MANUFACTURER'S RECOMMENDATIONS. OBJECT MARKER SHALL CONFORM TO THE STANDARDS REQUIRED IN TEXAS MUTCD.
4. FOR POST (LEAVE-OUT) INSTALLATION AND GUIDANCE SEE TXDOT'S LATEST ROADWAY MOW STRIP STANDARD.
5. HARDWARE (BOLTS, NUTS, & WASHERS) SHALL BE GALVANIZED IN ACCORDANCE WITH ITEM 445, "GALVANIZING". FITTINGS SHALL BE SUBSIDIARY TO THE BID ITEM.
6. SYSTEM SHOWN USING STEEL WIDE FLANGE POSTS WITH COMPOSITE BLOCKOUTS.
7. A COMPOSITE MATERIAL BLOCKOUTS THAT MEETS THE REQUIREMENTS OF DMS-7210, MAY BE SUBSTITUTED FOR BLOCKOUTS OF SIMILAR DIMENSIONS. SEE CONSTRUCTION DIVISION MATERIAL PRODUCER LIST (MPL) FOR CERTIFIED PRODUCERS.
8. IF SOLID ROCK IS ENCOUNTERED IN THE AREA OF (POST 1) AND / OR (POST 2) CONTACT THE MANUFACTURER, & REFER TO THE LATEST ROADWAY MBGF STANDARD FOR INSTALLATION GUIDANCE.
9. POSTS SHALL NOT BE SET IN CONCRETE.
10. SYSTEM MUST BE ATTACHED TO STANDARD 31" MBGF.
11. UNDER NO CIRCUMSTANCES SHALL THE GUARDRAIL WITHIN THE MSKT SYSTEM BE CURVED.
12. A FLARE RATE OF UP TO 25:1 MAY BE USED TO PREVENT THE TERMINAL HEAD FROM ENCROACHING ON THE SHOULDER. THE FLARE MAY BE DECREASED OR ELIMINATED FOR SPECIFIC INSTALLATIONS, IF DIRECTED BY THE ENGINEER.
13. THE SYSTEM IS SHOWN WITH TWO 12'-6" MBGF PANELS, ONE 25'-0" MBGF PANEL IS ALSO ALLOWED IN THEIR PLACE.
14. A DRIVING CAP WITH A TIMBER OR PLASTIC INSERT SHALL BE USED WHEN DRIVING POSTS 3-8 TO PREVENT DAMAGE TO THE GALVANIZING ON TOP OF THE POST. SPECIAL DRIVING CAP TO BE USED ON LOWER POSTS 1 & 2 TO PREVENT DAMAGE TO THE WELDED PLATES.

ITEM	QTY	MAIN SYSTEM COMPONENTS	ITEM NUMBERS
A	1	MSKT IMPACT HEAD	MS3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	SF1303
C	1	POST 1 - TOP (6" X 6" X ⅛" TUBE)	MTPHP1A
D	1	POST 1 - BOTTOM (6' W6X15)	MTPHP1B
E	1	POST 2 - ASSEMBLY TOP	UHP2A
F	1	POST 2 - ASSEMBLY BOTTOM (6' W6X9)	HP2B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770
K	1	GROUND STRUT	MS785
L	6	W6x9 OR W6x8.5 STEEL POST	P621
M	6	COMPOSITE BLOCKOUTS	CBSP-14
N	1	W-BEAM MGS RAIL SECTION (9'-4 ½")	G12025
O	2	W-BEAM MGS RAIL SECTION (12'-6")	G1203A
P	6	WOOD BLOCKOUT 6" X 8" X 14"	P675
Q	1	W-BEAM MGS RAIL SECTION (25'-0")	G1209
		SMALL HARDWARE	
a	2	⅝" x 1" HEX BOLT (GRD 5)	B5160104A
b	4	⅝" WASHER	W0516
c	2	⅝" HEX NUT	N0516
d	25	⅝" Dia. x 1 ¼" SPLICE BOLT (POST 2)	B580122
e	2	⅝" Dia. x 9" HEX BOLT (GRD A449)	B580904A
f	3	⅝" WASHER	W050
g	33	⅝" Dia. H.G.R NUT	N050
h	1	¾" Dia. x 8 ½" HEX BOLT (GRD A449)	B340854A
j	1	¾" Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	½" x 1 ¼" A325 BOLT WITH CAPTIVE WASHER	SB12A
n	8	½" STRUCTURAL NUTS	N012A
o	8	1 1/16" O.D. x 9/16" I.D. STRUCTURAL WASHERS	W012A
p	1	BEARING PLATE RETAINER TIE	CT-100ST
q	6	⅝" x 10" H.G.R. BOLT	B581002
r	1	OBJECT MARKER 18" X 18"	E3151

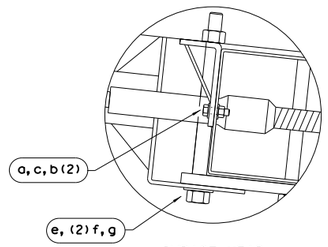
SEE NOTES: *

ALTERNATIVE ITEMS NOT SHOWN. **
* ITEM(P) 8" WOOD-BLOCKOUT
** ITEM(Q) 25'GUARD FENCE PANEL

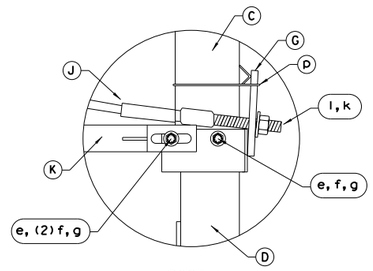


SECTION B-B
ANCHOR BRACKET

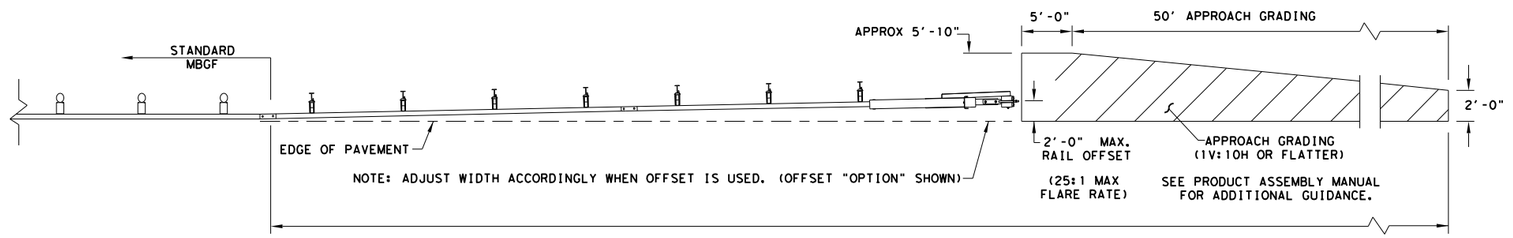
POST 2
SECTION A-A



IMPACT HEAD
CONNECTION DETAIL



POST 1
CONNECTION DETAIL



NOTE: ADJUST WIDTH ACCORDINGLY WHEN OFFSET IS USED. (OFFSET "OPTION" SHOWN)

TRAFFIC FLOW

APPROACH GRADING AT GUARDRAIL END TREATMENTS

NOTE: TXDOT GENERIC APPROACH GRADING LAYOUT USED FOR ALL TANGENT TYPE END TREATMENTS.

NOTE: THIS STANDARD IS A BASIC REPRESENTATION OF THE MSKT END TERMINAL, IT IS NOT INTENDED TO REPLACE THE PRODUCT DESCRIPTION ASSEMBLY MANUAL.

Texas Department of Transportation

Design Division Standard

SINGLE GUARDRAIL TERMINAL
MSKT-MASH-TL-3
SGT(12S)31-18

FILE: sgt12s3118.dgn	DN: TxDOT	CK: KM	DW: VP	CK: CL
© TxDOT: APRIL 2018	CONT	SECT	JOB	HIGHWAY
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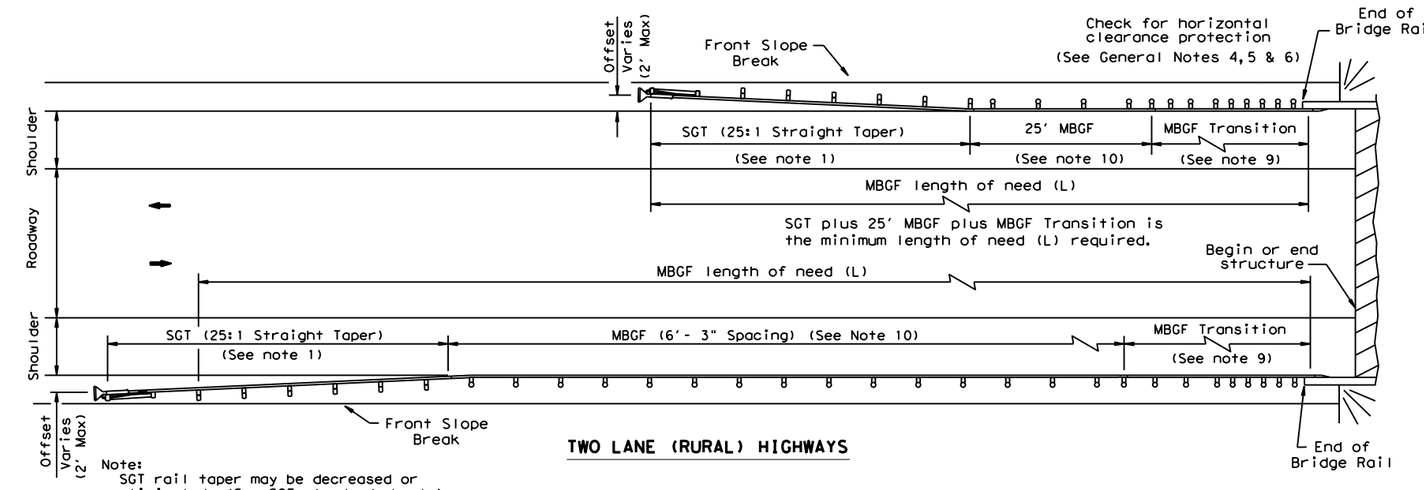
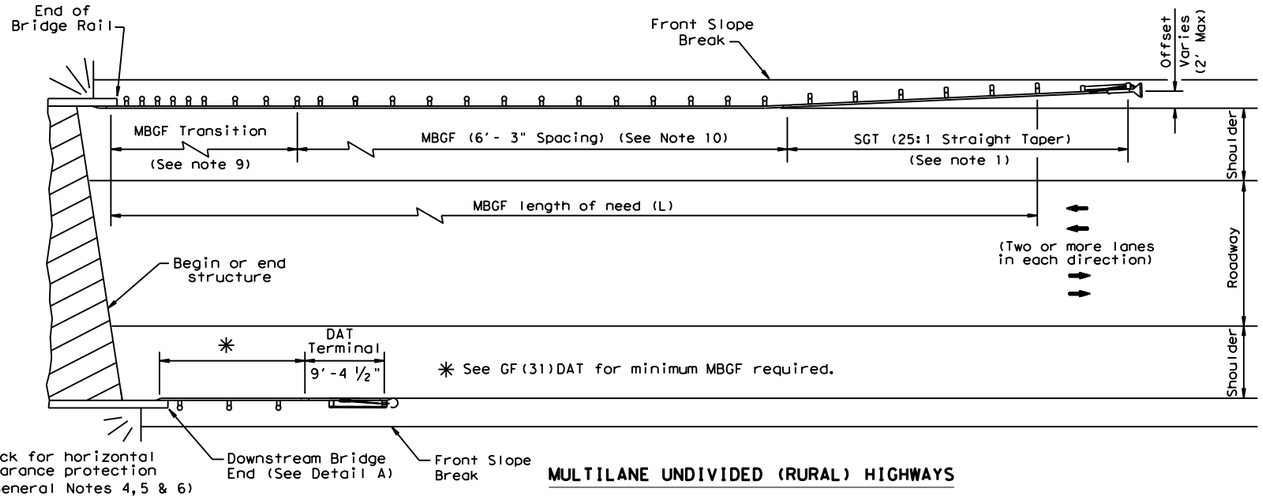
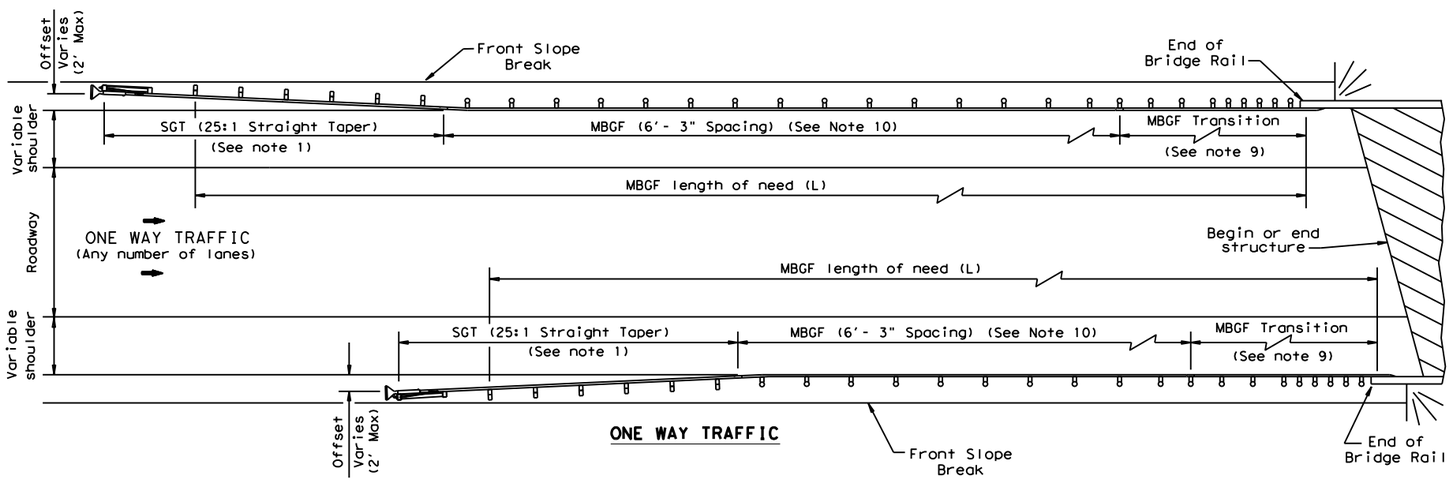


Note:
SGT rail taper may be decreased or eliminated. (See SGT standard sheets)

TWO LANE (RURAL) HIGHWAYS



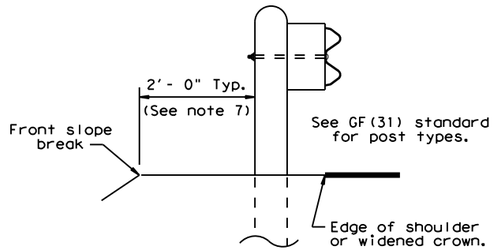
MULTILANE UNDIVIDED (RURAL) HIGHWAYS



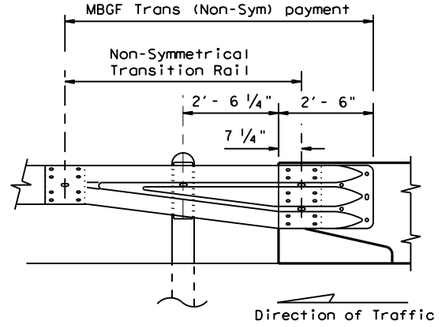
ONE WAY TRAFFIC

GENERAL NOTES

1. For more detail: See GF(31), SGT( )31, GF(31)TR, and GF(31)TL2 standard sheets.
2. Quantities of metal beam guard fence (MBGF) at individual bridge ends are as shown in the plans.
3. Use average daily traffic (ADT) for the current year to determine MBGF length of need in accordance with the Roadway Design Manual unless otherwise specified. Where significant traffic volume growth is anticipated on low volume (0-750 ADT) highways, use length determinations for the higher volume category.
4. MBGF may not be required to shield departure end of bridge unless other obstacles within the horizontal clearance limits or opposing traffic indicate a MBGF consideration.
5. Downstream anchor terminals (DAT) are only for downstream end anchorage use, outside the horizontal clearance area of opposing traffic.
6. Direct connection of MBGF to concrete rails are only for downstream rail connections outside the horizontal clearance area of opposing traffic. (This requires a minimum of three standard line posts plus the DAT terminal, See Detail A)
7. The crown shall be widened to accommodate MBGF. Typically the "front slope" break should be 2'- 0" from the back of the MBGF post. This applies to new construction on new alignment or where existing roadway cross section is to be widened to increase roadway width. This does not apply to rehabilitation work where existing roadway crown width is to be retained (See Typical Cross Section at MBGF).
8. For restrictive bridge widths: The MBGF should be properly transitioned from the existing bridge rail to the adjoining MBGF (See MBGF Transition Standards). Metal beam guard fence at these bridge location(s) shall be flared at the rate of 25:1 or flatter, and be of the length necessary to locate the terminal end at the 2 ft. "maximum" offset from the shoulder edge in the approach direction.
9. Transition length and post spacing will vary depending on the transition type. Transition type will be shown elsewhere in the plans.
10. A minimum 25' length of MBGF will be required.



TYPICAL CROSS SECTION AT MBGF



Note:
All rail elements shall be lapped in the direction of adjacent traffic.

DETAIL A

Showing Downstream Rail Attachment

Texas Department of Transportation — Design Division Standard

BRIDGE END DETAILS

(METAL BEAM GUARD FENCE APPLICATIONS TO RIGID RAILS)

BED-14

FILE: bed14.dgn	DN: TxDOT	CK: AM	DW: BD/VP	CK: CGL
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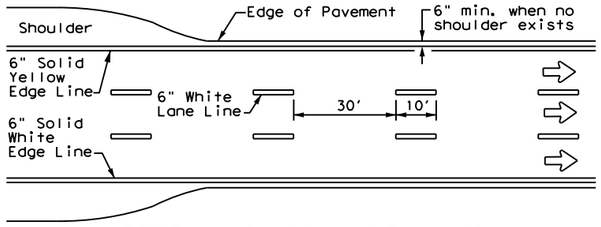
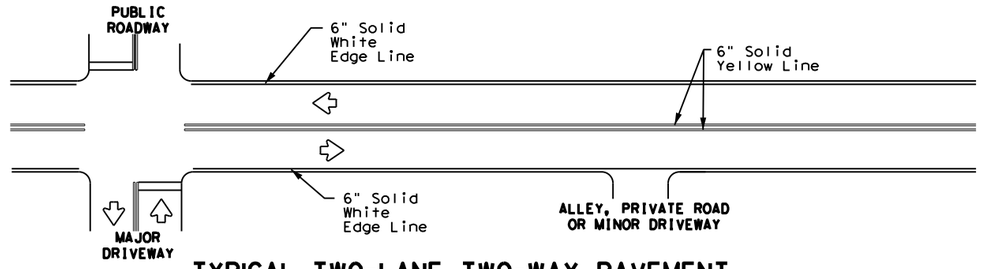
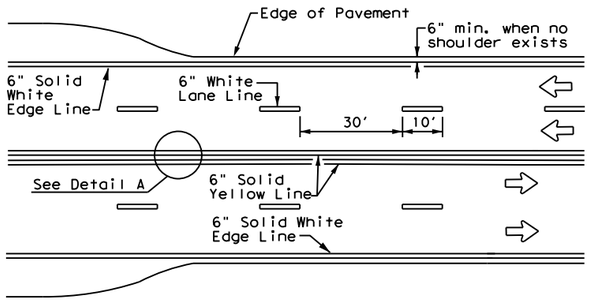
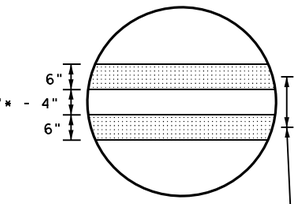


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS





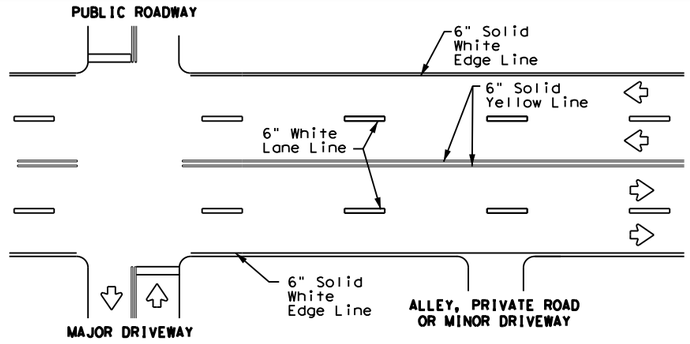
DETAIL "A"

9"** min. - 10" typ.
(18" max. for traveled way greater than 48' only)

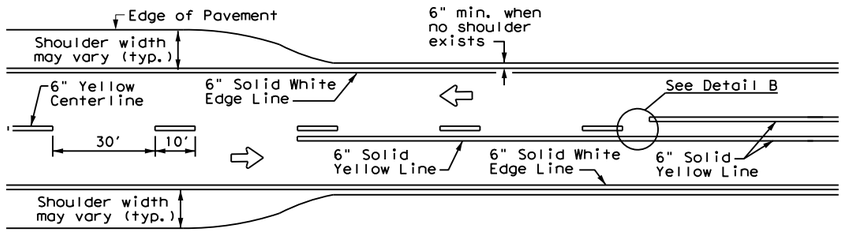
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

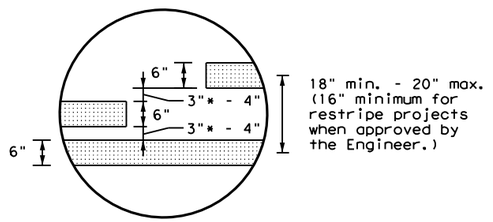
** 8" minimum for restripe projects when approved by the Engineer.



TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

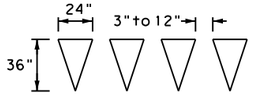


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



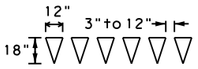
DETAIL "B"

* 2" minimum for restripe projects when approved by the Engineer.

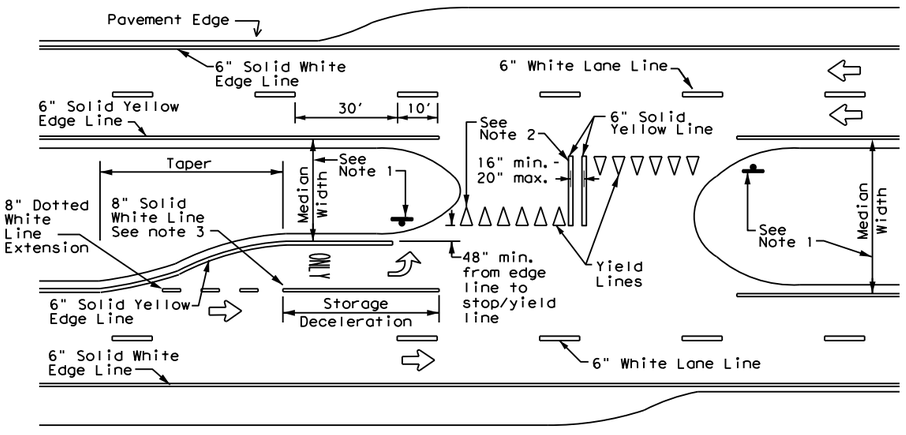


For posted speed on road being marked equal to or greater than 45 MPH.

YIELD LINES



For posted speed on road being marked equal to or less than 40 MPH.



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

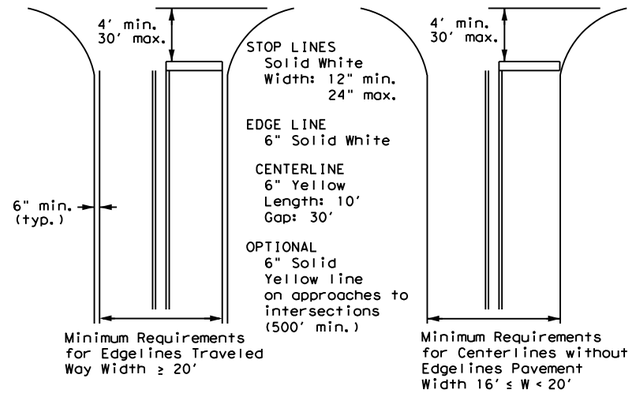
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections.
   Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

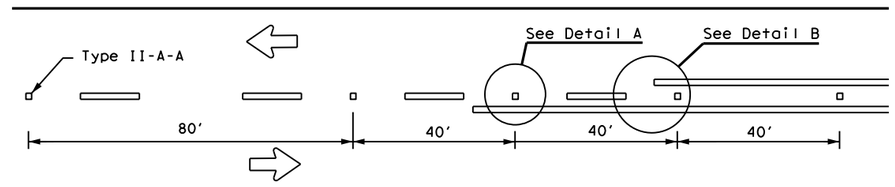
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-22

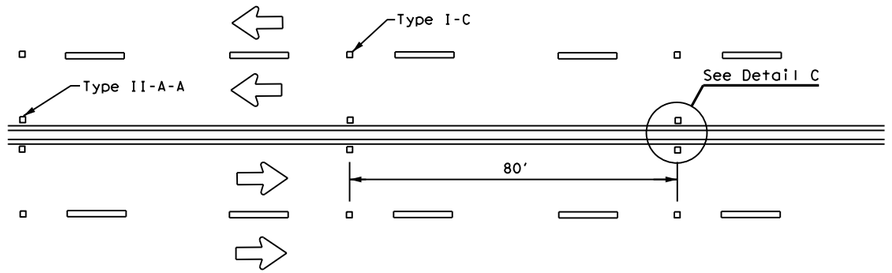
FILE: pm1-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 11-78 8-00 6-20	2094	01	071	FM 2220
8-95 3-03 12-22	DIST	COUNTY		SHEET NO.
5-00 2-12	PHR	HIDALGO		71

22A

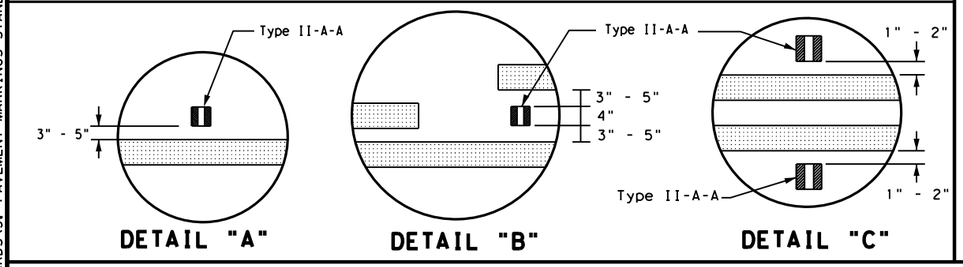
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

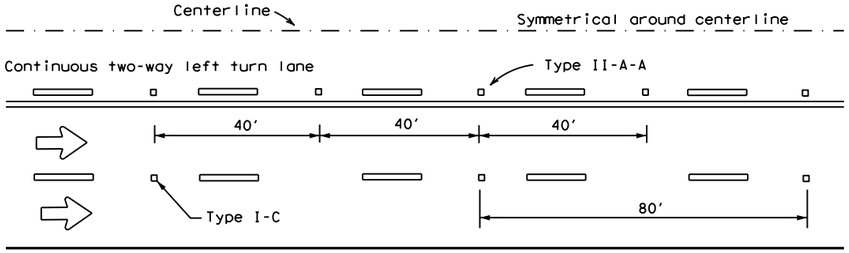


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

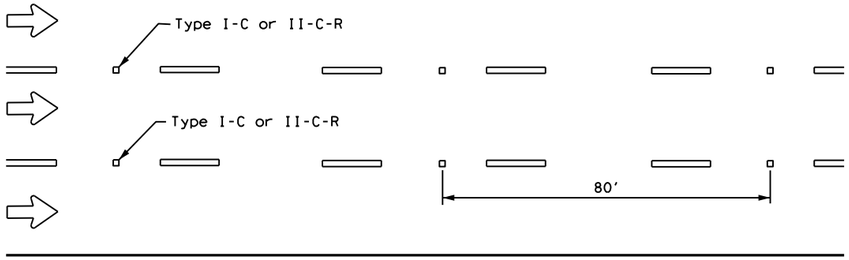


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



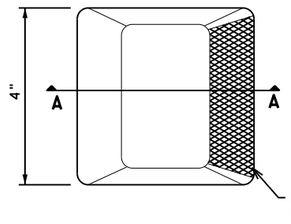
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

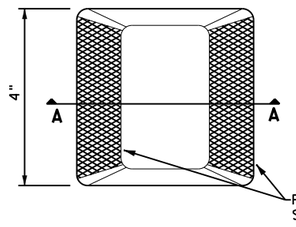
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

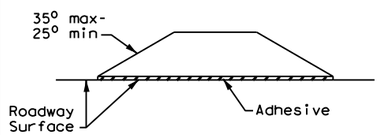
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

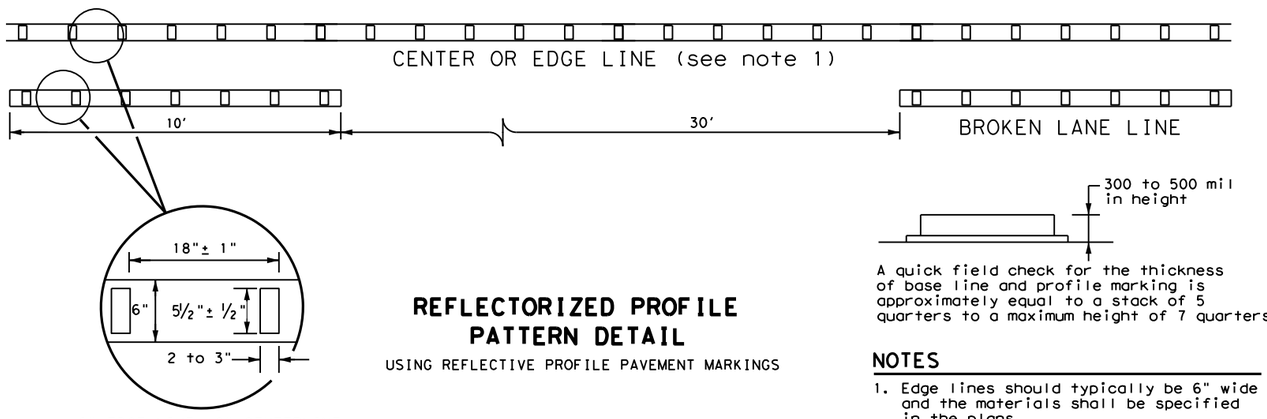


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		72

22B

DATE: 2/27/2023 5:44:51 PM
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DATE: 2/27/2023 5:44:53 PM
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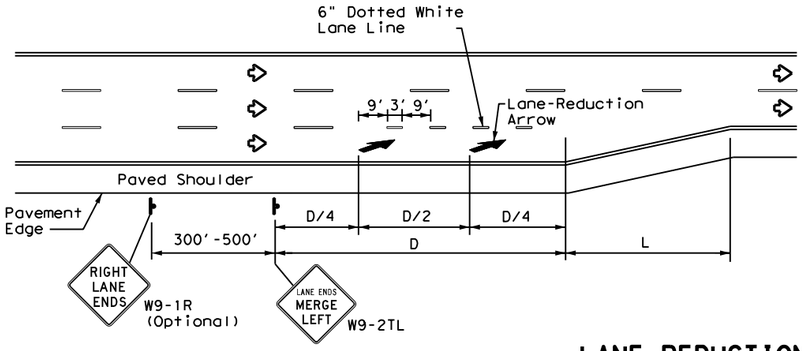


LANE REDUCTION

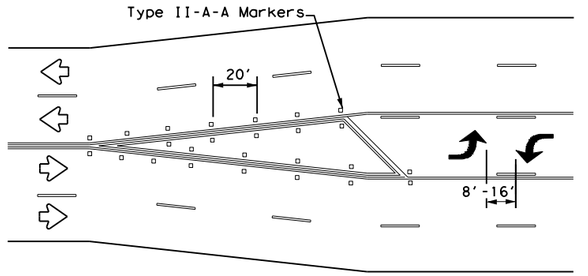
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

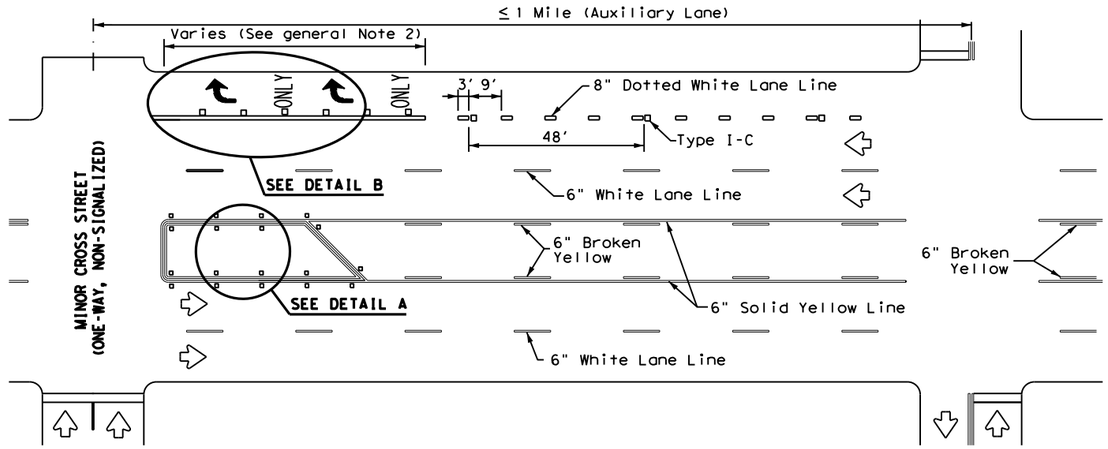


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

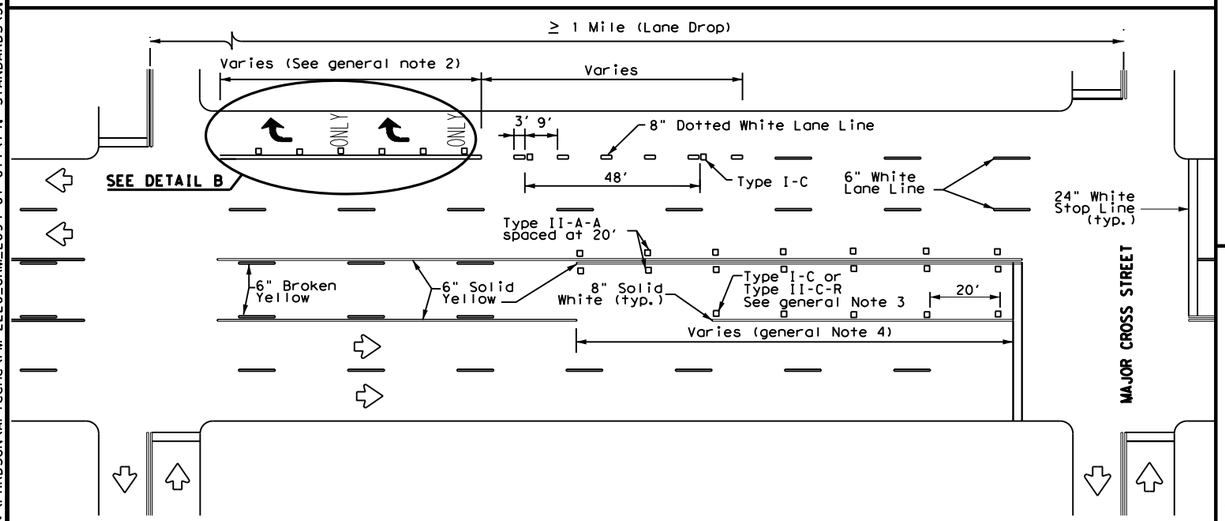
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

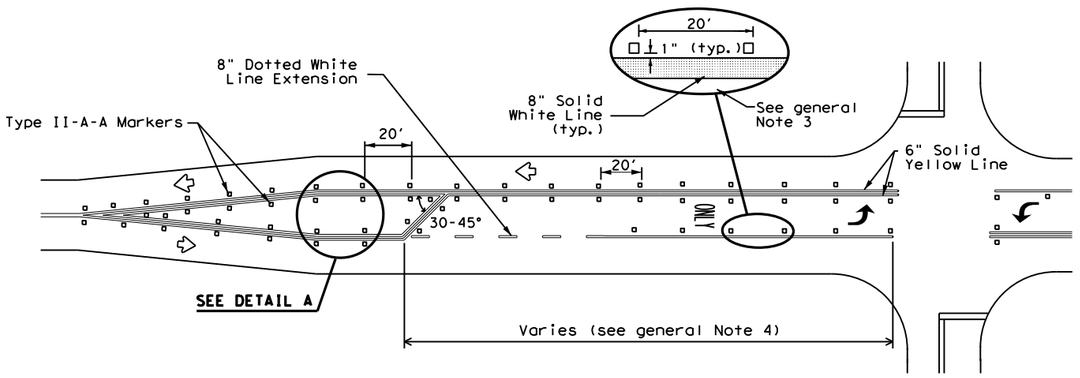
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



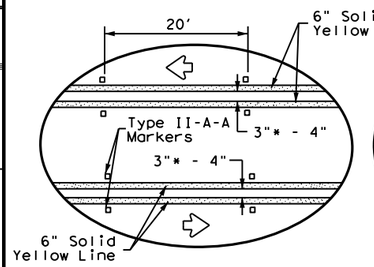
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



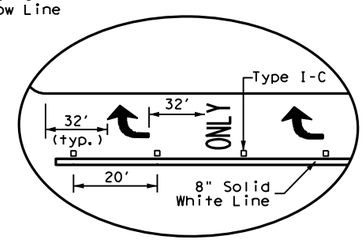
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



DETAIL A



DETAIL B

* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		73

22C

ENVIRONMENTAL COVER SHEET

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Pharr District Central Design

Texas Department of Transportation

FM 2220

ENVIRONMENTAL COVER SHEET

CONT	SECT	JOB	HIGHWAY
2094	01	071	FM 2220
DIST	COUNTY		SHEET NO.
PHR	HIDALGO		74

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

This SWP3 has been developed in accordance with TxDOT policy for projects disturbing less than 1 acre of soil, and not part of a larger common plan of development.

For all projects with any soil disturbing activities, TxDOT will maintain a SWP3 with all pertinent records, correspondence, environmental documents, etc. at the project field office. If no field office is available, then this SWP3 shall be kept at the appropriate TxDOT Area Office.

This SWP3 is consistent with requirements specified in applicable stormwater plans, and the project's environmental permits, issues, and commitments (EPICs).

1.0 SITE/PROJECT DESCRIPTION

1.1 PROJECT CONTROL SECTION JOB (CSJ):
2094-01-071 Federal Aid Project No. STP HES()

1.2 PROJECT LIMITS:
From: Neuhaus Dr.

To: Augusta Ave.

1.3 PROJECT COORDINATES:
BEGIN: (Lat) 26.1830910 ,(Long) -98.265631

END: (Lat) 26.1736620 ,(Long) -98.2671339

1.4 TOTAL PROJECT AREA (Acres): 0.579

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.0

1.6 NATURE OF CONSTRUCTION ACTIVITY:
Installation of a raised median consisting of milling, overlay, raised median installation and pavement markings

1.7 MAJOR SOIL TYPES:

Soil Type	Description
Hidalgo sandy clay loam,	0 to 1 percent slopes
Runn silty clay	
Runn silty clay, saline	

1.8 PROJECT SPECIFIC LOCATIONS (PSLs):
PSLs must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. PSLs may be identified during preconstruction meetings or during the construction process. Please choose from the options below:

- ☐ PSLs determined during preconstruction meeting
- ☐ PSLs determined during construction
- ☐ No PSLs planned for construction

Type	Sheet #s

All off-ROW PSLs required by the Contractor are the Contractor's responsibility. The Contractor shall secure all permits required by local, state, federal laws for off-ROW PSLs. The contractor shall provide diagrams, areas of disturbance, acreage, and BMPs for all off-ROW PSLs within one mile of the project.

1.9 CONSTRUCTION ACTIVITIES:
(Use the following list as a starting point when developing the Construction Activity Schedule and Ceasing Record in Attachment 2.3.)

- X Mobilization
- ☐ Install sediment and erosion controls
- ☐ Blade existing topsoil into windrows, prep ROW, clear and grub
- X Remove existing pavement
- ☐ Grading operations, excavation, and embankment
- ☐ Excavate and prepare subgrade for proposed pavement widening
- ☐ Remove existing culverts, safety end treatments (SETs)
- X Remove existing metal beam guard fence (MBGF), bridge rail
- X Install proposed pavement per plans
- ☐ Install culverts, culvert extensions, SETs
- X Install mow strip, MBGF, bridge rail
- ☐ Place flex base
- ☐ Rework slopes, grade ditches
- ☐ Blade windrowed material back across slopes
- ☐ Revegetation of unpaved areas
- ☐ Achieve site stabilization and remove sediment and erosion control measures
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.10 POTENTIAL POLLUTANTS AND SOURCES:

- ☐ Sediment laden stormwater from stormwater conveyance over disturbed area
- ☐ Fuels, oils, and lubricants from construction vehicles, equipment, and storage
- ☐ Solvents, paints, adhesives, etc. from various construction activities
- ☐ Transported soils from offsite vehicle tracking
- ☐ Construction debris and waste from various construction activities
- ☐ Contaminated water from excavation or dewatering pump-out water
- ☐ Sanitary waste from onsite restroom facilities
- ☐ Trash from various construction activities/receptacles
- ☐ Long-term stockpiles of material and waste
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

1.11 RECEIVING WATERS:
Receiving waters must be depicted on the Environmental Layout Sheets in Attachment 1.2 of this SWP3. Include Segment # for receiving waters.

Tributaries	Classified Waterbody
Arroyo Colorado Above Tidal (2221); Impaired for bacteria;	Freshwater Stream

* Add (*) for impaired waterbodies with pollutant in ().

1.12 ROLES AND RESPONSIBILITIES: TxDOT

- X Development of plans and specifications
- X Perform SWP3 inspections
- X Maintain SWP3 records and update to reflect daily operations
- ☐ Other: _____
- ☐ Other: _____

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

- X Day To Day Operational Control
- X Maintain schedule of major construction activities
- X Install, maintain and modify BMPs
- ☐ Other: _____
- ☐ Other: _____

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER
03/01/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			75
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	HIDALGO	
CONT.	SECT.	JOB	HIGHWAY NO.
2094	01	071	FM 2220

STORMWATER POLLUTION PRVENTION PLAN (SWP3):

2.0 BEST MANAGEMENT PRACTICES (BMPs) AND CONTROLS, INSPECTION, AND MAINTENANCE

The Contractor shall be the responsible party for implementing the BMPs described herein and for complying with the SWP3 for control of erosion and sedimentation during day-to-day operations. The Contractor shall implement changes to this SWP3 approved by TxDOT within the times specified in this SWP3 or the CGP.

2.1 EROSION CONTROL AND SOIL STABILIZATION BMPs:

T / P

- ☐ ☐ Protection of Existing Vegetation
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Soil Retention Blankets
- ☐ ☐ Geotextiles
- ☐ ☐ Mulching/ Hydromulching
- ☐ ☐ Soil Surface Treatments
- ☐ ☐ Temporary Seeding
- ☐ ☐ Permanent Planting, Sodding or Seeding
- ☒ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Vertical Tracking
- ☐ ☐ Interceptor Swale
- ☐ ☐ Riprap
- ☐ ☐ Diversion Dike
- ☐ ☐ Temporary Pipe Slope Drain
- ☐ ☐ Embankment for Erosion Control
- ☐ ☐ Paved Flumes
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

2.2 SEDIMENT CONTROL BMPs:

T / P

- ☐ ☐ Biodegradable Erosion Control Logs
- ☐ ☐ Dewatering Controls
- ☐ ☐ Inlet Protection
- ☐ ☐ Rock Filter Dams/ Rock Check Dams
- ☐ ☐ Sandbag Berms
- ☐ ☐ Sediment Control Fence
- ☐ ☐ Stabilized Construction Exit
- ☐ ☐ Floating Turbidity Barrier
- ☐ ☐ Vegetated Buffer Zones
- ☐ ☐ Vegetated Filter Strips
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____
- ☐ ☐ Other: _____

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.3 PERMANENT CONTROLS:

(Coordinate post-construction BMPs with appropriate TxDOT maintenance sections.)

BMPs To Be Left In Place Post Construction:

Type	Stationing	
	From	To
N/A		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.4 OFFSITE VEHICLE TRACKING CONTROLS:

- ☐ Excess dirt/mud on road removed daily
- ☐ Haul roads dampened for dust control
- X Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.5 POLLUTION PREVENTION MEASURES:

- ☐ Chemical Management
- ☐ Concrete and Materials Waste Management
- ☐ Debris and Trash Management
- ☐ Dust Control
- ☐ Sanitary Facilities
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

2.6 VEGETATED BUFFER ZONES:

Natural vegetated buffers shall be maintained as feasible to protect adjacent surface waters. If vegetated natural buffer zones are not feasible due to site geometry, the appropriate additional sediment control measures have been incorporated into this SWP3.

Type	Stationing	
	From	To
N/A		

Refer to the Environmental Layout Sheets/ SWP3 Layout Sheets located in Attachment 1.2 of this SWP3

2.7 ALLOWABLE NON-STORMWATER DISCHARGES:

- X Fire hydrant flushings
- X Irrigation drainage
- X Pavement washwater (where spills or leaks have not occurred, and detergents are not used)
- X Potable water sources
- X Springs
- X Uncontaminated groundwater
- X Water used to wash vehicles or control dust
- X Other allowable non-stormwater discharges as allowed by TPDES GP TXR150000.

2.8 INSPECTIONS:

All disturbed areas and erosion and sediment control devices shall be inspected at least once every seven (7) days. Inspections shall be performed by TxDOT as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3 .

2.9 MAINTENANCE:

Control measures shall be properly installed according to specifications. If it is determined that a BMP or control measure is not operating effectively, maintenance must be accomplished as soon as possible and before the next anticipated rain event, but in no case later than 7 calendar days after being able to access the site. Maintenance shall be performed by the Contractor as indicated on the Field Inspection and Maintenance Report Form 2118 and retained in Attachment 2.3 of this SWP3.

STATE OF TEXAS
JOEL GARCIA
106398
LICENSED
PROFESSIONAL ENGINEER

03/01/2023

STORMWATER POLLUTION PREVENTION PLAN (SWP3) (Less Than 1 Acre)

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
			76
STATE	STATE DIST.	COUNTY	
TEXAS	PHR	HIDALGO	
CONT.	SECT.	JOB	HIGHWAY NO.
2094	01	071	FM 2220

During the planning phase of project development, the following Environmental Permits, Issues and Commitments have been developed during coordination with resource agencies, local governmental entities and the general public. Any change orders and/or deviations from the final design must be reported to the Engineer prior to the commencement of construction activities as additional environmental clearances may be required.

I. Clean Water Act, Section 402; Stormwater Pollution Prevention

Action Items Required : ☐ No Action Required

1. ☒ The contractor must implement the SW3P by installing Best Management Practices (BMPs) as indicated in the construction plans and maintained appropriately throughout construction. BMPs must be in place prior to the start of construction. The SW3P may need to be revised as necessary as construction progresses.

2. ☒ For all construction PSL's off the ROW, the contractor must certify compliance with all applicable laws, rules and regulations pertaining to the preservation of cultural resources, natural resources and the environment.

3. ☒ Based on the acreage of impact, select the appropriate box below:

   ☒ This project will disturb less than 1 acre of soil and is not part of a larger common plan of development; therefore, a NOI and TPDES Site Notice are not required for this project.

   or

   ☐ This project will disturb equal to or more than 1 acre of soil but less than 5 acres; therefore a NOI is not required but a TPDES Site Notice is required. The Construction Site Notice (CSN) is required to be posted at the construction site in a publicly accessible location for review by the public, TCEQ, EPA and other Inspectors.

   or

   ☒ This project will disturb equal to or more than 5 acres of soil and will require a NOI and TPDES Site Notice. The NOI and Site Notice are required to be posted at the construction site in a publicly accessible location.

4. ☒ Need to address MS4 requirements (Cameron & Hidalgo Counties only) ☐ MS4 requirements not needed

II. Clean Water Act, Sections 401 and 404 Compliance

Action Items Rquired : ☐ No Action Required

1. ☒ Filling, dredging or excavating in any water bodies, rivers, creeks, streams, wetlands or wet areas is prohibited unless specified in the USACE permit and approved by the Engineer. The contractor shall adhere to all agreements, mitigation plans, and BMPs required by the NWP as regulated by the USACE.

   The Contractor must adhere to all of the terms and conditions associated with the following permit(s):

   ☒ No Permit Required

   ☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)

   ☐ Nationwide Permit 14 - PCN Required (1/10th to <1/2 acre, 1/3 in tidal waters)

   ☐ Individual 404 Permit Required

   ☐ Other Nationwide Permit Required: NWP#_____

2. ☒ The contractor is responsible for obtaining new or revised Section 404 permit(s) for Contractor initiated changes in construction methods that change Impacts To Waters Of The U.S., including wetlands. The Contractor will ensure that the water quality of the State will be maintained and not degraded.

3. ☒ Best Management Practices for applicable Section 401 General Conditions:

General Condition 12 - Categories I and II BMPs required

Category I (Erosion Control)

☐ Temporary Vegetation	☐ Interceptor Swale	☐ Mulch Filter Berms and/or Socks
☐ Blankets, Matting	☐ Diversion Dike	☐ Compost Filter Berms and/or Socks
☐ Mulch	☐ Erosion Control Compost	☐ Compost Blankets
☐ Sodding		

Category II (Sedimentation Control)

☐ Silt Fence	☐ Hay (Straw) Bale Dike	☒ Mulch Filter Berms and/or Socks
☐ Rock Berm	☐ Brush Berms	☐ Compost Filter Berms and/or Socks
☐ Triangular Filter Dike	☐ Sediment Basins	☐ Stone Outlet Sediment Traps
☐ Sand Bag Berm	☐ Erosion Control Compost	

General Condition 21 - Category III BMPs required

Category III (Post-Construction TSS Control)

☐ Vegetative Filter Strips	☐ Wet Basins	☒ Mulch Filter Berms and/or Socks
☐ Retention/Irrigation	☐ Grassy Swales	☐ Compost Filter Berms and/or Socks
☐ Extended Detention Basin	☐ Vegetation-Lined Ditches	☐ Sand Filter Systems
☐ Constructed Wetlands	☐ Erosion Control Compost	☐ Sedimentation Chambers

II. Clean Water Act, Sections 401 and 404 Compliance - Continued:

4. ☒ The Contractor's designated and qualified Contractor Responsible Person Environmental (CRPe) will monitor the project site daily to ensue compliance with SW3P and TPDES General Permit TXR 150000. Daily Monitoring Reports shall be provided to TxDOT within 48 hours, in accordance with Item 506.3.1.

5. ☒ Other Project Specific Actions:

   1. Contractor must sweep roadway & remove aggregate upon completed daily operations.

   2. Contractor shall not place removed aggregate along with adjacent grass areas.

III. Cultural Resources

Action Items Required : ☐ No Action Required

1. ☒ Refer to the 2014 TxDOT Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges, Item 7.7.1., in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

2. ☐ Other Project Specific Actions:

IV. Vegetation Resources

Action Items Required : ☐ No Action Required

1. ☒ In accordance with the 2014 TxDOT Standard Specifications; Item 164 - Seeding For Erosion Control; provide and install temporary or permanent seeding for erosion control as shown on the plans or as directed by the Engineer for all seeding and replanting of right of way where possible. (Required for Urban Settings)

2. ☒ In accordance with Executive Order 13112 on invasive species and the Executive Memorandum on Beneficial Landscaping, native species of plants shall be used for all seeding and replanting of right of way where possible for rural roadways. (Required for Rural Settings)

3. ☒ Preserve vegetation where possible throughout the project and minimize clearing, grubbing and excavation within stream banks, bed and approach sections.

4. ☒ Other Project Specific Actions:

   1. Vegetation clearing activities would be avoided during the general bird nesting season, Feb, 1 to Oct. 1, to minimize adverse impacts to birds.

   2. Colonization by invasive plants would be actively prevented. Vegetation management would include the removal of invasive specias as soon as practicable while allowing the existing native plants to revegetate disturbed areas.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

List of Abbreviations

BMP: Best Management Practice	NWP: Nationwide Permit
CGP: Construction General Permit	PCN: Pre-Construction Notification
CRPe: Contractor Responsible Person Environmental	PSL: Project Specific Location
DSHS: Texas Department of State Health Services	SPCC: Spill Prevention Control and Countermeasure
FEMA: Federal Emergency Management Agency	SW3P: Storm Water Pollution Prevention Plan
FHWA: Federal Highway Administration	TCEQ: Texas Commission on Environmental Quality
MOA: Memorandum of Agreement	THC: Texas Historical Commission
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MS4: Municipal Separate Stormwater Sewer System	TPWD: Texas Parks and Wildlife Department
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MBTA: Migratory Bird Treaty Act	T&E: Threatened and Endangered Species
NOI: Notice of Intent	USACE: U.S. Army Corp of Engineers
NOT: Notice of Termination	USFWS: U.S. Fish and Wildlife Service

Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 1 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			FM 2220
STATE	DISTRICT	COUNTY	
TEXAS	PHR	HIDALGO	
CONTROL	SECTION	JOB	SHEET NO.
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Date Printed: X-X-XX

V. Federal Listed, and Proposed Threatened and Endangered Species, Critical Habitat, State Listed Species, Candidate Species and Migratory Birds

Action Items Required : ☐ No Action Required

1. ☒ Under the Migratory Bird Treaty Act (MBTA) of 1918, codified at 16 U.S.C. § 703-712 and as enforced by the USFWS, the proposed construction work will not remove active nests from bridges, trees, ground and other structures during migratory bird nesting season, (February 1st. through October 1st.). If the Contractor needs to perform work within the right of way during nesting season, a qualified Biologist shall conduct a survey to determine if active nests are present. If present, the Contractor shall maintain a buffer zone around the nest(s) as directed by the Biologist. The buffer zone will be protected from clearing and disturbance until such time as the Biologist has determined that the nest(s) is no longer active. Prior to the nesting season, existing bridges and culverts should be treated against migratory bird nesting by utilizing Bird Exclusion Methods. Bird Exclusion Methods should be monitored and maintained throughout the nesting season. Refer to Standard Bird Exclusion Details.

2. ☒ There is the potential for the presence of state-listed species & species of concern in the project area and state law prohibits the taking (incidental or otherwise) of state-listed species. Taking is defined as the collection, hooking, hunting, netting, shooting, or share by any means or devices. If any listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately.

3. ☒ Other Project Specific Actions:

   1. The removal of unoccupied, inactive nests would be avoided, where practicable.
   2. The establishment of active nest during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair would be prevented.
   3. The collection, capture, relocation, or transportation of birds, eggs, young, or active nests without a permit would be prohibited.
   4. Due to increased activity (mating) of reptiles during the spring, construction activities such as clearing and grading, where practicable, would be scheduled outside of the spring (April-May) season.
   5. Ground-disturbing activities, where practicable, would be scheduled before October when reptiles become less active and may be using burrows within the protected area.

VI. Hazardous Materials on Contamination Issues

Action Items Required : ☐ No Action Required

General (applies to all projects):

Comply with the Hazard Communication Act (HCA) for personnel who will be working with hazardous materials by conducting safety meetings prior to beginning construction and making workers aware of potential hazards in the workplace. Ensure that all workers are provided with personal protective equipment appropriate for any hazardous materials used.

Obtain and keep on-site Material Safety Data Sheets (MSDS) for all hazardous products used on the project, which may include but are not limited to the following categories: Paints, acids, solvents, asphalt products, chemical additives, fuels and concrete curing compounds or additives. Provide protected storage, off bare ground and covered, for products which may be hazardous. Maintain product labelling as required by the HCA.

Maintain an adequate supply of on-site spill response materials as indicated in the MSDS. In the event of a spill, take immediate action to mitigate the spill as indicated in the MSDS and in accordance with safe work practices. Contact the TxDOT Pharr District Spill Coordinator immediately. The Contractor shall be responsible for the proper containment and cleanup of all product spills.

Contact the Engineer if any of the following are detected:

- Dead or distressed vegetation (identified as not normal)
- Trash piles, drums, canisters, barrels, etc.
- Undesirable smells or odors
- Evidence of leaching or seepage of contaminant substances

Any other evidence indicating possible hazardous materials or contamination discovered on site.

1. ☒ If potentially hazardous material and/or contaminated media (i.e.: soil, groundwater, surface water, sediment, building materials) are unexpectedly encountered during construction, assure that such materials and contamination are handled according to applicable federal and state regulations, cease work in the immediate area and contact the Engineer immediately.

VI. Hazardous Materials on Contamination Issues - Continued:

2. Does the project involve any bridge class structure rehabilitation or replacements (bridge class structures not including box culverts)?

   ☐ Yes ☒ No

   If "No", then no further action required.
   If "Yes", then TxDOT is responsible for completing an asbestos assessment/inspection.

3. Are the results of the asbestos inspection positive (is asbestos present)?

   ☐ Yes ☐ No

   If "Yes", then TxDOT must retain a Texas Department of State Health Services (DSHS) licensed asbestos consultant to assist with the notification, develop abatement/mitigation procedures, and perform management activities as necessary. The notification form to DSHS must be postmarked at least 15 working days prior to scheduled abatement activities and/or demolition.

   If "No", then TxDOT is still required to notify DSHS 15 working days prior to any scheduled demolition.

4. ☐ The Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and an Asbestos Consultant in order to minimize construction delays and subsequent claims.

VII. Other Environmental Issues

Action Items Required : ☐ No Action Required

1. ☒ Noise

   Contractor shall make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and proper maintenance of equipment mufflers.

2. ☒ Air

   Contractor shall practice common dust control techniques such as surface chemical treatment or watering of unpaved road surfaces and vehicle speed reduction shall be implemented to minimize and prevent airborne dust during construction.

   Contractor should minimize MSAT by utilizing measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increase use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

Pharr District Contact No. 956-702-6100 Revised 01/30/2017

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Texas Department of Transportation

PHARR DISTRICT

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS (EPIC)

SHEET 2 OF 2

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			FM 2220
STATE	DISTRICT	COUNTY	
TEXAS	PHR	HIDALGO	SHEET NO.
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TPWD BMPs

Under Section 12.0011 of the Texas Parks and Wildlife Code, Texas Parks and Wildlife Department (TPWD) is charged with "providing recommendations that will protect fish and wildlife resources to local, state, and federal agencies that approve, permit, license, or construct developmental projects" and "providing information on fish and wildlife resources to any local, state, and federal agencies or private organizations that make decisions affecting those resources."

The purpose of this section is to provide beneficial management practices (BMP) that should be implemented during construction, and maintenance activities statewide for transportation projects with the goal of avoidance and minimization of impacts to natural resources. Statewide Standard BMP pertain to all fish and wildlife species, including state-listed species and other Species of Greatest Conservation Need (SGCN). Implementing the recommendations as outlined below will improve conservation of species and their habitat.

☒ General Design/Construction BMPs

- ☒ Prior to start of construction, information will be provided to personnel of the potential for all state-listed threatened species or other SGCN to occur within the project area and should be advised of relevant rules and regulations to protect plants, fish, and wildlife.
- ☒ Contractor should avoid harming all wildlife species if encountered and allow them to safely leave the project site. Due diligence should be used to avoid killing or harming any wildlife species in the implementation of transportation projects.
- ☒ Contractors should install wildlife exclusion fencing and should examine the inside of the exclusion area daily to determine if any wildlife species have been trapped inside the area of impact and provide safe egress opportunities prior to initiation of construction activities.
- ☒ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas.
- ☒ Contractor should use woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☒ Project staging areas, stockpiles, temporary construction easements, and other project related sites should be situated in previously disturbed areas to avoid or minimize impacts to sensitive or unique habitats including intact native vegetation, floodplains, riparian corridors, wetlands, playa lakes, and habitat for wildlife species.
- ☒ When lighting is added, consider wildlife impacts from light pollution and incorporating dark-sky practices into design strategies. Minimize sky glow by focusing light downward, with full cutoff luminaries to avoid light emitting above the horizontal. The minimum amount of night-time lighting needed for safety and security should be used.

☒ Vegetation BMPs

- ☒ Minimize the amount of vegetation cleared. Removal of native vegetation, particularly mature native trees and shrubs should be avoided. Impacted vegetation should be replaced with in-kind on- site replacement /restoration of native vegetation.
- ☒ It is strongly recommended that trees greater than 12 inches in diameter at breast height (DBH) that are removed be replaced. TPWD 9/32 s experience indicates that for ecologically effective replacement, a ratio of three trees for every one (3:1) lost should be provided to either on-site or off-site. Trees less than 12 inches DBH should be replaced at a 1:1 ratio.
- ☒ The use of any non-native vegetation in landscaping and revegetation is discouraged. Locally adapted native species should be used.
- ☒ The use of seed mix that contains seeds from only regional ecotype native species is recommended

☐ Invasive Species BMPs

- ☐ For all work in water bodies designated as 3/32 infested 5/32 or 3/32 positive 5/32 for invasive zebra (Dreissena polymorpha) OR quagga mussels (Dreissena bugensis) as well as waters downstream of these lakes, all machinery, equipment, vessels, or vehicles coming in contact with such waters should be cleaned prior to leaving the site to remove any mud, plants, organisms, or debris, water drained (if applicable), and dried completely before use in another water body to prevent the potential spread of invasive mussels.
- ☐ Care should be taken to prevent the spread of aquatic and terrestrial invasive plants during construction activities.
- ☐ Care should be taken to avoid the spread of aquatic invasive plants such as giant Salvinia (Salvinia molesta), common salvinia (Salvinia minima), hydrilla (Hydrilla verticillata), water hyacinth (Eichhornia spp.), Eurasian watermilfoil (Myriophyllum spicatum), water lettuce (Pistia stratiotes), and alligatorweed (Alternanthera philoxeroides) from infested water bodies into areas not currently infested. All machinery, equipment, vessels, boat trailers, or vehicles coming in contact with waters containing aquatic invasive plant species should be cleaned prior to leaving the site to remove all aquatic plant material and dried completely before use on another water body to prevent the potential spread of invasive plants. Removed plants should be transported for disposal in a secure manner to prevent dispersal.
- ☐ Only native or non-invasive plants should be planted. Care should be taken to avoid mowing invasive giant reed (Arundo donax), which spreads by fragmentation, and to clean equipment if inadvertently mowed to prevent spread. If using hay bales for sediment control, use locally grown weed-free hay to prevent the spread of invasive species. Leave the hay bales in place and allow them to break down, as this acts as mulch assisting in revegetation.

☐ Stream Crossings BMPs

- ☐ Riparian buffer zones should remain undisturbed.

☐ Dewatering BMPs

- ☐ Impact avoidance measures for aquatic organisms, including all native fish and freshwater mussel species, regardless of state-listing status, should be considered during project planning and construction activities.

☐ Wildlife Crossing BMPs

- ☐ Incorporate wildlife crossings with fencing, particularly in areas that bisect wildlife travel corridors or seasonal movement routes to avoid further habitat fragmentation and minimize wildlife-vehicle interactions.

☐ Rare Plant BMPs

- ☐ Avoid impacts and minimize unavoidable impacts. Plant locations should be protected with temporary barrier fencing and contractors should be instructed to avoid protected areas. Conducting construction outside of the growing season or after a plant has produced mature fruit is the preferred way to avoid/minimize impacts to SGCN plant populations. Staging areas, stockpiles, and other project related sites on TxDOT ROW should not impact SGCN plant populations. After construction begins, minimize herbicide use near SGCN plant populations (if possible, use hand-held spot sprayers, several meters from rare plants, on still or days with little wind).

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☐ Rare Plants BMPs (Continued)

- ☐ If there are unintended impacts to SGCN populations, these impacts should be reported to TPWD Transportation Staff.
- ☐ During project period, conduct work during times of the year when plants are dormant and/or conditions minimize disturbance of the habitat.

☒ Bird BMPs

- ☒ Avoid vegetation clearing activities during the general bird nesting season, February 15th to October 1st to minimize adverse impacts to birds.
- ☒ Do not collect, capture, relocate, or transport birds, eggs, young, or active nests without a permit.
- ☒ Minimize extended human presence near nesting birds during construction and maintenance activities. Protect sensitive habitat areas with temporary barriers or fencing to limit human foot- traffic and off-road vehicle use to alert and discourage contractors from causing any unintentional impacts.
- ☒ Minimize construction noise above ambient levels during general bird nesting season to minimize adverse impacts on birds.
- ☒ Minimize construction lighting during the general bird nesting season by scheduling work activities between dawn and dusk.

☐ Rookeries BMPs

- ☐ In general, nesting dates for herons and egrets range from early February to late August in Texas, depending on the species. Great blue herons (GBHE) (Ardea herodis) are usually the first to nest. When GBHE get disrupted from the nest and abandon nesting, then the other species of herons and egrets may not attempt to nest at the colony that year.
- ☐ If rookeries are encountered, avoid and minimize disturbance during nesting to protect rookery species and their habitat.
- ☐ Vegetation clearing in a primary buffer area of 300 meters (984 feet) from a rookery or heronry periphery should be avoided. Utilizing areas that have already been cleared within this buffer area may be acceptable depending on site-specific characteristics. Additionally, human foot-traffic or machinery use should not occur within this buffer area during the nesting season.
- ☐ Clearing activities or construction using heavy machinery in a secondary buffer area of 1000 meters (3281 feet) from the heronry periphery should be avoided during the breeding season (courting and nesting).

Revised 02/24/2022

List of Abbreviations

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MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 1 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
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☐ Fish BMPs

- ☐ The following Fish BMP apply to projects for all fish species in waters of the state to minimize impacts to water quality and aquatic passage from transportation projects.
- ☐ For projects in waters of the state and work is adjacent to water: follow Water Quality and Stream Crossing BMPs.
- ☐ For projects in waters of the state and work is in the water: follow Water Quality, Stream Crossing, and Dewatering BMP.

☐ Aquatic Invertebrate BMPs

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ For spring-seep associated caddisflies (Cheumatopsyche morsei, Chimarra holzenthali, and Hydroptila ouachita): Avoid or minimize impacts to the natural riparian buffer along stream channel including native shrubs and trees.

☐ Crayfish BMP

- ☐ For projects within the range of a SGCN or state-listed species and work is adjacent to water: Water Quality and Stream Crossing BMP.
- ☐ For projects within the range of a SGCN or state-listed species and work is in the water: Water Quality, Stream Crossing, and Dewatering BMP.
- ☐ Avoid or minimize impacts to the natural riparian buffer that provides terrestrial and aquatic plant matter for the diet of most crayfish species.

☐ Freshwater Mussel BMP

- ☐ In addition to Water Quality and Stream Crossing BMP, follow the most recent, $^{7}/_{32}$ TPWD$^{9}/_{32}$ TxDOT Annual Work Plan for Pre-Construction Surveys, Aquatic Resources Relocations, and Other Best Management Practices to Avoid, Minimize, and Mitigate Impacts to Freshwater Resources.$^{9}/_{32}$
- ☐ When work is adjacent to the water: Water Quality BMP implemented as part of the Texas Commission on Environmental Quality (TCEQ) Stormwater Pollution Prevention Plan (SWPPP) for a construction general permit or any conditions of the 401 Water Quality Certification for the project will be implemented.

☐ Insect Pollinator BMP

- ☐ Deep soil disturbances, such as, tilling or deep disking in areas that host aggregations of ground- nesting bees should be avoided. Tilling and disking also may promote the invasion or germination of non-native plants. Different species of native ground-nesting bees prefer different soil conditions, although research suggests that many ground nesting bees prefer sandy, loamy sand or sandy loam soils. In areas with these soil types consider leaving open patches of soil.
- ☐ Allow dead trees to stand (so long as they do not pose a risk to property or people) and protect shrubs and herbaceous plants with pithy or hollow stems (e.g., cane fruits, sumac, elderberry), as these provide nesting habitat for tunnel-nesting native bees.
  Retain dead or dying branches whenever it is safe and practical at the edges of the ROW. Wood- boring beetle larvae often fill dead trees and branches with narrow tunnels into which tunnel- nesting bees will establish nests. Additionally, bumble bees may choose to nest in wood piles.
- ☐ Retain rotting logs at edges of the ROW where some bee species may burrow tunnels in which to nest.

☐ Insect Pollinator BMP (Continued)

- ☐ Protect sloped or well-drained ground sites where plants are sparse and direct access to soil is available. These are the areas where ground-nesting bees may dig nests. Turning the soil destroys all ground nests that are present at that depth and hinders the emergence of bees that are nesting deeper in the ground.
- ☐ Protect grassy thickets, or other areas of dense, low cover from mowing or other disturbance. These are the sites where bumble bees might find the nest cavities they need, as well as annual and perennial wildflowers that can provide important food resources.
- ☐ Where available and economical, native plants and seed should be procured from local eco-type providers. Seed mixes should be diverse and include as many ecoregion natives as possible ensuring full season floral resources. Species by Texas ecoregion can be found in the Texas Management Recommendations for Native Insect Pollinators in Texas document: https://tpwd.texas.gov/publications/pwdpubs/media/pwd*bk*w7000*1813.pdf
- ☐ Planting at least three different native flowering plants within each of three blooming periods are recommended (spring, summer, early fall) in high rainfall regions of Texas. In drier regions of the state, a target of three native flowering plants within each of two blooming periods can be used.

☐ Small Mammal BMP

For Coues' rice rat (Oryzomys couesi aquaticus):

- ☐ Minimize impacts to wetland, resaca, oxbow Conversion of property containing cave or cliff features to transportation purposes should be avoided.lake, and marsh habitats
- ☐ Water Quality BMP

☐ Fossorial Mammal BMP

- ☐ When a construction zone is adjacent to active BTPD burrows or pocket gopher mounds, erect barriers to discourage individuals moving through or into the construction area.
- ☐ When seeding or revegetation is planned in an area adjacent to BTPD burrows or pocket gopher mounds, a vegetative barrier should be considered in the planting to discourage dispersal into the ROW.

☐ Bat BMP

- ☐ For activities that have the potential to impact structures, cliffs or caves, or trees; a qualified biologist will perform a habitat assessment and occupancy survey of the feature(s) with roost potential as early in the planning process as possible or within one year before project letting.
- ☐ For roosts where occupancy is strongly suspected but unconfirmed during the initial survey, revisit feature(s) at most four weeks prior to scheduled disturbance to confirm absence of bats.
- ☐ If bats are present or recent signs of occupation (i.e., piles of guano, distinct musky odor, or staining and rub marks at potential entry points) are observed, take appropriate measures to ensure that bats are not harmed, such as implementing non-lethal exclusion activities or timing or phasing of construction.
- ☐ Exclusion devices can be installed by a qualified individual between September 1 and March 31. Exclusion devices should be used for a minimum of seven days when minimum nighttime temperatures are above 50°F AND minimum daytime temperatures are above 70°F. Prior to exclusion, ensure that alternate roosting habitat is available in the immediate area. If no suitable roosting habitat is available, installation of alternate roosts is recommended to replace the loss of an occupied roost. If alternate roost sites are not provided, bats may seek shelter in other inappropriate sites, such as buildings, in the surrounding area.

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☐ Bat BMP (Continued)

- ☐ If feature(s) used by bats are removed as a result of construction, replacement structures should incorporate bat-friendly design or artificial roosts should be constructed to replace these features.
- ☐ Avoid unnecessary removal of dead fronds on native and ornamental palm trees in south Texas (Cameron, Hidalgo, Willacy, Kenedy, Brooks, Kleberg, Nueces, and San Patricio counties) from April 1 through October 31. If removal of dead fronds is necessary at other times of the year, limit frond removal to extended warms periods (nighttime temperatures = 55°F for at least two consecutive nights), so bats can move away from the disturbance and find new roosts.
- ☐ Large hollow trees, snags (dead standing trees), and trees with shaggy bark should be surveyed for colonies and, if found, should not be disturbed until the bats are no longer occupying these features. Post-occupancy surveys should be conducted by a qualified biologist prior to tree removal from the landscape.
- ☐ Retain mature, large diameter hardwood forest species and native/ornamental palm trees.
- ☐ In all instances, avoid harm or death to bats. Bats should only be handled as a last resort and after communication with TPWD.

☒ Aquatic Amphibian and Reptile BMP

For projects within existing right-of-way (ROW) when work is in water or will permanently impact a water feature and potential habitat exists for the target species complete the following:

- ☒ Minimize impacts to wetlands, temporary and permanent open water features, including depressions, and riverine habitats.
- ☒ Maintain the existing hydrologic regime and any connections between wetlands and other aquatic features.
- ☒ Use barrier fencing to direct animal movements away from construction activities and areas of potential wildlife-vehicle collisions in construction areas directly adjacent, or that may directly impact, potential habitat for the target species.
- ☒ Apply hydromulching and/or hydroseeding in areas for soil stabilization and/or revegetation of disturbed areas around wetlands and in riparian areas. If erosion control blankets or mats will be used, the product should not contain netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.
- ☒ Project specific locations (PSLs) proposed within state-owned ROW should be located in uplands away from aquatic features.
- ☒ When work is directly adjacent to the water, minimize impacts to shoreline basking sites (e.g., downed trees, sand bars, exposed bedrock) and refugia/overwinter sites (e.g., brush and debris piles, crayfish burrows, aquatic logjams, and leaf packs).

Revised 02/24/2022

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CRPe: Contractor Responsible Person Environmental	NOI: Notice of Intent	TPDES: Texas Pollutant Discharge Elimination System
DSHS: Texas Department of State Health Services	NOT: Notice of Termination	TPWD: Texas Parks and Wildlife Department
FEMA: Federal Emergency Management Agency	NWP: Nationwide Permit	TxDOT: Texas Department of Transportation
FHWA: Federal Highway Administration	PCN: Pre-Construction Notification	T&E: Threatened and Endangered Species
MOA: Memorandum of Agreement	PSL: Project Specific Location	USACE: U.S. Army Corp of Engineers
MOU: Memorandum of Understanding	SPCC: Spill Prevention Control and Countermeasure	USFWS: U.S. Fish and Wildlife Service
MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

SHEET 2 OF 3

FED. RD. DIV. NO.	PROJECT NO.		HIGHWAY NO.
6			FM 2220
STATE	DISTRICT	COUNTY	
TEXAS	PHR	HIDALGO	SHEET NO.
CONTROL	SECTION	JOB	
2094	01	071	80

Date Printed: X-X-XX

☒ Aquatic Amphibian and Reptile BMP (Continued)

- ☒ If gutters and curbs are part of the roadway design, install gutters that do not include the side box inlet and include sloped (i.e., mountable) curbs to allow small animals to leave roadway. If this modification to the entire curb system is not possible, install sections of sloped curb on either side of the storm water drain for several feet to allow small animals to leave the roadway. Priority areas for these design recommendations are those with nearby wetlands or other aquatic features.

For projects that require acquisition of additional ROW and work within that new ROW is in water or will permanently impact a water feature, implement BMP for projects within existing ROW above plus those below:

- ☒ For sections of roadway adjacent to wetlands or other aquatic features, install wildlife barriers that prevent climbing. Barriers should terminate at culvert openings in order to funnel animals under the road. The barriers should be of the same length as the adjacent feature or 80 feet long in each direction, or whichever is the lesser of the two.
- ☒ For culvert extensions and culvert replacement/installation, incorporate measures to funnel animals toward culverts such as concrete wingwalls and barrier walls with overhangs.
- ☒ When riprap or other bank stabilization devices are necessary, their placement should not impede the movement of terrestrial or aquatic wildlife through the water feature. Biotechnical streambank stabilization methods using live native vegetation, or a combination of vegetative and structural materials should be used.

☒ Terrestrial Amphibian and Reptile BMP

- ☒ For open trenches and excavated pits, install escape ramps at an angle of less than 45 degrees (1:1) in areas left uncovered. Visually inspect excavation areas for trapped wildlife prior to backfilling
- ☒ Avoid or minimize disturbing or removing cover objects, such as downed trees, rotting stumps, brush piles, and leaf litter. If avoidance or minimization is not practicable, consider removing cover objects prior to the start of the project and replace them at project completion.
- ☒ Examine heavy equipment stored on site before use, particularly after rain events when reptile and amphibian movements occur more often, to ensure use will not harm individuals that might be seeking temporary refuge.
- ☒ Due to increased activity (mating) of reptiles and amphibian during the spring, construction activities like clearing or grading should attempt to be scheduled outside of the spring (March-May) season.
  Also, timing ground disturbing activities before October when reptiles and amphibians become less active and may be using burrows in the project area is also encouraged.
- ☒ If Texas tortoises (Gopherus berlandieri) or box turtles (Terrepene spp.) are present in a project area, they should be removed from the area and relocated between 100 and 200 meters from the project area. After removal of the individuals, the area that will be disturbed during active construction and project specific locations should be fenced off to exclude reentry by turtles, tortoises, and other reptiles. The exclusion fence should be constructed and maintained as follows:
  - The exclusion fence should be constructed with metal flashing or drift fence material.
  - Rolled erosion control mesh material should not be used.
  - The exclusion fence should be buried at least 6 inches deep and be at least 24 inches high.
  - The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and the disturbed site has been revegetated.

☒ Terrestrial Amphibian and Reptile BMP (Continued)

- ☒ After project is complete, revegetate disturbed areas with an appropriate locally sourced native seed mix. If erosion control blankets or mats will be used, the product should not contain nylon netting, but should only contain loosely woven natural fiber netting in which the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic netting should be avoided.

☒ Black-spotted newt/Mexican Burrowing toad/ Mexican treefrog/ Strecker's chorus frog/White-lipped frog/Woodhouse's toad

- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Water Quality BMP
- ☒ Vegetation BMP

☐ Sheep Frog

- ☐ Minimize disturbance to burrows or downed woody debris
- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Terrestrial Amphibian and Reptile BMP
- ☐ Water Quality BMP
- ☐ Vegetation BMP

☒ South Texas Siren (Large Form)

- ☒ Minimize impacts to warm, shallow waters with vegetative cover such as ponds and ditches
- ☒ Aquatic Amphibian and Reptile BMP
- ☒ Water Quality BMP

☐ Black-striped snake/ Eastern box turtle/Northern cat-eyed snake/Plateau spot-tailed earless lizard/ Reticulate collared lizard/ Slender glass lizard/ Speckler racer/Tamaulipan spot-tailed earless lizard/ Texas Indigo snake/ Western box turtle/Western hognose snake/Western massasauga

- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

☐ Rio Grande River Cooter

- ☐ Aquatic Amphibian and Reptile BMP
- ☐ Water Quality BMP

☒ Texas Horned Lizard

- ☒ Avoid harvester ant mounds in the selection of Project Specific Locations (PSLs).
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

☒ Texas Tortoise

- ☒ Utility trenches should be covered overnight or visually inspected before filling to avoid burial of the species
- ☒ Terrestrial Amphibian and Reptile BMP
- ☒ Vegetation BMP

Pharr District Contact No. 956-702-6100

OTHER PERTINENT INFORMATION

☐ Trifold Available

- ☐ Ocelot information
- ☐ Pelican information
- ☐ Ashy dogweed

☐ Stockcards Available

- ☐ Mitigatory Bird Treaty Act
- ☐ Texas Tortoise
- ☐ Harvester Ants and Horn Lizards

Revised 02/24/2022

List of Abbreviations

BMP: Best Management Practice	MSAT: Mobile Source Air Toxic	TCEQ: Texas Commission on Environmental Quality
CGP: Construction General Permit	MBTA: Migratory Bird Treaty Act	THC: Texas Historical Commission
CRPe: Contractor Responsible Person Environmental	NOI: Notice of Intent	TPDES: Texas Pollutant Discharge Elimination System
DSHS: Texas Department of State Health Services	NOT: Notice of Termination	TPWD: Texas Parks and Wildlife Department
FEMA: Federal Emergency Management Agency	NWP: Nationwide Permit	TxDOT: Texas Department of Transportation
FHWA: Federal Highway Administration	PCN: Pre-Construction Notification	T&E: Threatened and Endangered Species
MOA: Memorandum of Agreement	PSL: Project Specific Location	USACE: U.S. Army Corp of Engineers
MOU: Memorandum of Understanding	SPCC: Spill Prevention Control and Countermeasure	USFWS: U.S. Fish and Wildlife Service
MS4: Municipal Separate Stormwater Sewer System	SW3P: Storm Water Pollution Prevention Plan	

Texas Department of Transportation

PHARR DISTRICT

EPIC SHEET SUPPLEMENTALS

TPWD BMPs

FED.RD. DIV.NO.	PROJECT NO.		HIGHWAY NO.
6			FM 2220
STATE	DISTRICT	COUNTY	
TEXAS	PHR	HIDALGO	SHEET NO.
CONTROL	SECTION	JOB	
2094	01	071	81

Date Printed: X-X-XX

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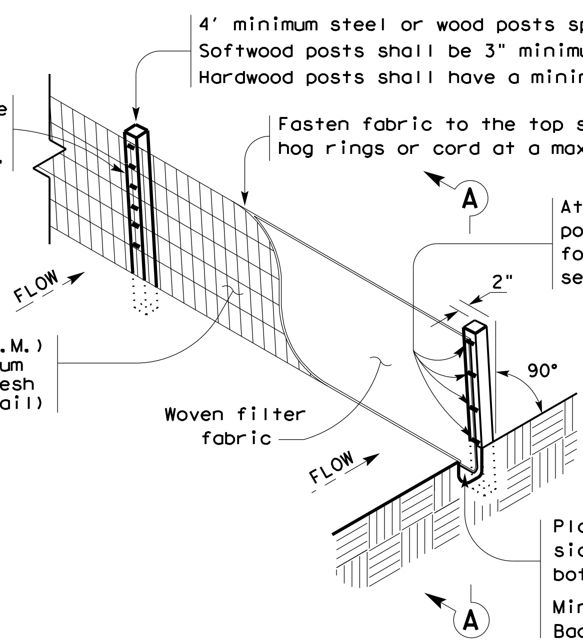
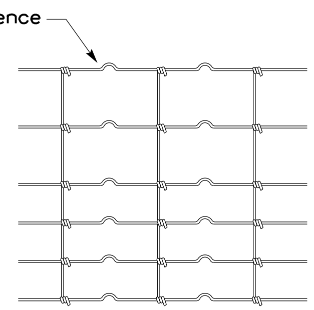
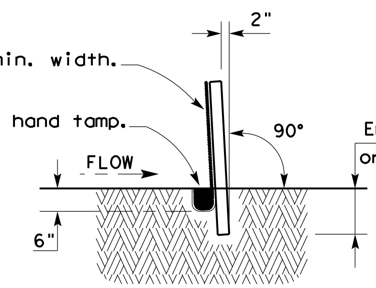


TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

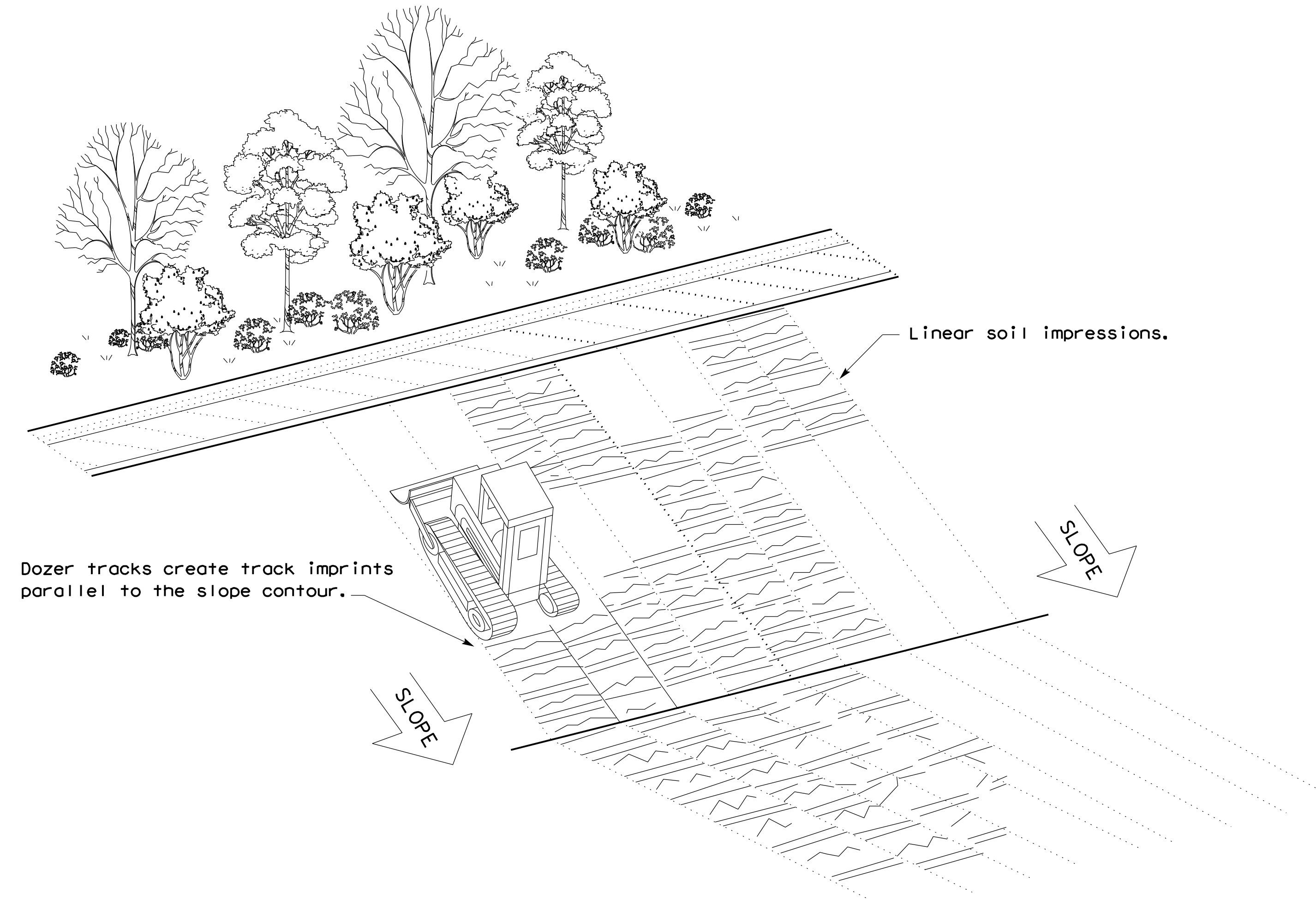
LEGEND

Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

EC(1)-16

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	PHR		HIDALGO	82

2/8/2023

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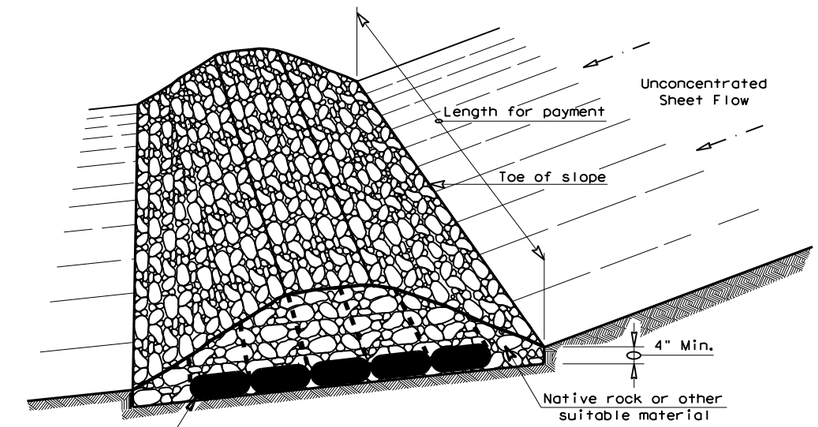
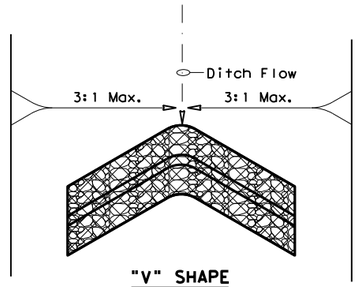
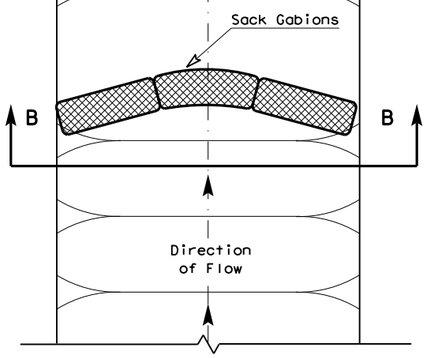


FILTER DAM AT TOE OF SLOPE

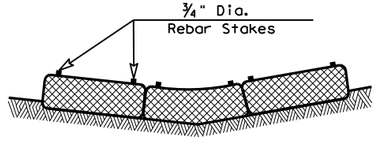
RFD1



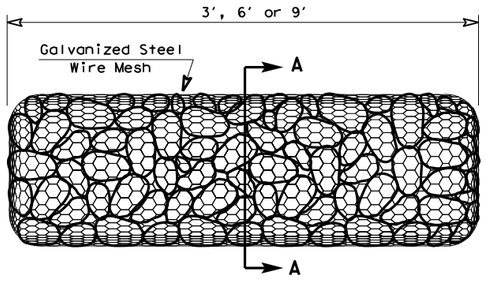
"V" SHAPE PLAN VIEW



PLAN VIEW

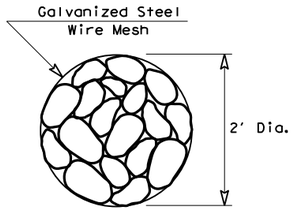


SECTION B-B

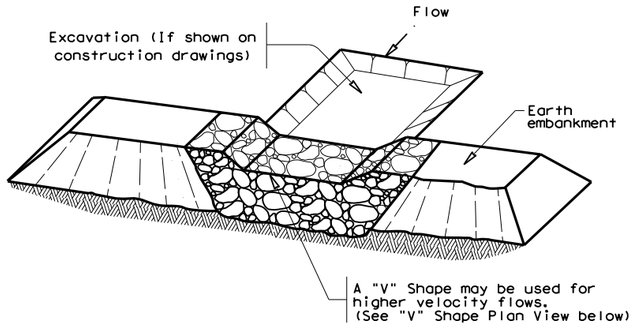


TYPE 4 (SACK GABIONS)

RFD4

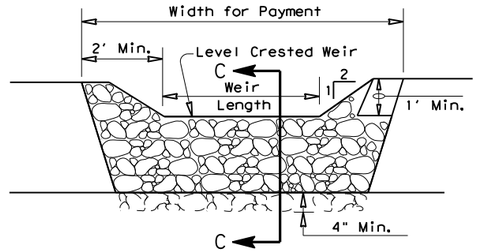


SECTION A-A



FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2



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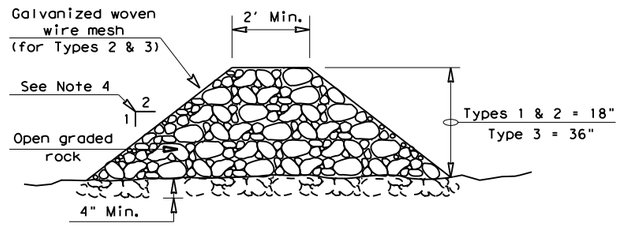


SECTION C-C

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

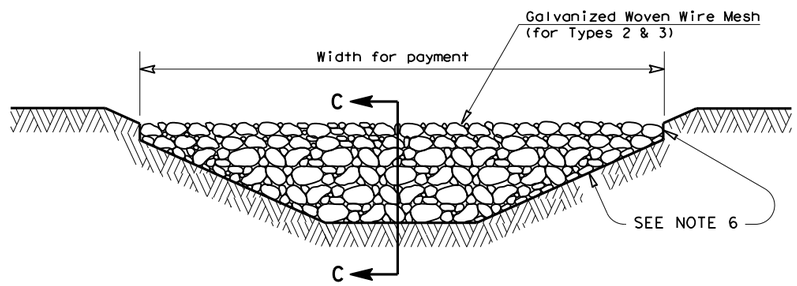
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		83

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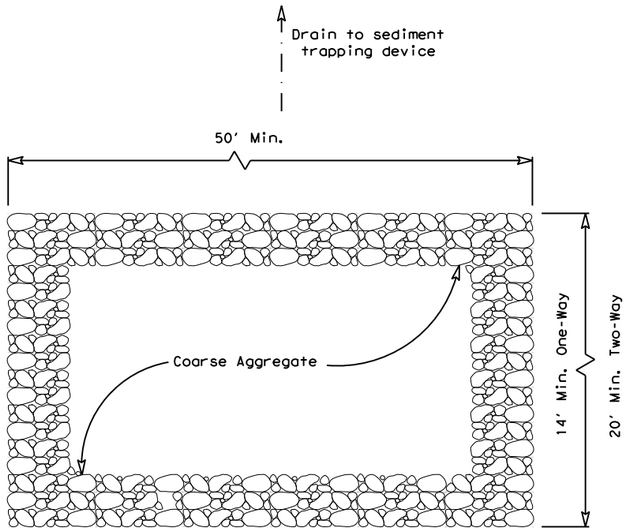

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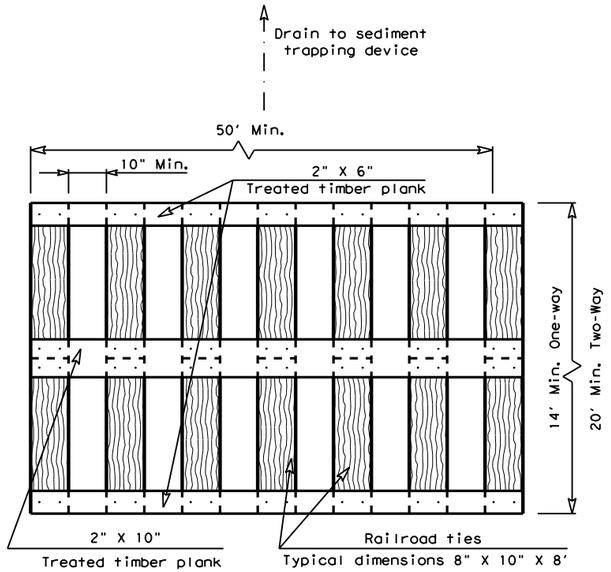

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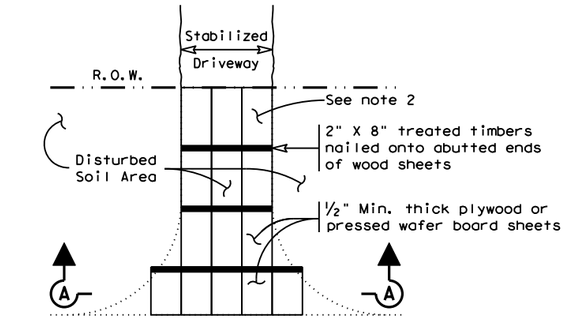

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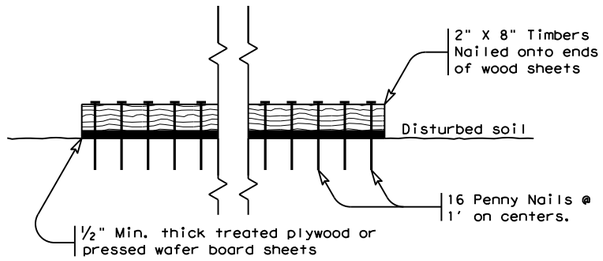
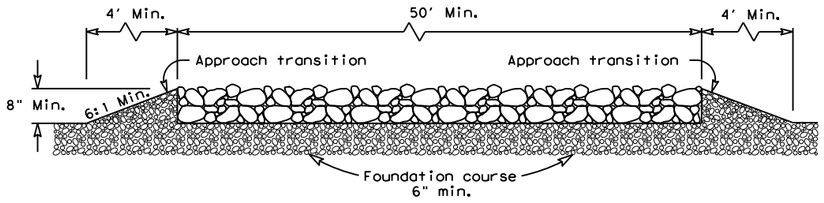


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

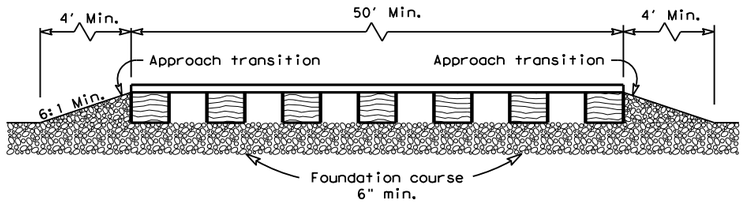
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
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	PHR	HIDALGO		84

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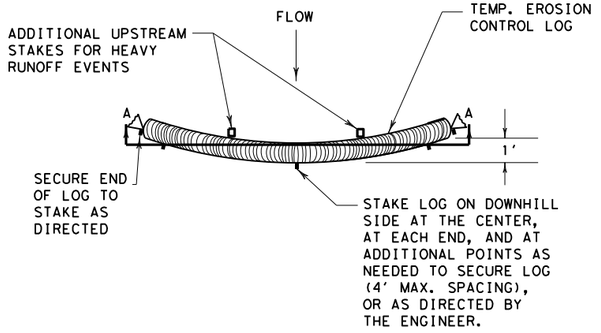

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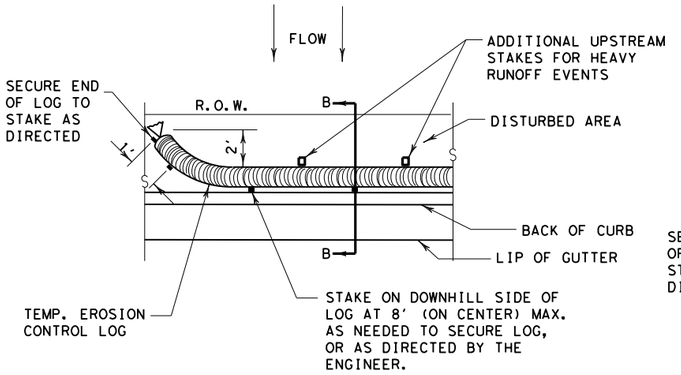

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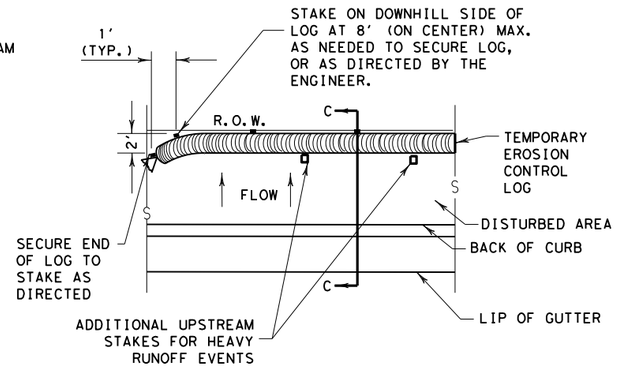

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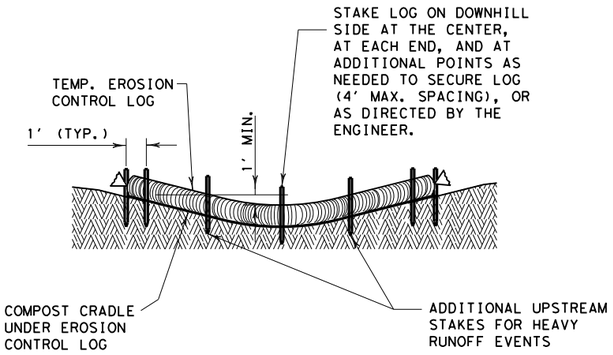
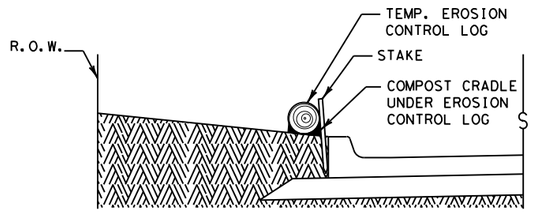


SECTION A-A

EROSION CONTROL LOG DAM

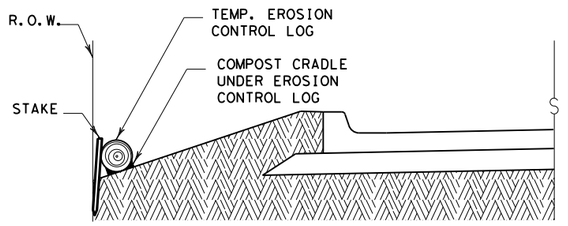
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

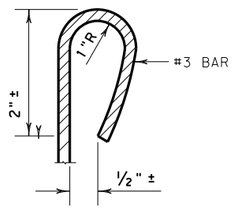
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

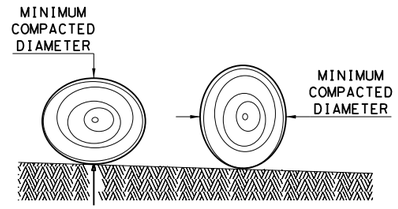
Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM		DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY		
REVISIONS	2094	01	071		FM 2220		
	DIST	COUNTY				SHEET NO.	
	PHR	HIDALGO				85	

DATE: 2/27/2023
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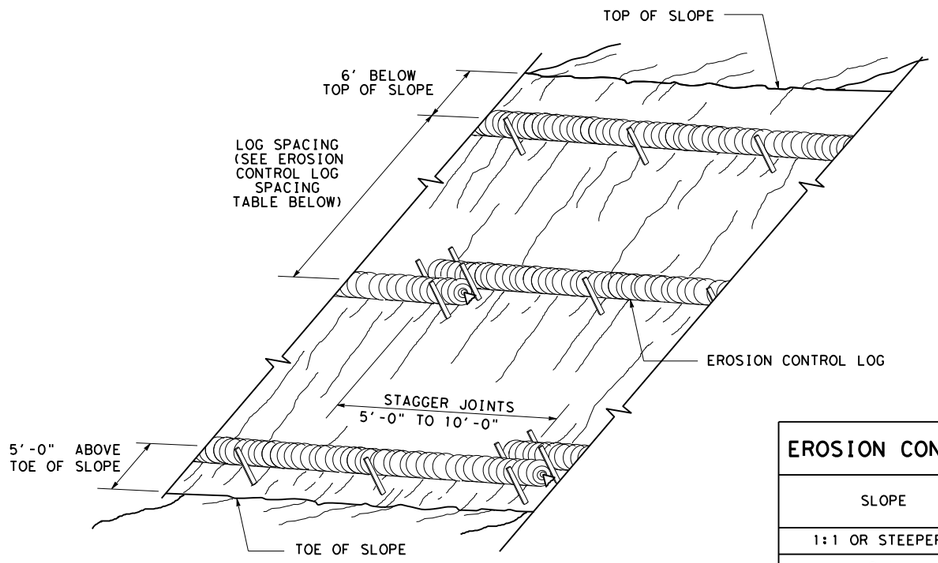
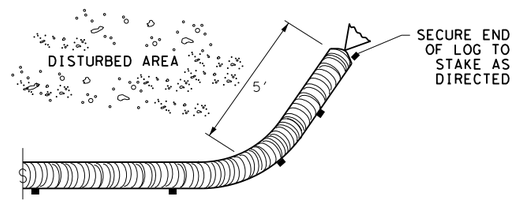


EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

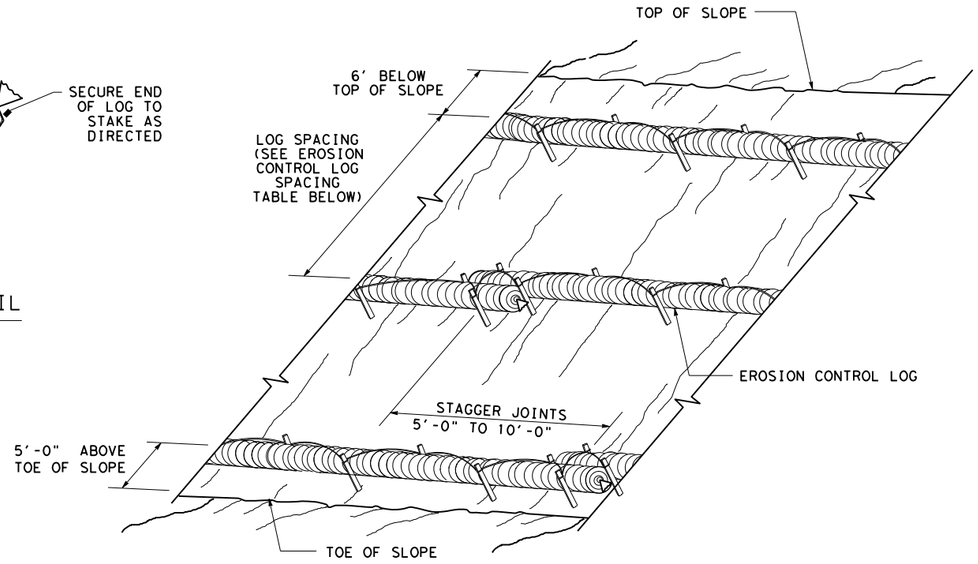
CL-SST



END SECTION RAP DETAIL

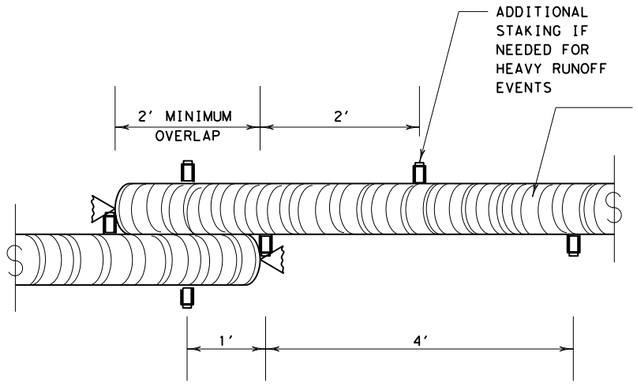
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

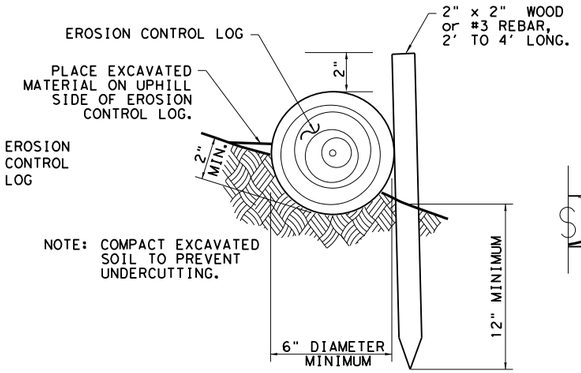
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

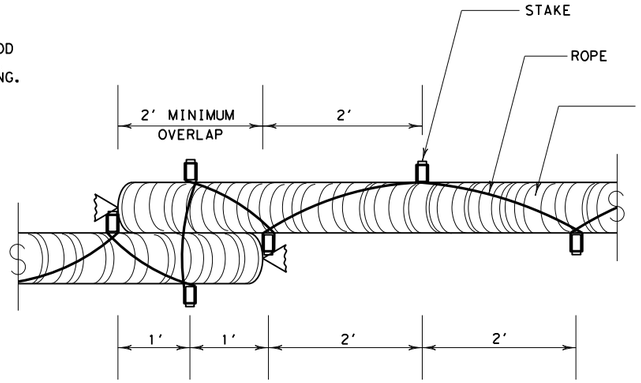


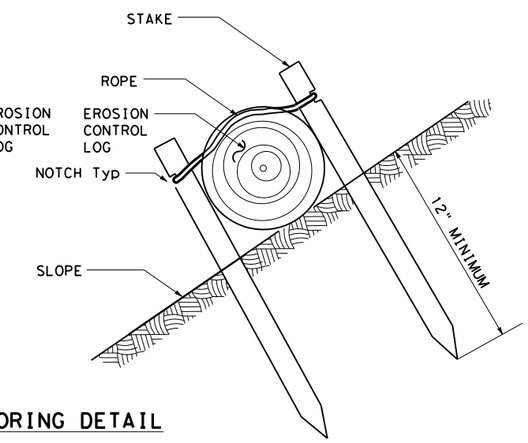


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

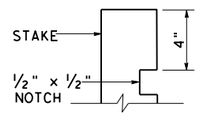
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

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REVISIONS	2094	01	071	FM 2220
	DIST	COUNTY		SHEET NO.
	PHR	HIDALGO		86

DATE: 2/27/2023
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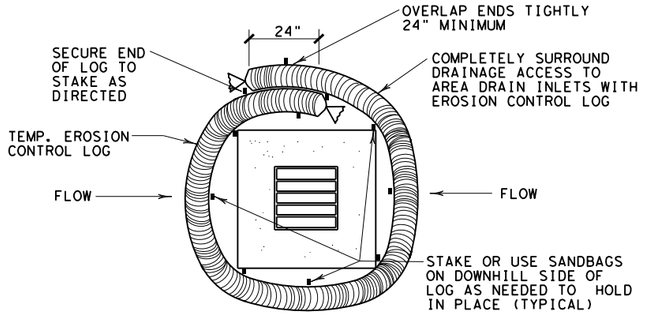
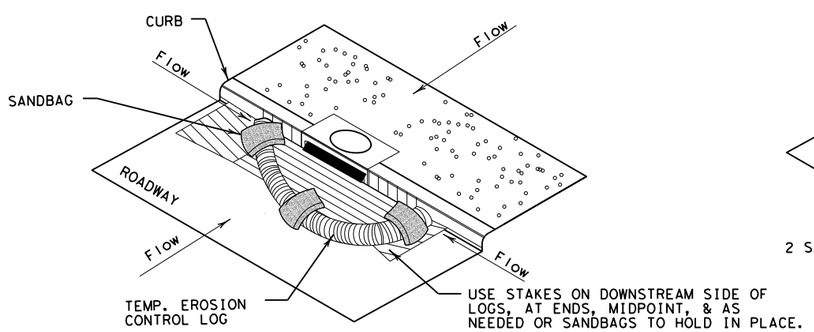


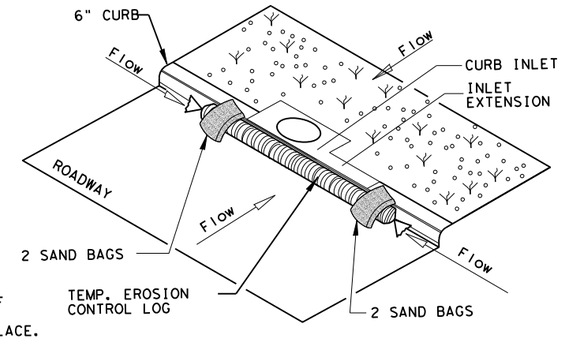
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

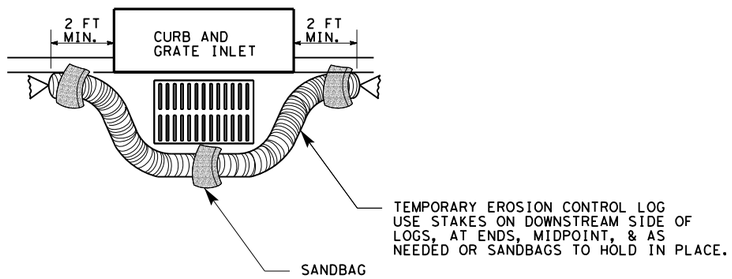
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

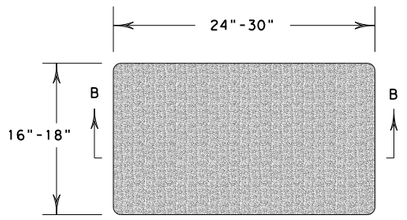
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

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	PHR	HIDALGO		87