INDEX OF SHEETS

SHEET No.	DESCRIPTION
1	TITLE SHEET
2	INDEX OF SHEETS

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

MAINTENANCE PROJECT No.				SHEET No.
BPM 643811001				1
DRAFT	STATE	DISTRICT	COUNTY	
DL	TEXAS	WACO	HILL, ETC	
CHECK	CONT	SECT	JOB	HIGHWAY No.
CS	6438	11	001	SH 22, ETC

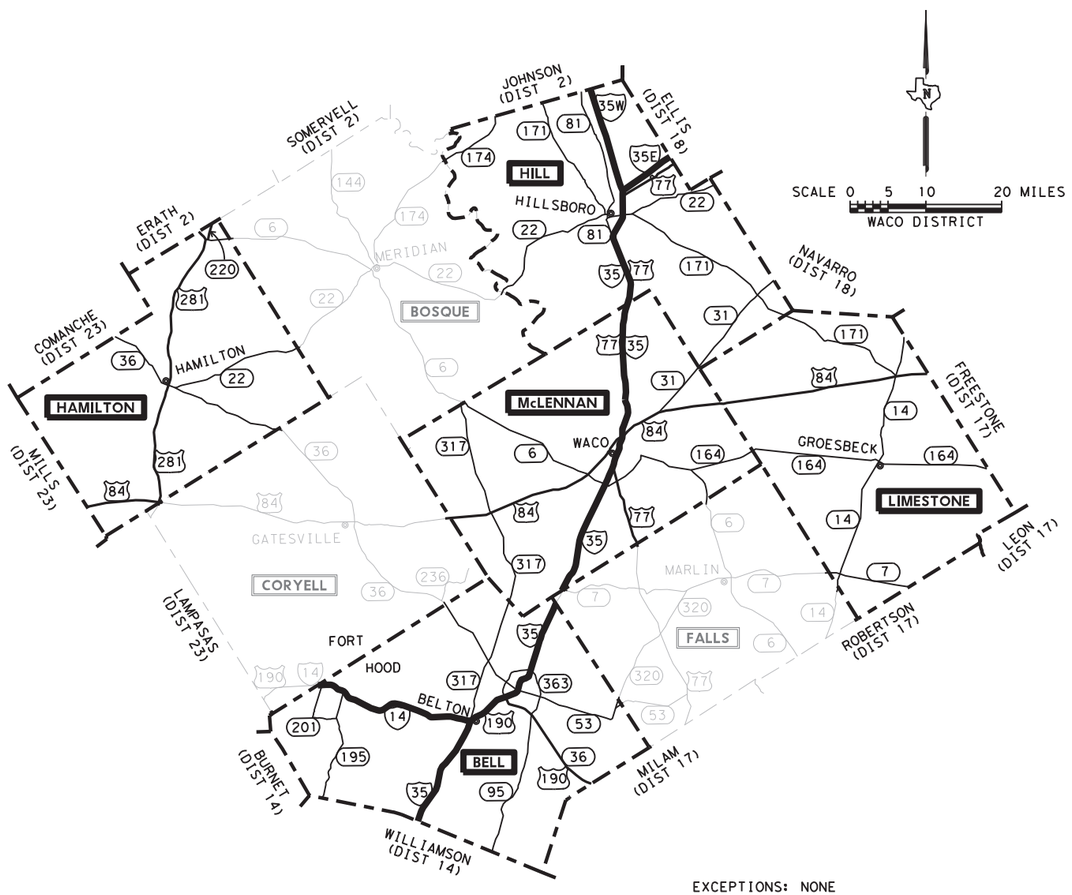
AREA OF DISTURBED SOIL = 0.333 ACRES

PLANS OF PROPOSED
HIGHWAY ROUTINE MAINTENANCE CONTRACT

TYPE OF WORK:

BRIDGE PREVENTIVE MAINTENANCE

PROJECT No.: BPM 643811001
HIGHWAY No.: SH 22, ETC
LIMITS OF WORK: BELL, HAMILTON, HILL, LIMESTONE & McLENNAN COUNTIES



EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND PROVISIONAL ITEMS INCLUDED HEREIN, SHALL GOVERN ON THIS CONTRACT.

TEXAS DEPARTMENT OF TRANSPORTATION

RECOMMENDED FOR LETTING:

DocuSigned by:
Josh Voiles
AC8604F84EC2483...
8/30/2023
AREA ENGINEER

RECOMMENDED FOR LETTING:

DocuSigned by:
Stephen Michael Vasberg P.E.
6597DEC5B49C452...
8/30/2023
DIRECTOR OF MAINTENANCE

APPROVED FOR LETTING:

DocuSigned by:
Stanley Swiatek
B69BD796DD564C9...
8/31/2023
DISTRICT ENGINEER

8/29/2023
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STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

STANDARD SHEETS SPECIFICALLY IDENTIFIED WITH (*) HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Charles W. Smith, PE P.E. 8/30/23 DATE

INDEX OF SHEETS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
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CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	2
GRAPHICS	CONTROL	SECTION	JOB	
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CS				

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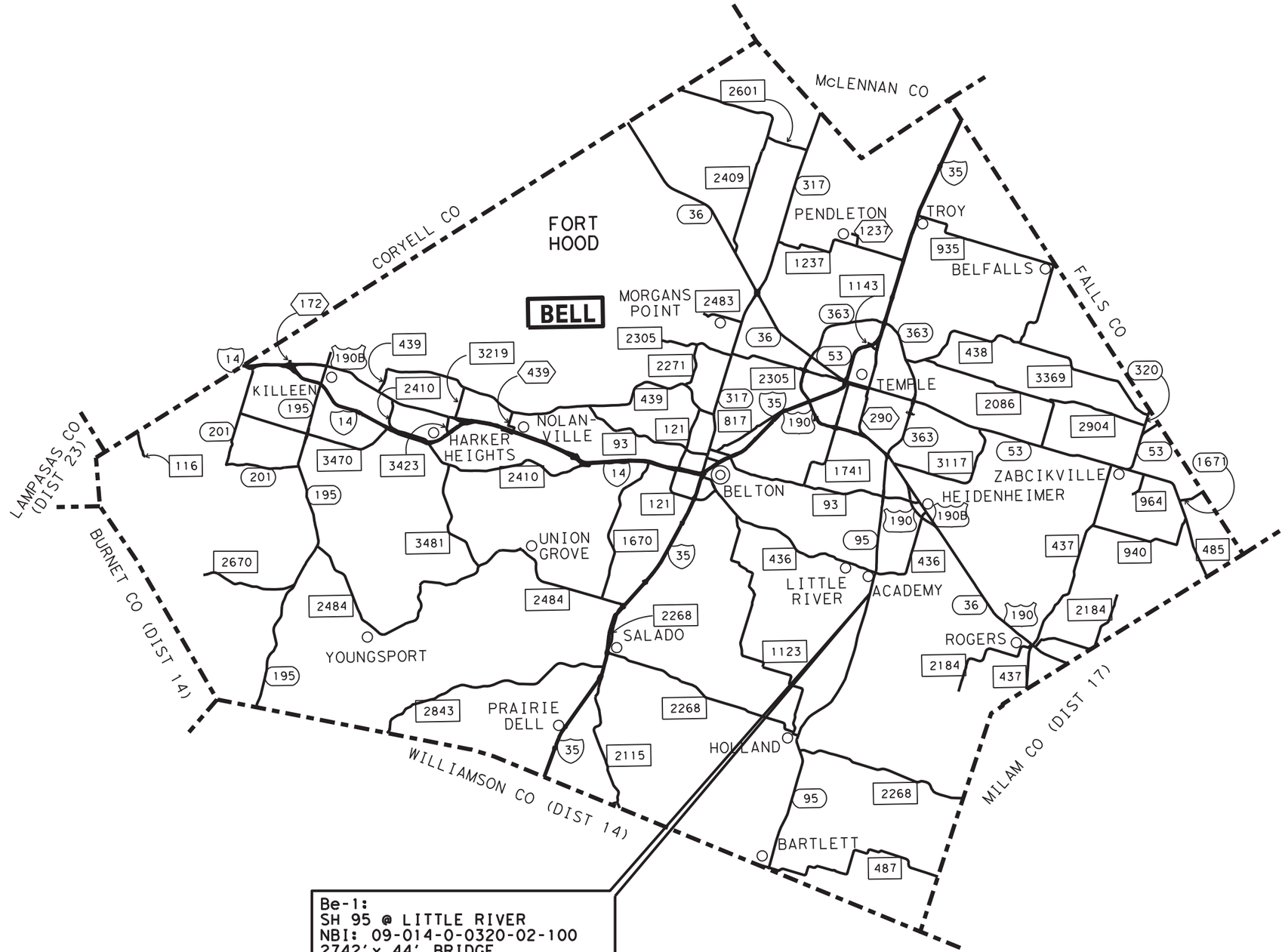

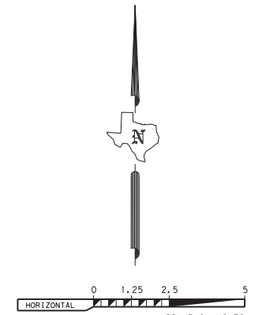

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, PE, PE 8/30/23
Signature of Registrant & Date

PROJECT LAYOUT
BELL COUNTY

SCALE: 1"= 5 MILES Sheet 1 of 5

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	
GRAPHICS	CONTROL	SECTION	JOB	
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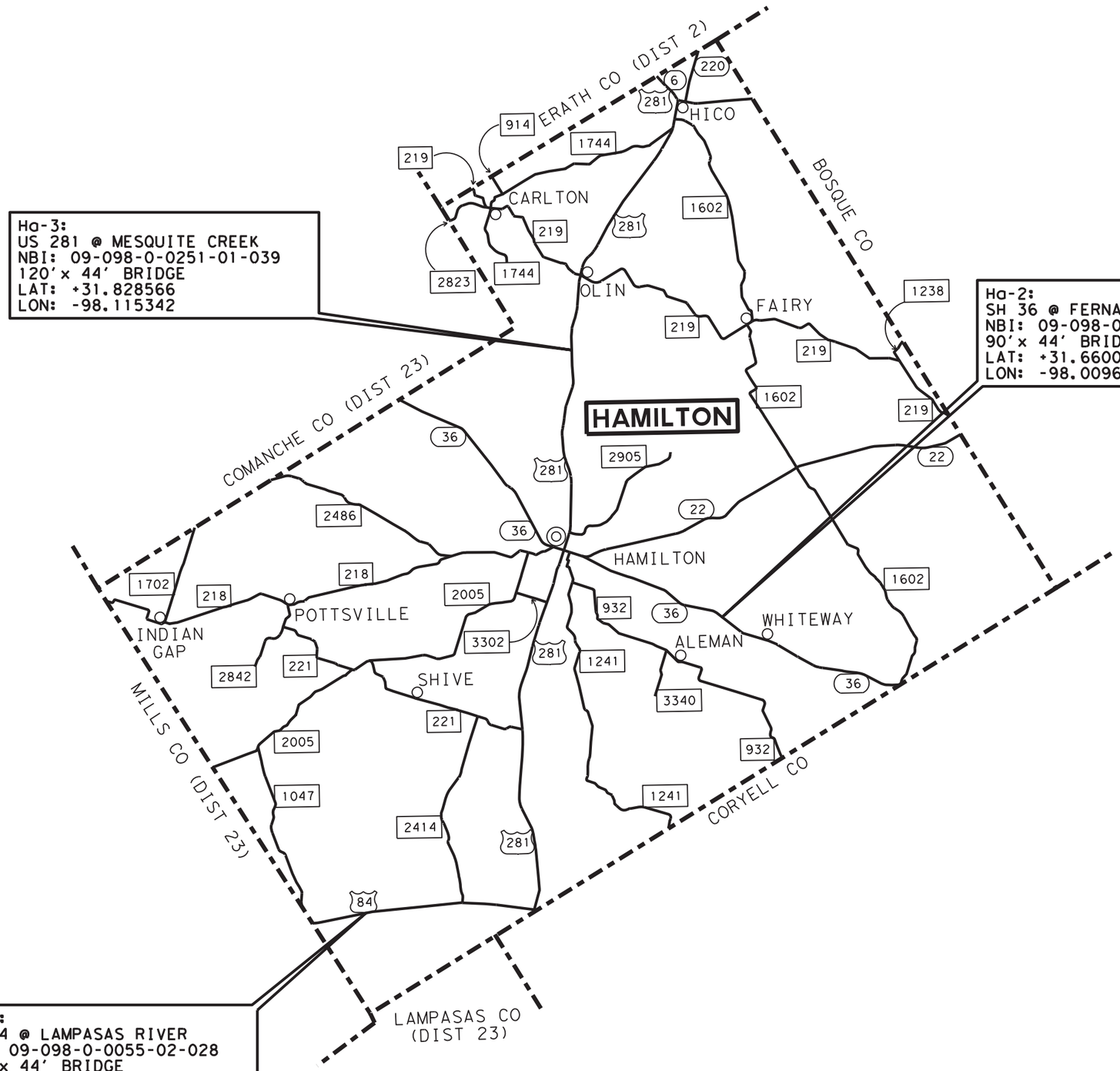

Ha-3:
US 281 @ MESQUITE CREEK
NBI: 09-098-0-0251-01-039
120'x 44' BRIDGE
LAT: +31.828566
LON: -98.115342

Ha-2:
SH 36 @ FERNASH CREEK
NBI: 09-098-0-0183-03-022
90'x 44' BRIDGE
LAT: +31.660070
LON: -98.009637

Ha-1:
US 84 @ LAMPASAS RIVER
NBI: 09-098-0-0055-02-028
253'x 44' BRIDGE
LAT: +31.480001
LON: -98.273489

HORIZONTAL 0 1.25 2.5 5
SCALE IN MILES

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

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Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

PROJECT LAYOUT
HAMILTON COUNTY

SCALE: 1"= 5 MILES Sheet 2 of 5

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT / COUNTY	SHEET No.
CS	TEXAS	WACO / HILL, ETC	
GRAPHICS	CONTROL	SECTION / JOB	
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CHECK			
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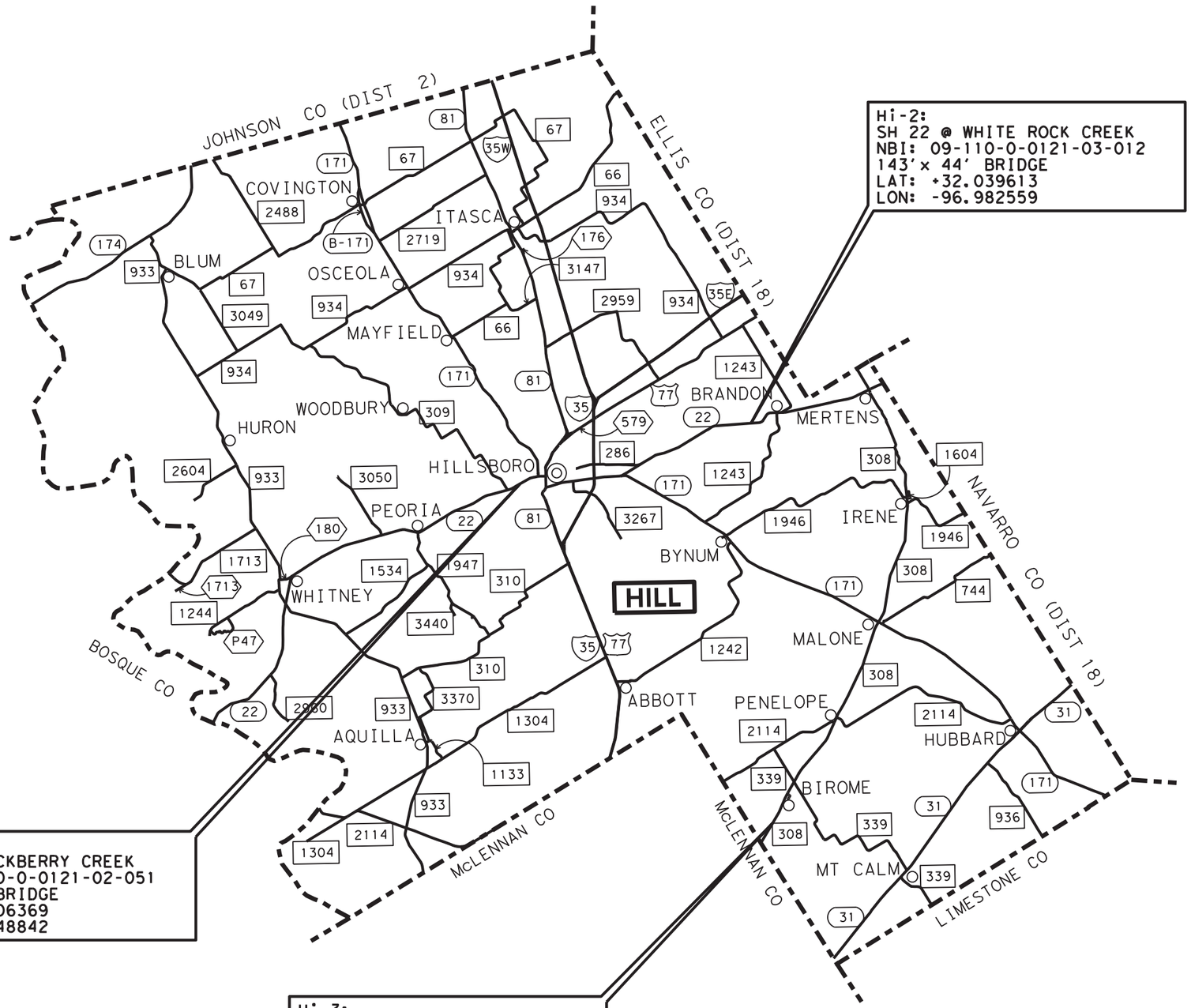

Hi-2:
SH 22 @ WHITE ROCK CREEK
NBI: 09-110-0-0121-03-012
143'x 44' BRIDGE
LAT: +32.039613
LON: -96.982559

Hi-1:
SH 22 @ HACKBERRY CREEK
NBI: 09-110-0-0121-02-051
800'x 44' BRIDGE
LAT: +32.006369
LON: -97.148842

Hi-3:
FM 308 @ BROOKEEN CREEK
NBI: 09-110-0-0834-03-018
150'x 44' BRIDGE
LAT: +31.796123
LON: -96.975176

HORIZONTAL 0 1.25 2.5 5
SCALE IN MILES

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

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Signature of Registrant & Date

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PROJECT LAYOUT
HILL COUNTY

SCALE: 1"= 5 MILES Sheet 3 of 5

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	5
GRAPHICS	CONTROL	SECTION	JOB	
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CS				

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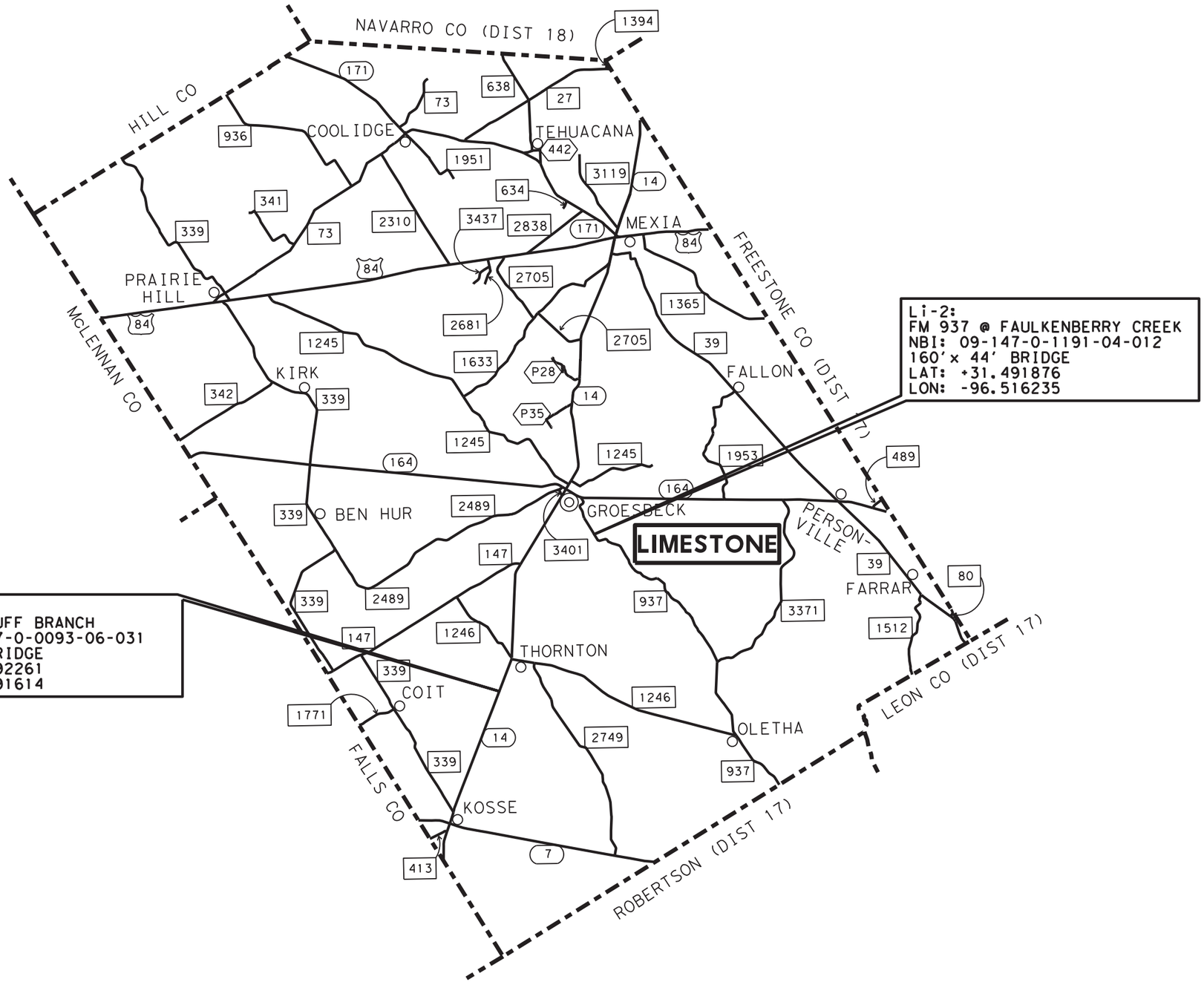
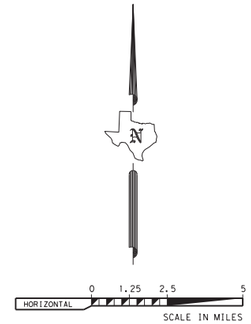


Li-2:
FM 937 @ FAULKENBERRY CREEK
NBI: 09-147-0-1191-04-012
160'x 44' BRIDGE
LAT: +31.491876
LON: -96.516235

Li-1:
SH 14 @ ACUFF BRANCH
NBI: 09-147-0-0093-06-031
86'x 48' BRIDGE
LAT: +31.392261
LON: -96.591614



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Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

Texas Department of Transportation
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PROJECT LAYOUT
LIMESTONE COUNTY

SCALE: 1"= 5 MILES Sheet 4 of 5

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	6
GRAPHICS	CONTROL	SECTION	JOB	
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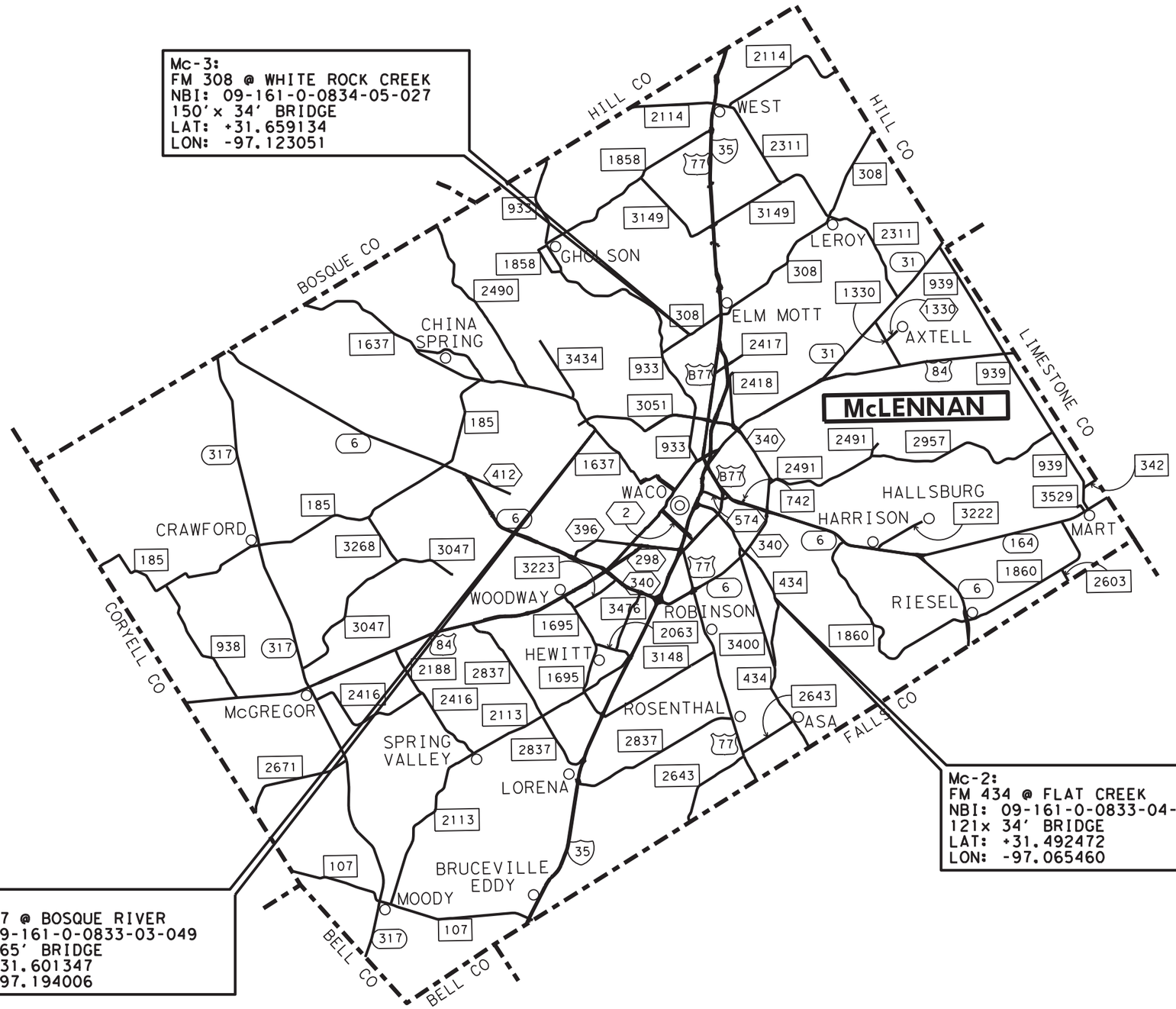

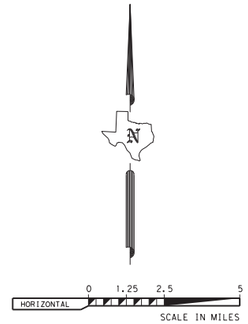

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

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Charles W Smith, P.E. 8/30/23
Signature of Registrant & Date

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PROJECT LAYOUT
McLENNAN COUNTY

SCALE: 1"= 5 MILES Sheet 5 of 5

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT / COUNTY	SHEET No.
CS	TEXAS	WACO / HILL, ETC	
GRAPHICS	CONTROL	SECTION / JOB	7
DL	6438	11 / 001	
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CS			

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GENERAL NOTES

A site-specific contract for bridge maintenance consisting of embankment, pile encasements, riprap, and concrete structure repairs within the highway right of way of various roadways in Bell, Hamilton, Hill, Limestone and McLennan Counties according to the standard specifications or as modified in the general specifications listed below.

The disturbed area for this project, as shown on the plans is 0.333 acres. However, the Total Disturbed Area (TDA) will establish the required authorization for storm water discharges. The TDA of this project will be determined by the sum of the disturbed area in all project locations in the contract, and all disturbed area on all Project-Specific Locations (PSL) located in the project limits and/or within 1 mile of the project limits. The department will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction site as shown on the plans, according to the TDA of the project. The contractor will obtain any required authorization from the TCEQ for the discharge of storm water from any PSL for construction support activities on or off of the project row according to the TDA of the project. When the TDA for the project exceeds 1 acre, provide a copy of the appropriate application of permit (NOI, or Construction Site Notice) to the engineer, for any PSL located in the project limits or within 1 mile of the project limits. Follow the directives and adhere to all requirements set forth in the TCEQ, Texas Pollution Discharge Elimination System, Construction General Permit (TPDES, CGP).

PRE-BID QUESTIONS

Contractor questions for this project may 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.

For this contract, the office of record is the Maintenance Office listed below. All work will be coordinated through this office and with the Maintenance Supervisor or his designated representative.

Maint. Supervisor	Telephone Number	Maint. Office Location
Eric Olivas	(254) 582-5411	1400 S. Abbott Ave. Hillsboro, TX 76645

The Contractor will perform the work required for this contract according to the Texas Department of Transportation Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (2014).

Prior to beginning work, a pre-construction meeting between representatives of the State and the Contractor will be arranged by the State. This meeting will outline the proper methods of construction, sequence of work, work locations, emphasize traffic control, plans, specifications, unusual conditions, and other pertinent items regarding the work.

ITEM 4: SCOPE OF WORK

All new and existing concrete adjacent to the roadway must be free of stains, dirt, tire marks, etc., at the time of final acceptance. These items include but are not limited to bridge rails curb and gutter, inlets and riprap. Blast cleaning of these items will be required to achieve acceptance of the project and will be considered subsidiary to the applicable bid items.

During final clean-up the contractor will be required to remove any foreign material that has accumulated at all bridge abutments and bent caps. The removal of foreign material will be performed in a manner approved. All work and equipment involved in the removal of this material will be subsidiary to the various bid items of the contract.

ITEM 5: CONTROL OF THE WORK

Underground utilities owned by the Texas Department of Transportation may be present within the Right-Of-Way on this project. For signal, illumination, surveillance, and communications & control maintained by TxDOT, call the TxDOT Traffic Signal Office (254)867-2808 for locates a minimum of 48 hours in advance of excavation. For irrigation systems, call TxDOT Landscape Office (254)867-2726 for locates a minimum of 48 hours in advance of excavation. If city or town owned irrigation facilities are present, call the appropriate department of the local city or town a minimum of 48 hours in advance of excavation. The Contractor is liable for all damages when utilities are damaged due to Contractor's negligence including, but not limited to, repair or replacement at the Contractor's expense.

ITEM 6: CONTROL OF MATERIALS

This proposed Contract will not include federal funds. Buy Texas stipulations apply in accordance with 6.1.2 "Buy Texas".

Mixing of materials, storing of materials, storing of equipment, or repairing of equipment on top of concrete pavement or bridge decks will not be permitted unless specifically authorized. Permission will be granted to store materials on surfaces if, in the opinion of the Engineer, no damage or discoloration will result.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only and the contractor will be permitted to furnish like materials of other manufacturers provided they are of equal quality and comply with specifications for this project.

ITEM 7: LEGAL RELATIONS AND RESPONSIBILITIES

At SH 95 at Little River, Bell County; no work in the Little River, stay out of the river. If work has to take place in the river, contact District Environmental (254) 867-2737.

No significant traffic generator events identified.

If utilizing private property for waste disposal sites, field office sites, equipment storage sites or for any other purpose involved with this project, provide to the Engineer written proof of the property owner's approval of the use of this property. This proof may be in the form of a letter or agreement signed by the property owner or other documents acceptable to the Engineer.

Personal vehicles of the contractor's employees will not be parked within the right of way at any time including any section closed to public traffic, unless the vehicle is being utilized for construction procedures. However, the contractor's employees may park on the right of way at the sites where the contractor has his office, equipment and materials storage yard.

The contractor is alerted to the possible presence of swallows under the existing bridges or culverts. Because the migratory bird treaty act prohibits harm to swallows, their eggs or their nestlings, the contractor will not begin potentially disturbing activities on or near the bridge until the birds have abandoned any occupied nests (approximately September 1). Active nests may not be removed regardless of the date.

Prior to the swallows returning to the nests (approximately March 1), abandoned nests will be removed from the bridge. The contractor will prevent the establishment of new nests on any portion of the structure. Methods for preventing the establishment of new nests must be approved by the project Engineer. Examples of acceptable nest prevention methods are bird-deterrent netting and bird-repelling sprays and/or gels to be applied to the structure. This work will not be paid for directly, but will be subsidiary to the various bid items.

The Contractor will submit detailed site-specific plans for work in each "water of the United States" designated on the EPIC sheet. These plans must be approved by the TxDOT Engineer prior to starting any work in these areas. The plans must also describe facilities and work activities adjacent the Ordinary High-Water Marks. The plan must show actual dimensions and materials for:

- Proposed construction roads and work areas leading to or in close proximity to the Ordinary High-Water Marks
- Temporary material or equipment storage areas in close proximity to the Ordinary High-Water Marks
- Locations of proposed sediment and erosion control devices

- Identification of construction equipment and construction techniques to accomplish the work

Once this drawing and supporting information is reviewed and approved by TxDOT, all construction workers should be made aware of the limits designated on the drawings by the Contractor's supervision. Work in all waters of the US will be limited to the minimum necessary required to construct the bridge, culvert or roadway fills. Work will also include all activities needed for bridge and culvert demolitions. Working or disturbing soil in the stream channel outside the limits of the work plan will not be allowed. Orange fencing will be provided and maintained to establish the TxDOT approved boundaries in which work may be conducted between the Ordinary High-Water Marks. Orange fencing will not be paid for but will be considered subsidiary to Item 502, "Barricades, Signs and Traffic Handling".

ITEM 8: PROSECUTION AND PROGRESS

This Project will be a Standard Workweek in accordance with Article 8.3.1.4.

Meet bi-weekly or at intervals as agreed upon with the engineer to notify him or her of planned work for the upcoming 3-week period.

For this project, provide a Bar Chart progress schedule.

Submit the schedule in both PDF and in a base software electronic file format acceptable to TxDOT to allow for import and analysis into TxDOT's current scheduling software.

ITEM 132: EMBANKMENT

Excavated material from the project site has not been determined to be suitable for embankment. The bidder assumes all risk for the use of excavated materials for embankment and is expected to meet all material requirements for embankment regardless of the source.

Perform Tex-106-E (Plasticity Index) by an approved laboratory on excavated soils from sources outside right of way when used in roadway embankment. Provide the test results at no expense to the department. The engineer will sample and test soils produced by the construction project for specification requirements or material sources specified in the plans.

Type B Embankment will consist of suitable earthen material such as rock, loam, clay or other materials as approved that will form a stable embankment.

ITEM 420: CONCRETE SUBSTRUCTURES

Apply an ordinary surface finish to all concrete surfaces within 30 days after form removal.

ITEM 432: RIPRAP

Locations and quantities may be varied as directed to accommodate field conditions.

The sodium sulfate soundness requirement for material used in rock riprap is waived for this project.

ITEM 500: MOBILIZATION

Material On Hand (MOH) will not be used in calculating partial payments for Mobilization.

ITEM 502: BARRICADES, SIGNS AND TRAFFIC HANDLING

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 Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

Access will be provided to all business and residences at all times. Where turning radii are limited during phased construction at intersections, provide all weather surfaces such as RAP or base in turning movements to accommodate and to protect the traffic from edge drop-offs. Materials, labor, maintenance and removal for these temporary accesses and radii will not be paid for directly but will be considered subsidiary to the various bid items.

Provide a person on the project at all times (24 hours/day, 7 days/week) to patrol, monitor, and maintain the traffic control devices and signs. The person must be knowledgeable of TxDOT Guidelines for traffic control devices and signs.

Place barricades and signs in locations that do not obstruct the sight distance of drivers entering the highway from driveways or side streets.

Provide rectangular shape (CW12-2P) Temporary Clearance Signs on all bridges where the existing vertical clearance has changed. Install Signs to the satisfaction of the Engineer prior to opening to traffic. Plywood sign blanks will have minimum dimensions of 84" X 12". Work performed and materials are subsidiary to this item.

Law Enforcement Personnel.

As approved by the Engineer, provide uniformed off duty police officers and squad cars during the following activities:

- Lane closures on controlled access facilities or 4 lane divided facilities with speed limits above 55mph,
- ramp closures,
- Roadway Closures,
- Support of phase construction traffic switches,
- nighttime work, or
- other situations that indicate a need for additional traffic control to protect the traveling public or the construction workforce.

Law Enforcement Personnel must have jurisdictional authority to act in the area of the project.

Law Enforcement Personnel will be paid when use is approved by the Engineer. The Contractor retains the right to have law enforcement personnel on sight at their own cost and discretion when note approved by the Engineer.

Submit charge summary and invoices using the Department form 318. Provide documentation such as payroll, log sheets with signatures and badge number, or invoices from the government entity providing the officers for reimbursement. 318 forms must be submitted daily, upon completion of shift.

Patrol vehicles must be clearly marked to correspond with the officer’s agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles. Windows / Windshields may not be blocked.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site. A minimum number of hours is not guaranteed. Payment is for work performed.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or “show up” fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual “show up” time to the event site due to cancellation will be on a case by case basis at a maximum of 2 hours per officer.

The Contractor Responsible Person(s) (CRP) for Work Zone Traffic Controls will inspect and ensure any deficiencies are corrected each and every day throughout the duration of this contract. Any misaligned or damaged traffic control devices will be repaired as soon as practical after deficiency is discovered.

In addition to providing a Contractor’s Responsible Person and a phone number for emergency contact, have an employee(s) available to respond on the project for emergencies and for taking corrective measures within One (1) Hour.

ITEM 506: TEMPORARY EROSION, SEDIMENTATION AND ENVIRONMENTAL CONTROLS

Take all practicable precautions to prevent debris from being discharged into the Waters of Texas or a designated wetland. Install Best Management Practices before demolition begins and maintain them during the demolition. Remove any debris or construction material that escapes containment devices and are discharged into the restricted areas, before the next rain event or within 24 hours of the discharge.

If temporary construction stream crossings are allowed under a Nationwide Permit, submit in writing for approval the type and location of each temporary stream crossing. Use temporary bridges, timber mats, or other structurally sound and non-eroding material for temporary stream crossings. A temporary culvert crossing will consist of storm sewer pipes and 4- to 8-inch nominal size rock. Temporary stream crossings must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality. Remove the temporary stream crossings in their entirety and return the affected areas to their pre-existing elevation. All work and materials use for temporary construction stream crossings will not be paid for directly but are subsidiary to pertinent Items.

No soil disturbing activities will begin on any section of TxDOT ROW without adequate sedimentation controls first being installed and functioning at adjacent drainage outfalls. Begin and continuously prosecute the repairs, additions and maintenance of erosion and sedimentation control devices within seven days after the Contractor receives each Form 2118, Field Inspection and Maintenance Report, from the Engineer. Failure of the Contractor to fulfill either of the above requirements places TxDOT in potential non-compliance with permit requirements and may result in withholding estimates or stopping work or both until all environmental permit requirements are fulfilled.

The SW3P for this contract will consist of using, as directed, any erosion or water pollution control measure deemed necessary. Any erosion or water pollution control measure deemed necessary will be implemented by the Contractor as prescribed by this item and in accordance with the applicable specification. Payment for erosion control measures for which applicable pay items are not included in the contract will be made in accordance with Article 9.7, "Force Account."

ITEM 752: TREE AND BRUSH REMOVAL

The Contractor will take precautions to avoid harm to any wildlife encountered during the project; this includes active nests or burrows.

All Oak Tree Species:

1. To avoid the spread of Oak Wilt or other disease, all species of oak trees that are damaged or cut (branches, roots and/or stumps) for any reason during this contract, must be treated with a commercial wound dressing within 20 minutes of causing the damage or cut.

2. To prevent the spread of infection from tree to tree when pruning oak trees (all species), the Contractor must disinfect all pruning tools with a solution of 70% isopropyl alcohol after all cutting is complete on each oak tree.

3. Potentially dangerous trees or limbs will be removed as soon as possible.

4. The Engineer can stop all Work operations if the dressing, cut and removal requirements are not followed.

5. Pruning shall be in accordance with ANSI A300 pruning standard.

The Contractor will be responsible for leaving the project site clean and neat in appearance upon completion and before final acceptance by the Engineer.

Limits as shown in the plans are approximate. Actual limits may vary.

Remove and dispose of cuttings within five (5) calendar days after cutting.

Material will be disposed of in accordance with federal, state, and local regulations. No material will be placed on private property unless otherwise approved in writing by the Engineer. The Contractor will provide sufficient documentation to verify proper disposal.

Wood chips may be left on the right of way no deeper than two (2) inches. Do not trespass on private property while perform work on this contract. Do not cut or damage timber outside the right-of-way lines.

Remove all fallen parts of trees, damaged limbs, and dead limbs. This work will not be paid for directly, but will be considered subsidiary to this item.

Tree Trimming: Contractor may use a buzzbar type saw for trimming trees. If using a buzzbar type saw, branches may protrude from the truck. The use of a brushax will not be allowed.

Trees will be trimmed to a clearance height as follows:
1. 10 feet above natural ground within the ROW (except above pavement)
2. 18 feet above pavement (includes shoulders and travel lanes)

Tree Trimming and Brush Removal for Channels: Item is paid by the acre. This item will be used to pay for work in channels, slopes, wide right of way, and areas of dense trees areas as shown on the plans.

Stump removal is subsidiary to this bid item for trees removed by Contractor.

ITEM 6001: PORTABLE CHANGEABLE MESSAGE SIGN

This project will require “full matrix” type portable changeable message signs.

Ensure that the Contractor's Responsible Person for traffic control can revise messages within thirty (30) minutes of notification.

Furnish portable changeable message signs. The portable changeable message sign(s) will be used for all lane closures and freeway closures as shown on the traffic control plan standard sheets.

Supply portable changeable message sign(s) in accordance with the Traffic Control Plan standard sheets and Article 6f.55 of the Texas Manual on Uniform Traffic Control Devices for Streets and Highways Part VI.

ITEM 6185: TRUCK MOUNTED ATTENUATORS

The shadow vehicle with truck mounted attenuator (TMA) will not be optional, but will be required as shown on the appropriate traffic control plan sheets. Truck mounted attenuators must meet the requirements of the Compliant Work Zone Traffic Control Device List.

All TMAs required for this contract will be Level 3 Compliant.

Trailer Attenuators will not be allowed on this project.

The total number of truck mounted attenuators (TMA) required when utilizing the traffic control standards are shown in the tables below.

TCP S Series	Scenario		Required TMA	
(S-2)-08a	B		1	
(S-3)-08	A	B	1	2

TCP 1 Series	Scenario		Required TMA	
(1-1)-18 / (1-2)-18			1	
(1-3)-18	A	B	1	2
(1-4)-18 / (1-5)-18 / (1-6)-18			1	

TCP 2 Series	Scenario		Required TMA	
(2-1)-18 / (2-2)-18 / (2-4)-18 / (2-5)-18 / (2-6)-18	All		1	
(2-3)-18	A	B	1	2

TCP 3 Series	Scenario	Required TMA

(3-1)-13	All	2
(3-2)-13	All	3
(3-3)-14	A B D	2
	C	3
(3-4)-13	All	1, unless working inside a twltl, then 2.
(3-5)-15	All	1

TCP 6 Series	Scenario		Required TMA	
(6-1)-12	A	B	1	2
(6-2)-12 / (6-3)-12	All		1	
(6-4)-12	A	B	1	2
(6-5)-12	A	B	1	2
(6-6)-12 / (6-7)-12	All		1 Per Lane	
(6-8)-14 / (6-9)-14	All		1	

WZ (BTS) Series	Scenario	Required TMA
(BTS-1)-13	Near Side Lane Closure	1

Shadow vehicles equipped for truck mounted attenuators (TMA) for stationary operations will be paid for by the day and must be available for use at any time as determined by the Engineer.

Mobile operations will be paid for by the hour, per specifications. For mobile operations, payment will be made only while the TMA is in use.

For mobile operations requiring multiple TMA's, judgement may be applied in lower speed, urban / in town traffic environments to reduce the numbers of TMA in use where the added TMA may pose a hazard for traffic entering and exiting driveways, side streets, etc.

The contractor will be responsible for determining if one or more of these operations will be ongoing at the same time to determine the total number of TMA needed for the project for those times per plan requirements. Additional TMAs used that are not specified in the plans in which the contractor expects compensation will require prior approval from the Engineer.

ITEM 7000: REMOVAL AND PROPER DISPOSAL OF DRIFTWOOD AND DEBRIS

All quantities are estimated and subject to change at the discretion of the Engineer.

Work shall be paid for by the CY of removed material. Payment will be a measured quantity, based upon disposal truck dimensions.

Equipment may include but is not limited to dragline, front-end loader, backhoe, hydraulic excavator, dozer, track loader, dump trucks, etc.

Limits for the removal of driftwood and debris shall typically include the width of the right of way (upstream and downstream) for the length of the structure.

Debris shall consist of all foreign material within the work area including trash, tires, etc.

Contractor shall cut and remove abandoned timber bridge piles. This shall not be paid for directly, but considered subsidiary to various bid items.

Cut driftwood as required, load, haul and dispose of driftwood and debris off the right of way in accordance with federal, state and local regulations. Unless otherwise approved by the Engineer, small items (less than 24 inches in diameter) may be chipped on site and spread on the ROW above the ordinary high-water mark as approved by the Engineer. No debris, whole or chipped will be deposited in a floodplain area.

Disposal sites must be permitted by State and Local Government.

ITEM 7329: MAINTENANCE SPEED LIMIT SIGNING

All maintenance activity work sites will require Maintenance Work Zone Speed Limit Signs to temporarily lower regulatory speed limits. Form 1204M will be completed for each work site and this form will determine the temporary reduced speed based on the type of work and relevant work zone factors. Refer to the Maintenance Work Zone Speed Limit Standard Sheets for the listing of signs required and additional information on placement and covering of signs. At the conclusion of work, all signs related to the temporary speed limit must immediately be removed and permanent speed limit signs uncovered.

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6438-11-001 **DISTRICT** Waco **COUNTY** Hill
HIGHWAY SH0022

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6438-11-001**			
		PROJECT ID		**A00195056**			
		COUNTY		**Hill**			
		HIGHWAY		**SH0022**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	104-6009	REMOVING CONC (RIPRAP)	SY	83.000		83.000	
	104-6021	REMOVING CONC (CURB)	LF	9.000		9.000	
	132-6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	819.000		819.000	
	158-6002	SPEC EXCAV WORK (BACKHOE)	HR	20.000		20.000	
	351-6012	FLEXIBLE PAVEMENT STRUCTURE REPAIR(2")	SY	196.000		196.000	
	354-6088	PLANE ASPH CONC PAV (0" TO 5")	SY	2,469.000		2,469.000	
	356-6021	PAV JT UNDERSEAL (24")	LF	1,270.000		1,270.000	
	401-6001	FLOWABLE BACKFILL	CY	397.630		397.630	
	420-6070	CL C CONC (PILE ENCASEMENT)	CY	12.300		12.300	
	420-6074	CL C CONC (MISC)	CY	16.600		16.600	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	829.700		829.700	
	429-6009	CONC STR REPAIR (STANDARD)	SF	732.000		732.000	
	432-6002	RIPRAP (CONC)(5 IN)	CY	27.000		27.000	
	432-6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	696.000		696.000	
	432-6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	881.000		881.000	
	438-6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	1,120.000		1,120.000	
	438-6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	220.000		220.000	
	446-6051	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)	EA	3.000		3.000	
	459-6001	GABIONS (GALV)	CY	200.000		200.000	
	495-6001	RAISING EXIST STRUCT	LS	1.000		1.000	
	500-6001	MOBILIZATION	LS	0.100		0.100	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	10.000		10.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	200.000		200.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	200.000		200.000	
	529-6002	CONC CURB (TY II)	LF	26.000		26.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	35.000		35.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	1,112.000		1,112.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	72.000		72.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	540.000		540.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	14.000		14.000	
	752-6015	TREE AND BRUSH REMOVAL	AC	0.200		0.200	
	780-6010	CNC CRACK REPAIR (DISCRETE)(SURF SEAL)	LF	200.000		200.000	
	784-6001	REP STL BRIDGE MEMBERS	LS	3.000		3.000	
	3076-6069	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	TON	298.000		298.000	
	3085-6001	UNDERSEAL COURSE	GAL	486.000		486.000	
	6001-6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	100.000		100.000	
	6185-6002	TMA (STATIONARY)	DAY	200.000		200.000	

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6438-11-001 **DISTRICT** Waco **COUNTY** Hill
HIGHWAY SH0022

						TOTAL EST.	TOTAL FINAL
		CONTROL SECTION JOB		**6438-11-001**			
		PROJECT ID		**A00195056**			
		COUNTY		**Hill**			
		HIGHWAY		**SH0022**			
ALT	**BID CODE**	**DESCRIPTION**	**UNIT**	EST.	FINAL		
	7000-6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	136.000		136.000	
	7306-6002	BRIDGE SUBSTRUCTURE CLEANING (BENT)	EA	3.000		3.000	
	7329-6002	MAINTENANCE SPEED LIMIT SIGNING	DAY	100.000		100.000	

BPM SUMMARY (FY-2024)

COUNTY	LOCATION CODE	LOCATION & STR ID	100 6002 PREPARING ROW STA	104 6009 REMOVING CONC (RIPRAP) SY	104 6021 REMOVING CONC (CURB) LF	104 6025 REMOVE CONC (WINGWALL) CY	132 6019 EMBANKMENT (VEHICLE) (ORD COMP) (TY B) CY	158 6002 SPEC EXCAV WORK (BACKHOE) HR	351 6012 FLEXIBLE PAVEMENT STRUCTURE REPAIR (2") SY	354 6088 PLANE ASPH CONC PAV (0" TO 5") SY	356 6021 PAV JT UNDERSEAL (24") LF	401 6001 FLOWABLE BACKFILL CY	403 6001 TEMPORARY SPL SHORING SF
BELL	Be-1	SH 95 @ LITTLE RIVER; BELL CO STR: 09-014-0-0320-02-100					400					325.00	
HAMILTON	Ha-1	US 84 @ LAMPASAS RIVER; HAMILTON CO STR: 09-098-0-0055-02-028										1.13	
	Ha-2	SH 36 @ FERNASH CREEK; HAMILTON CO STR: 09-098-0-0183-03-022											
	Ha-3	US 281 @ MESQUITE CREEK; HAMILTON CO STR: 09-098-0-0251-01-039											
HILL	Hi-1	SH 22 @ HACKBERRY CREEK; HILL CO STR: 09-110-0-0121-02-051							196		440		
	Hi-2	SH 22 @ WHITE ROCK CREEK; HILL CO STR: 09-110-0-0121-03-012					310					54.00	
	Hi-3	FM 308 @ BROOKEEN CREEK; HILL CO STR: 09-110-0-0834-03-018		31			109					1.00	
LIMESTONE	Li-1	SH 14 @ ACUFF BRANCH; LIMESTONE CO STR: 09-147-0-0093-06-031								1529	192	2.00	
	Li-2	FM 937 @ FAULKENBERRY CREEK; LIMESTONE CO STR: 09-147-0-1191-04-012											
McLENNAN	Mc-1	FM 1637 @ BOSQUE RIVER; McLENNAN CO STR: 09-161-0-0833-03-049		52	9			20				5.00	
	Mc-2	FM 434 @ FLAT CREEK; McLENNAN CO STR: 09-161-0-0833-04-046										6.50	
	Mc-3	FM 308 @ WHITE ROCK CREEK; McLENNAN CO STR: 09-161-0-0834-05-027								940	638	3.00	
TBD		TO - BE - DETERMINED											
TOTALS:		TOTALS:	0	83	9	0	819	20	196	2469	1270	397.63	0

QUANTITIES ARE FOR ESTIMATION AND MAY VARY. CONTRACTOR SHOULD VERIFY ALL QUANTITIES IN THE FIELD.

SUMMARY SHEET

Sheet 1 of 3

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT / COUNTY	SHEET No.
CS	TEXAS	WACO / HILL, ETC	
GRAPHICS	CONTROL	SECTION / JOB	10
DL	6438	11 / 001	
CHECK			
CS			

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BPM SUMMARY (FY-2024)

COUNTY	LOCATION CODE	420 6057 CL C CONC (WINGWALLS) CY	420 6070 CL C CONC (PILE ENCASEMENT) CY	420 6074 CL C CONC (MISC) CY	429 6007 CONC STR REPAIR (VERTICAL & OVERHEAD) SF	429 6009 CONC STR REPAIR (STANDARD) SF	432 6002 RIPRAP (CONC)(5 IN) CY	432 6033 RIPRAP (STONE PROTECTION)(18 IN) CY	432 6035 RIPRAP (STONE PROTECTION)(24 IN) CY	438 6002 CLEANING AND SEALING EXIST JOINTS(CL3) LF	438 6004 CLEANING AND SEALING EXIST JOINTS(CL7) LF	446 6051 SPOT CLEAN & PAINT EXT STR(SPL PRT SYS) EA	459 6001 GABIONS (GALV) CY	495 6001 RAISING EXIST STRUCT LS	500 6001 MOBILIZATION LS	502 6001 BARRICADES, SIGNS AND TRAFFIC HANDLING MO	506 6038 TEMP SEDMT CONT FENCE (INSTALL) LF	506 6039 TEMP SEDMT CONT FENCE (REMOVE) LF
BELL	Be-1								650									
HAMILTON	Ha-1				7.2	132.0												
	Ha-2													0.5				
	Ha-3				3.0							3		0.5				
HILL	Hi-1				564.0	600.0				440								
	Hi-2				86.0			100	100	300			100					
	Hi-3		12.3		79.0		17	521	131				100					
LIMESTONE	Li-1				17.5					192								
	Li-2																	
McLENNAN	Mc-1			15			10	30			220							
	Mc-2			1.6				45										
	Mc-3				73.0					188								
TBD															1	10	200	200
TOTALS:		0	12.3	16.6	829.7	732.0	27	696	881	1120	220	3	200	1	1	10	200	200

SUMMARY SHEET

Sheet 2 of 3

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	11
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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BPM SUMMARY (FY-2024)

COUNTY	LOCATION CODE	529	662	666	666	666	672	752	780	784	3076	3085	6001	6185	7000	7306	7329
		6002	6111	6303	6312	6315	6009	6015	6010	6001	6069	6001	6001	6002	6001	6002	6002
		CONC CURB (TY II)	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	REFL PAV MRKR TY II-A-A	TREE AND BRUSH REMOVAL	CNC CRACK REPAIR (DISCRETE)(SURF SEAL)	REP STL BRIDGE MEMBERS	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	UNDERSEAL COURSE	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	REML & DISPL DRIFTWOOD & DEBRIS	BRIDGE SUBSTRUCTURE CLEANING (BENT)	MAINTENANCE SPEED LIMIT SIGNING
		LF	EA	LF	LF	LF	EA	AC	LF	LS	TON	GAL	DAY	DAY	CY	EA	DAY
BELL	Be-1							0.2									
HAMILTON	Ha-1																
	Ha-2									1							
	Ha-3									2						3	
HILL	Hi-1																
	Hi-2														100		
	Hi-3																
LIMESTONE	Li-1		22	572	72		7				168	306					
	Li-2								200								
McLENNAN	Mc-1	26															
	Mc-2																
	Mc-3		13	540		540	7				130	180			36		
TBD													100	200			100
TOTALS:		26	35	1112	72	540	14	0.2	200	3	298	486	100	200	136	3	100

SUMMARY SHEET

Sheet 3 of 3

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT / COUNTY	SHEET No.
CS	TEXAS	WACO / HILL, ETC	12
GRAPHICS	CONTROL	SECTION / JOB	
DL	6438	11 / 001	
CHECK			
CS			

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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

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		13

DATE: 8/29/2023 7:50:03 AM
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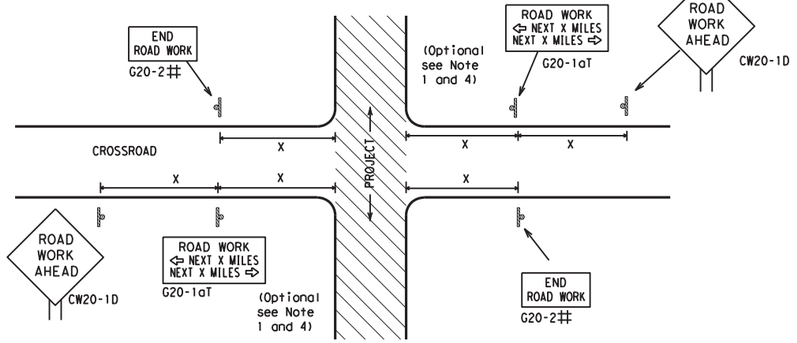
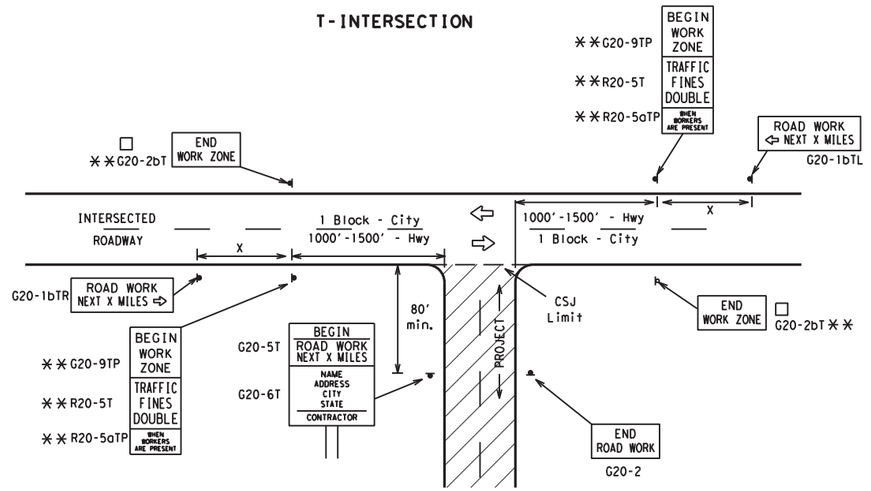
TYPICAL LOCATION OF CROSSROAD SIGNS



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]

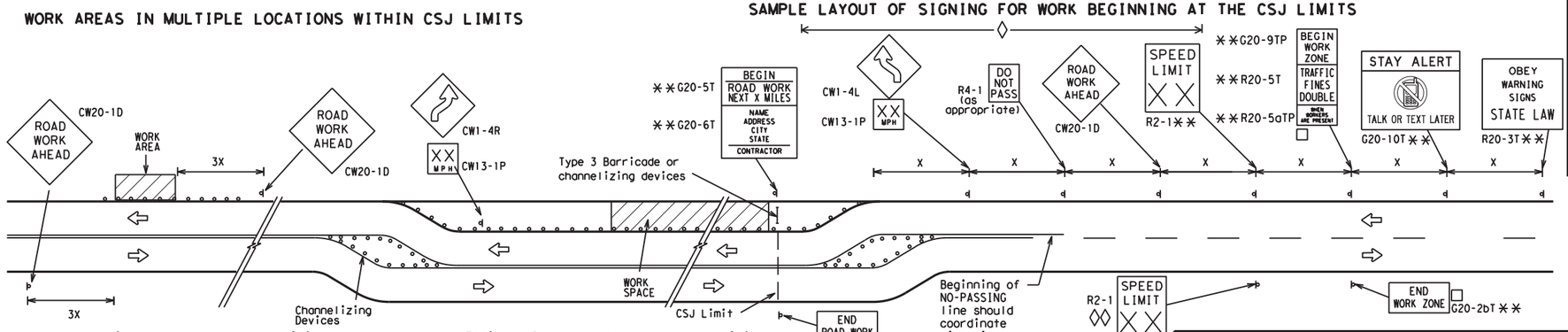
✱ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

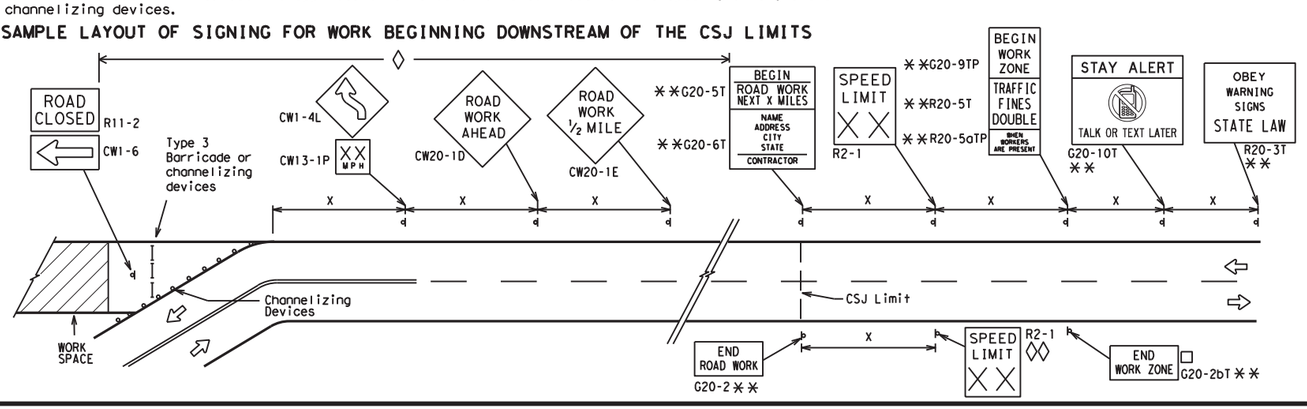
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may 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 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	6438	11	001	SH 22,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WACO	HILL,ETC		14

DATE: 8/29/2023 7:50:03 AM
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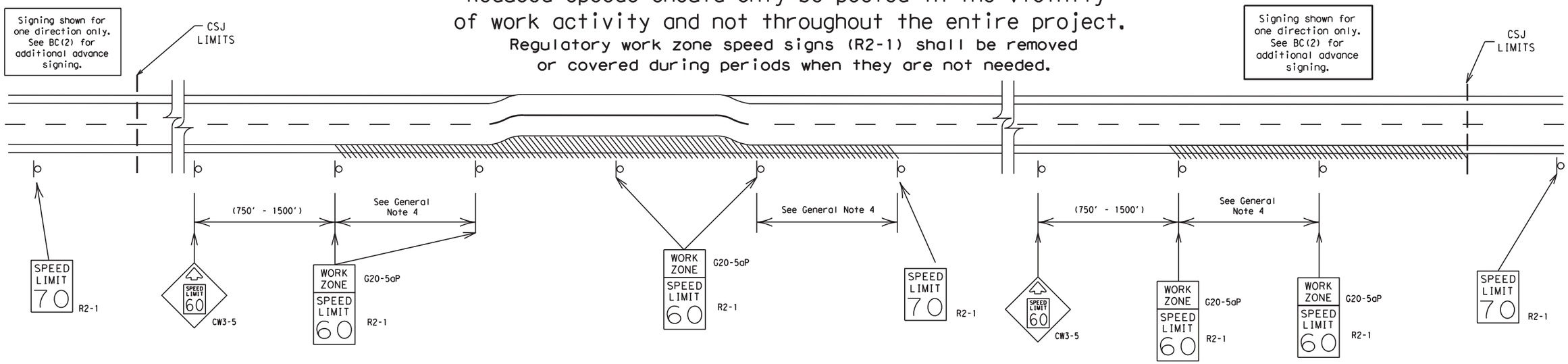
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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7-13 5-21	WACO	HILL,ETC		15

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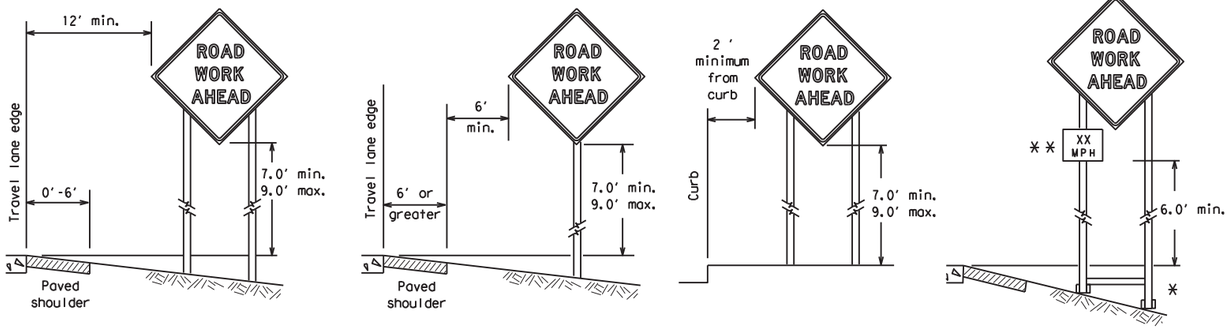
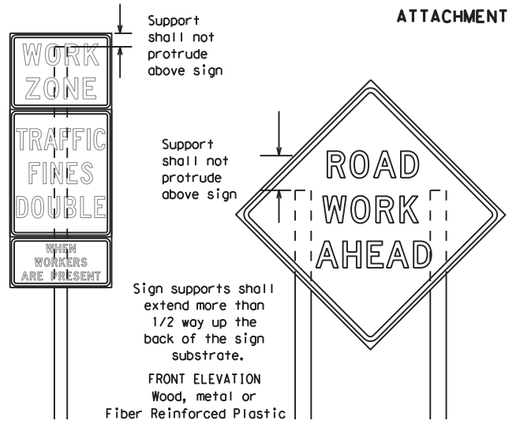
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

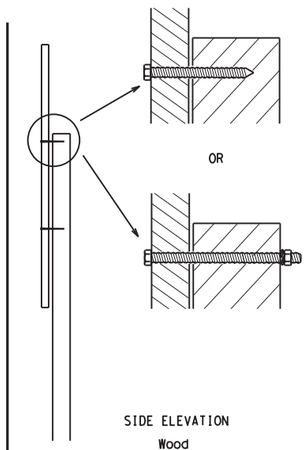


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** 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





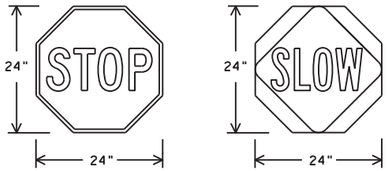
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

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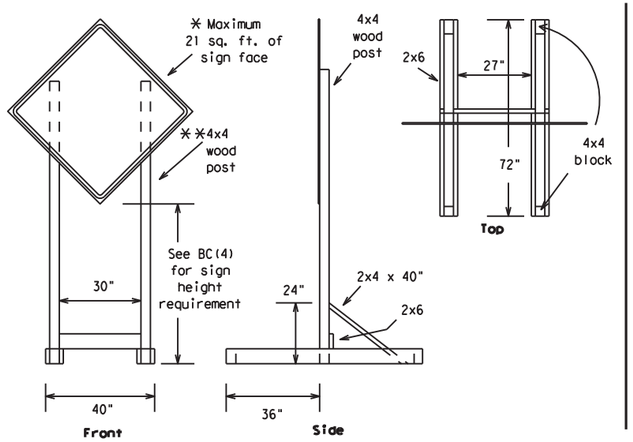
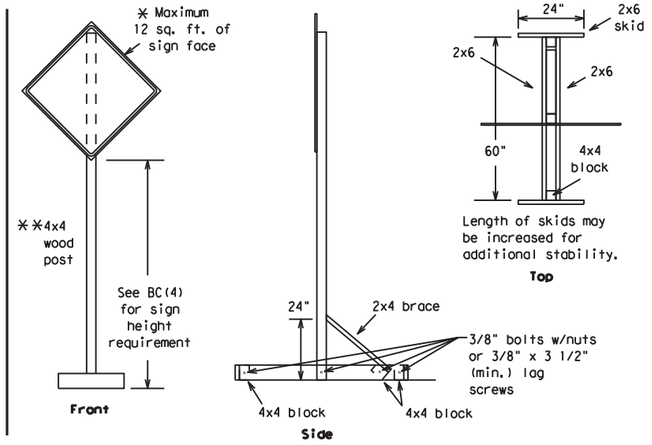
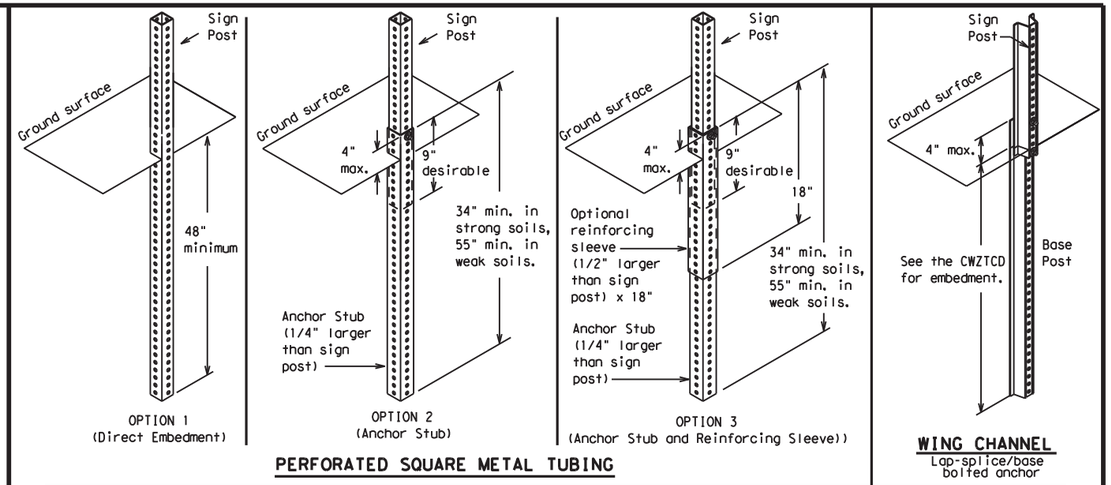




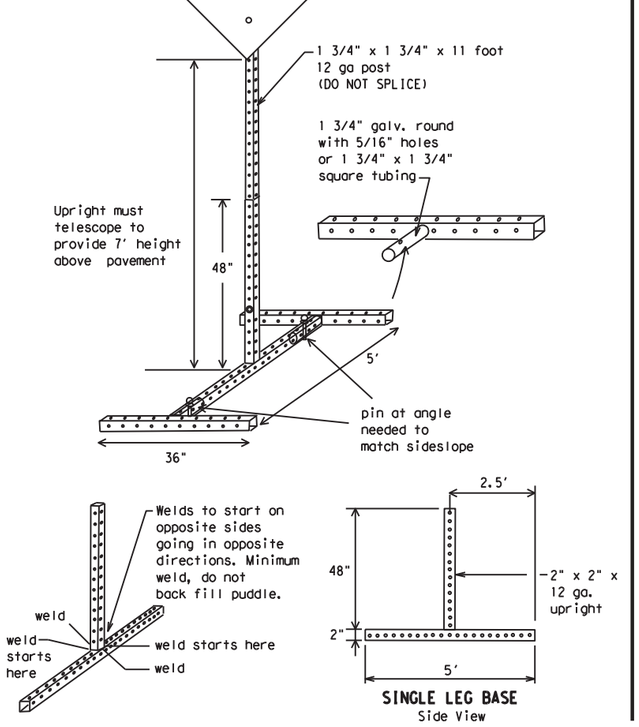
SKID MOUNTED WOOD SIGN SUPPORTS

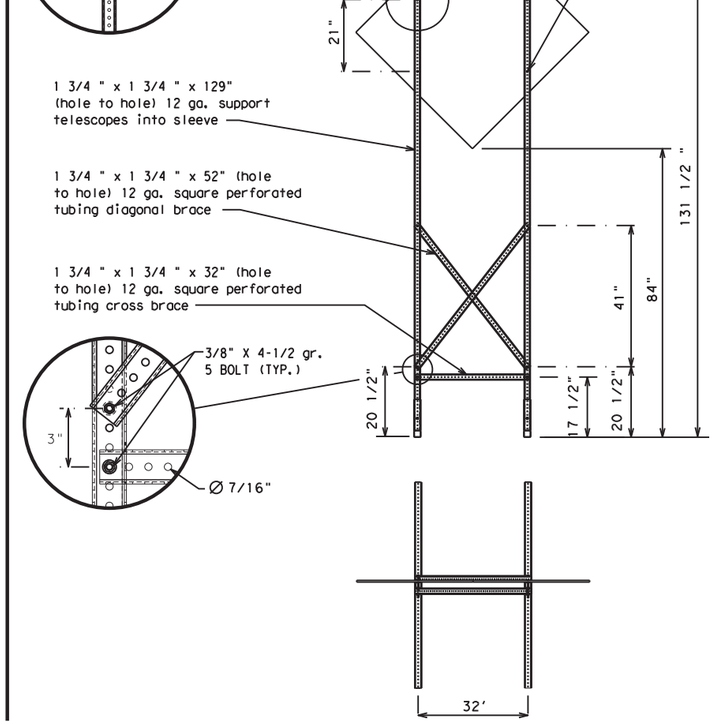
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

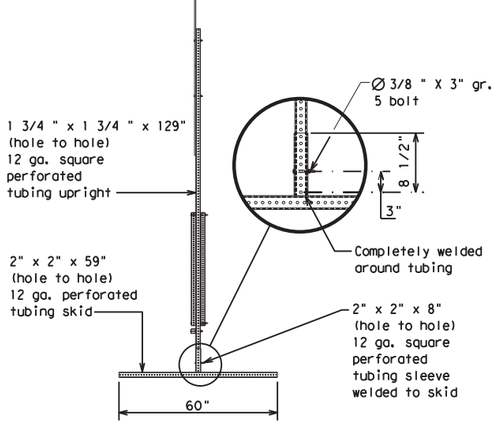


GROUND MOUNTED SIGN SUPPORTS

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

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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

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* 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

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

* 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)

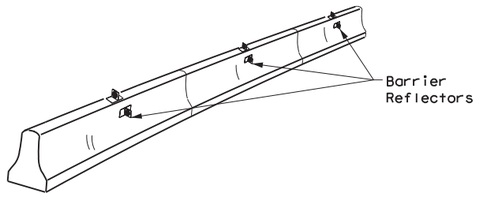
BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	6438	11	001	SH 22,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WACO	HILL,ETC		18

100

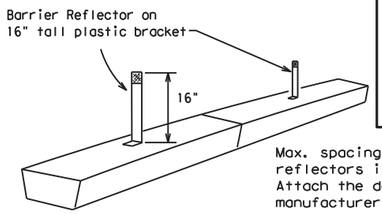
DATE: 8/29/2023 7:50:05 AM
FILE: T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM6438110O1\CADD\BASE\STANDARDS\bc-21.dgn

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.



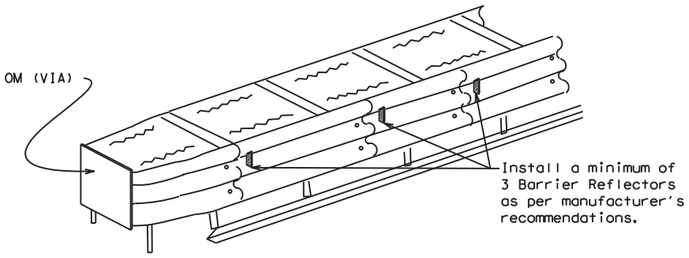
CONCRETE TRAFFIC BARRIER (CTB)

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)



DELINEATION OF END TREATMENTS

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

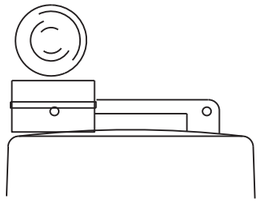
LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the appropriate 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

WARNING LIGHTS

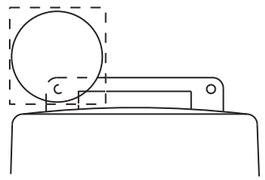


Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

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.



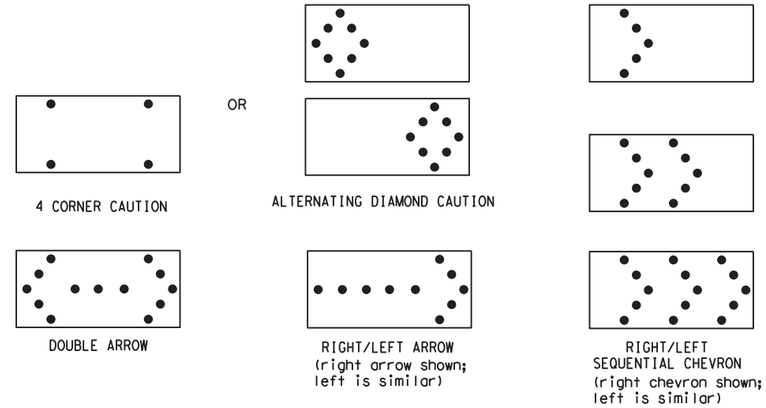
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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	6438	11	001	SH 22,ETC
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	WACO	HILL,ETC		19

101

DATE: 8/29/2023 7:50:06 AM
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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:

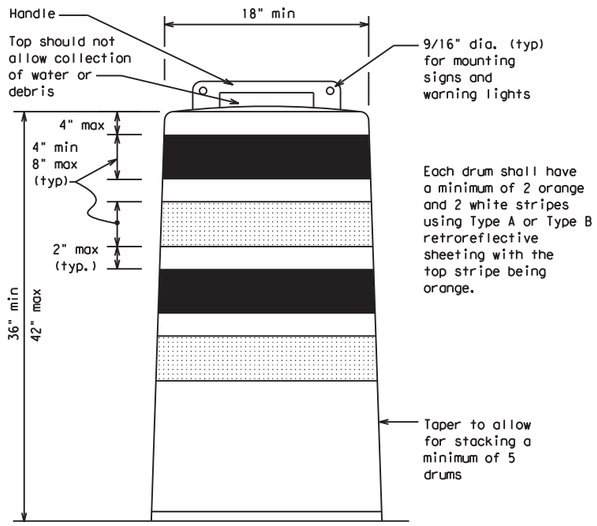
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

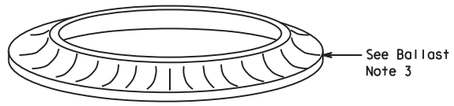
RETROREFLECTIVE SHEETING

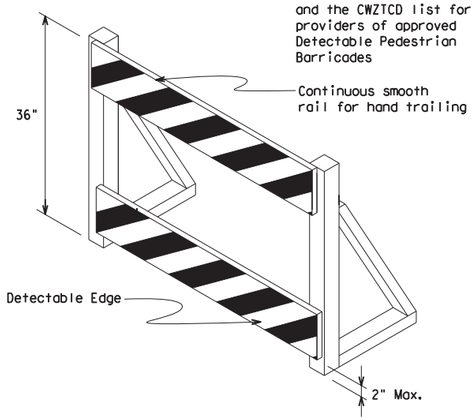
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall 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.



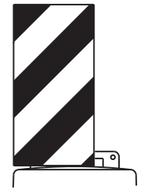




DETECTABLE PEDESTRIAN BARRICADES

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
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REVISIONS	6438	11	001	SH 22,ETC
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	WACO	HILL,ETC		20
7-13				

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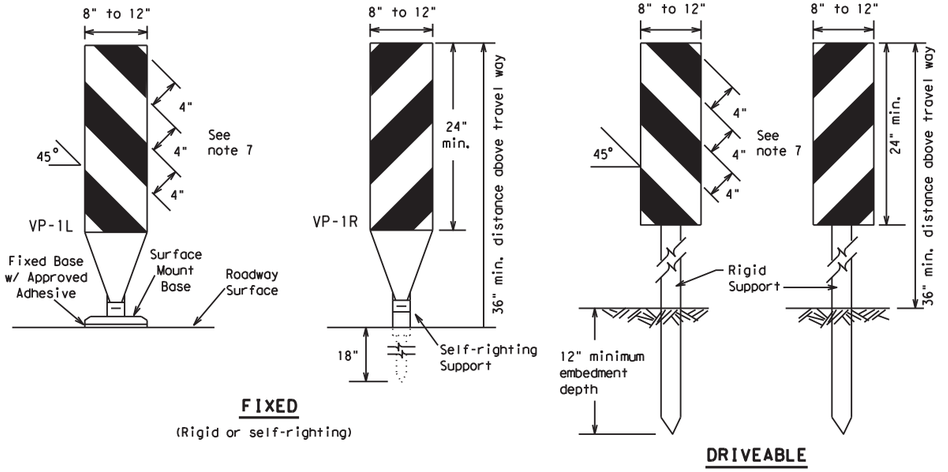
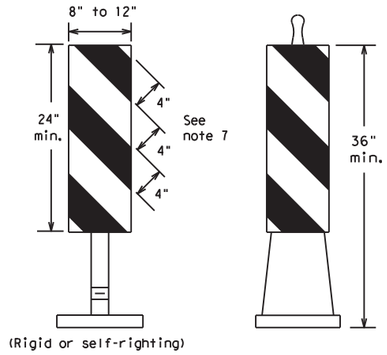


FIXED
(Rigid or self-righting)

DRIVEABLE

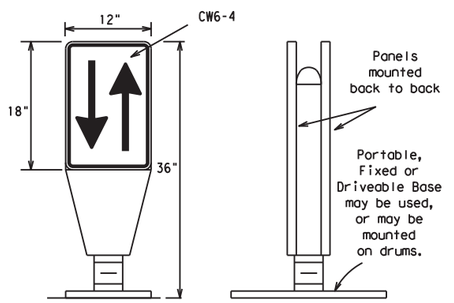


(Rigid or self-righting)

PORTABLE

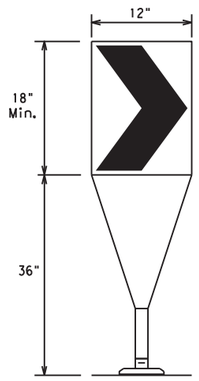
VERTICAL PANELS (VPs)

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.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

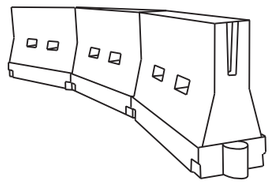
1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The 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.



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



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

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.

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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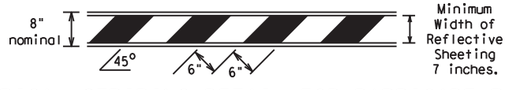
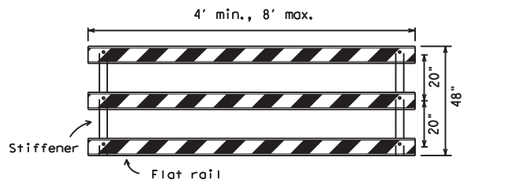
TYPE 3 BARRICADES

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.



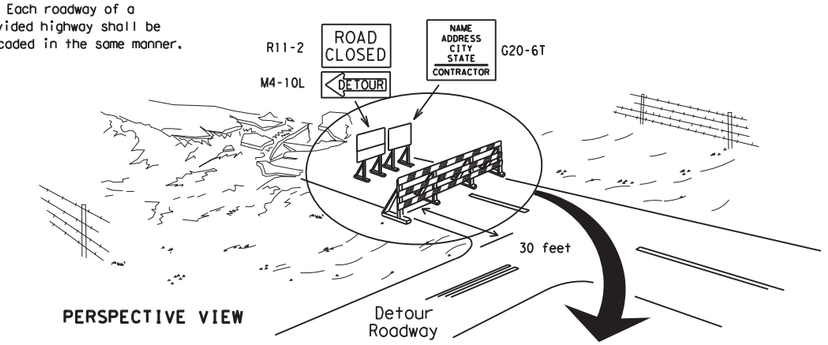
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

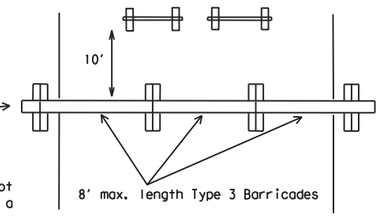
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

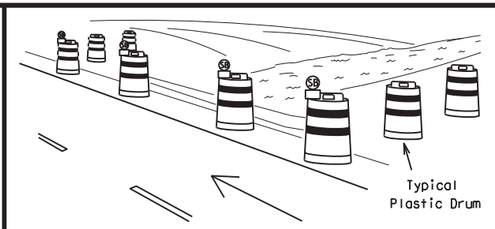
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

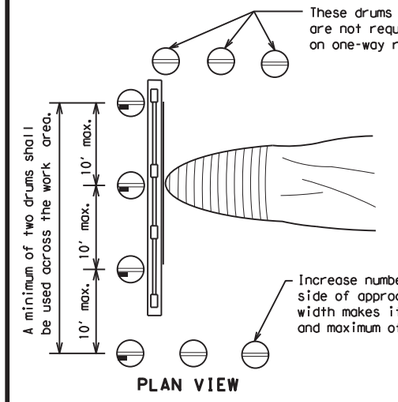
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

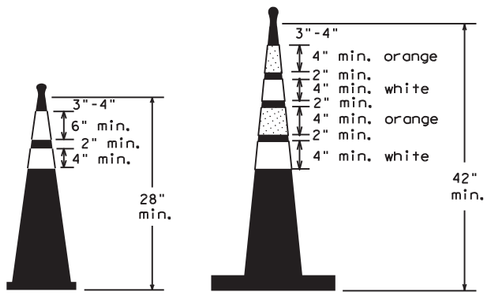
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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.



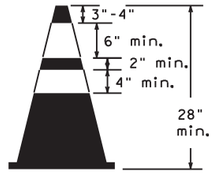
PLAN VIEW

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

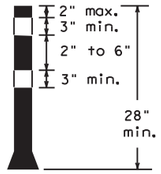
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

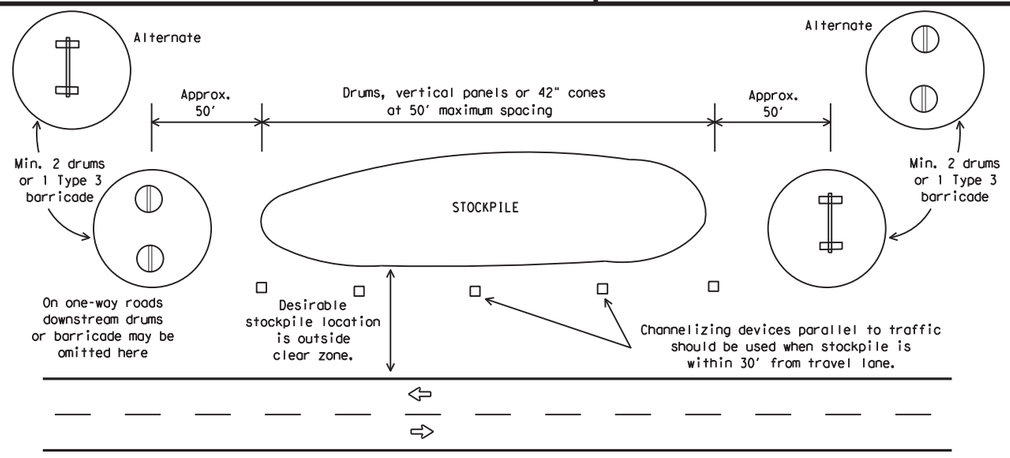


Tubular Marker

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

SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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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.

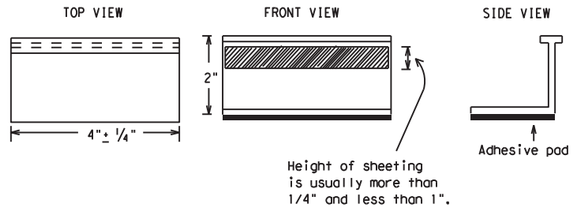
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

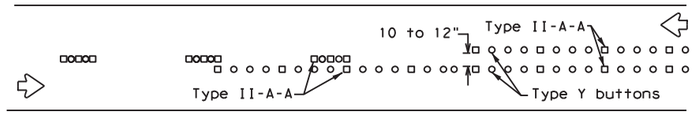
BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	6438	11	001	SH 22, ETC
2-98 9-07 5-21	DIST	COUNTY		SHEET NO.
1-02 7-13	WACO	HILL, ETC		23
11-02 8-14				

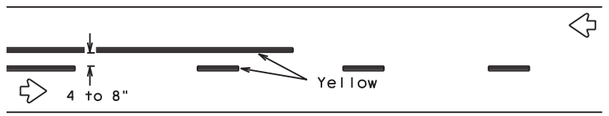
DATE: 8/29/2023 7:50:08 AM
FILE: T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM6438110O1\CADD\BASE\STANDARDS\bc-21.dgn

PAVEMENT MARKING PATTERNS

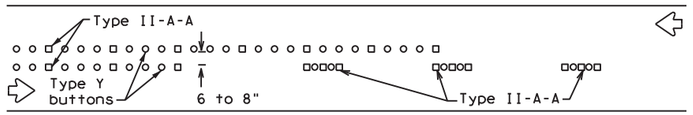
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



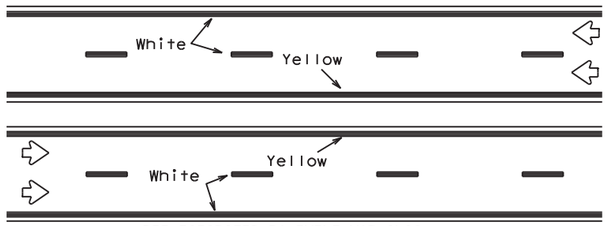
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



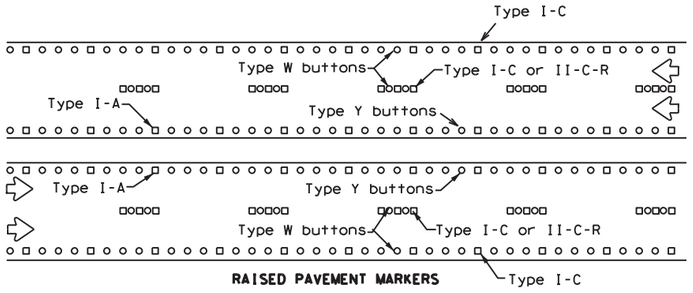
RAISED PAVEMENT MARKERS - PATTERN B

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



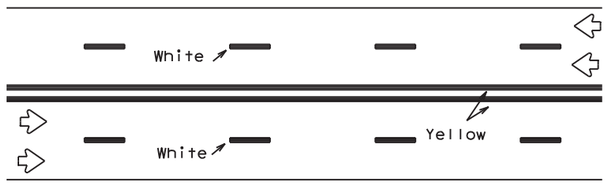
REFLECTORIZED PAVEMENT MARKINGS



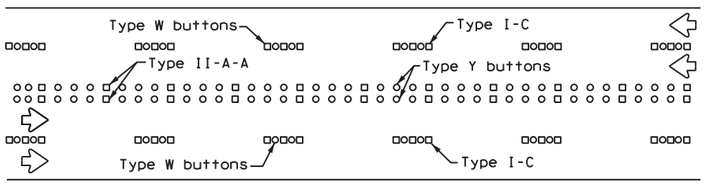
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



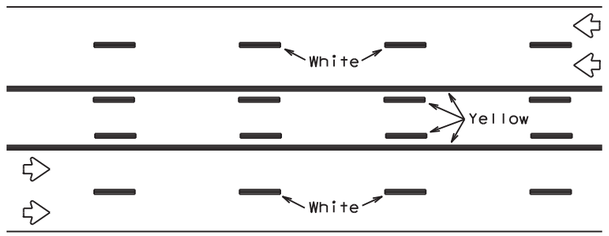
REFLECTORIZED PAVEMENT MARKINGS



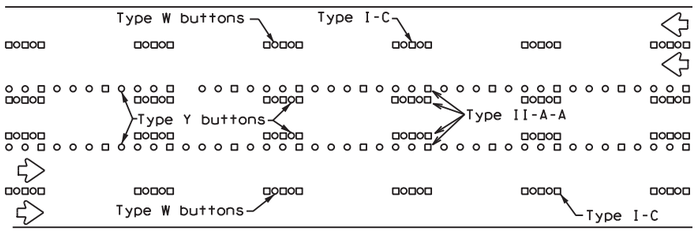
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

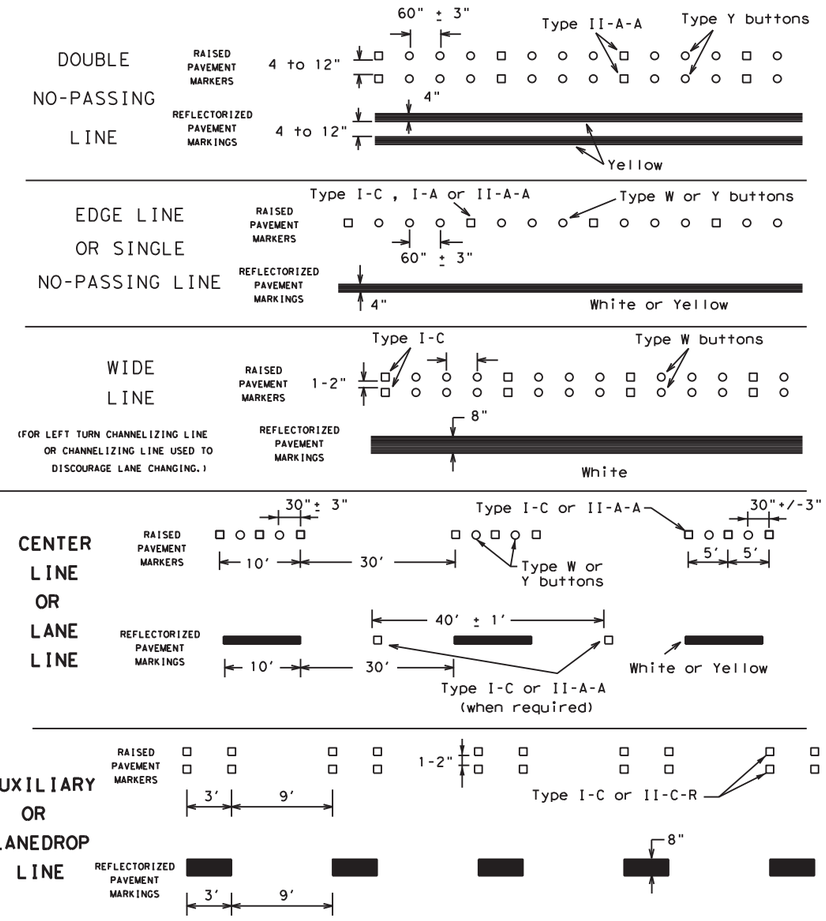


RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

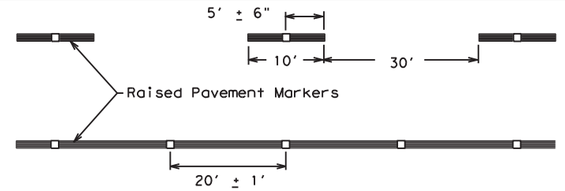
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



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	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		24

DATE: 8/29/2023
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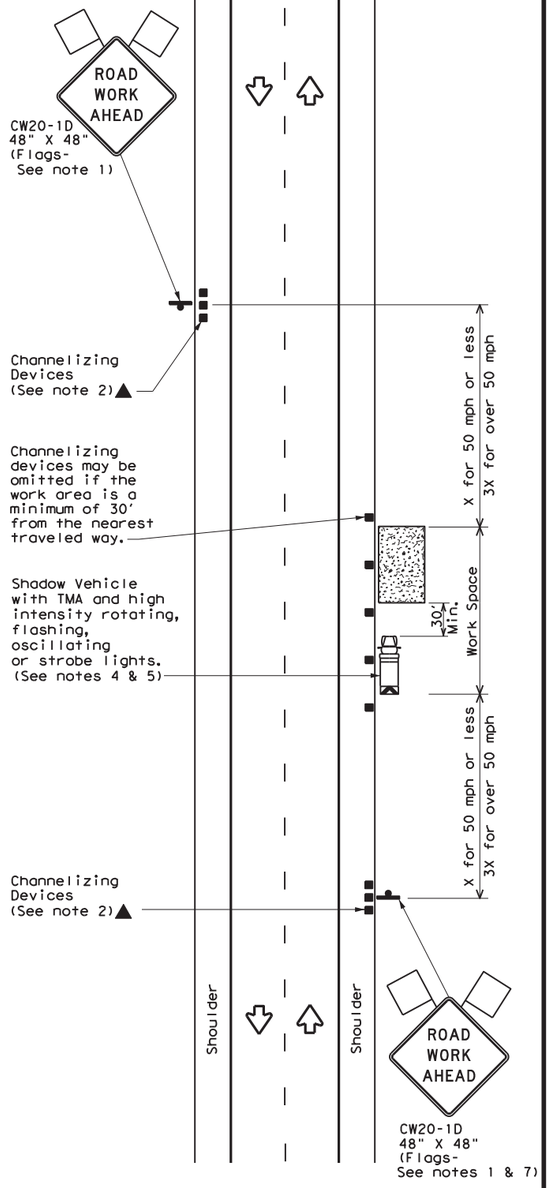
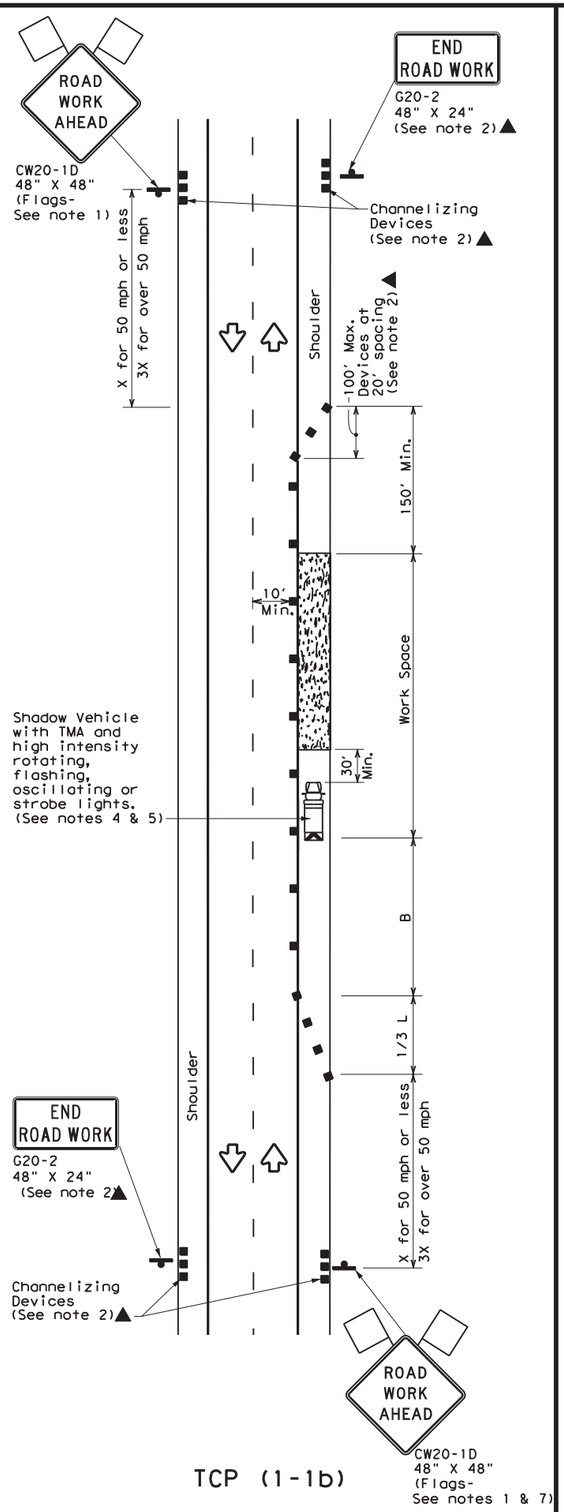


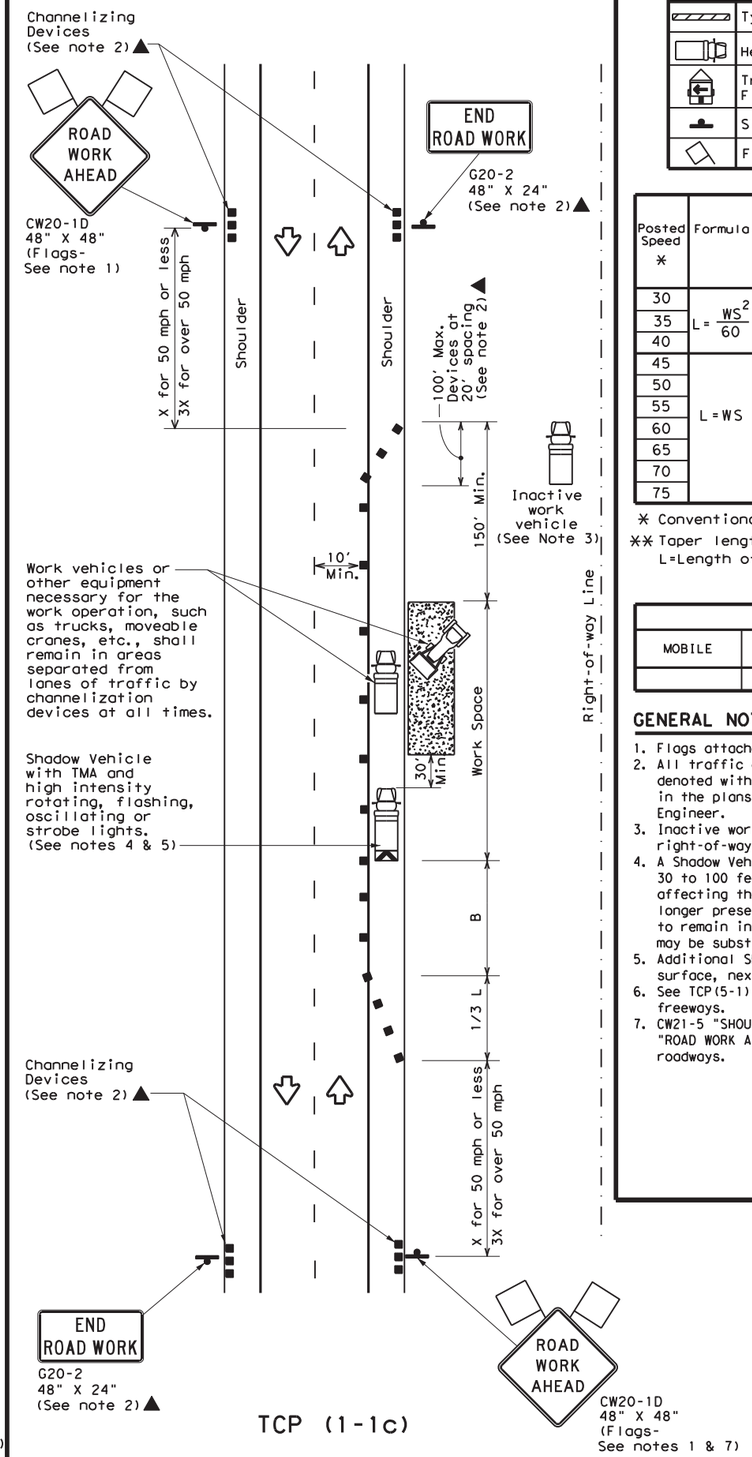
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

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 elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
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.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. 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(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98	6438	11	001	SH 22,ETC
8-95 2-12	DIST	COUNTY		SHEET NO.
1-97 2-18	WACO	HILL,ETC		25

DATE: 8/29/2023
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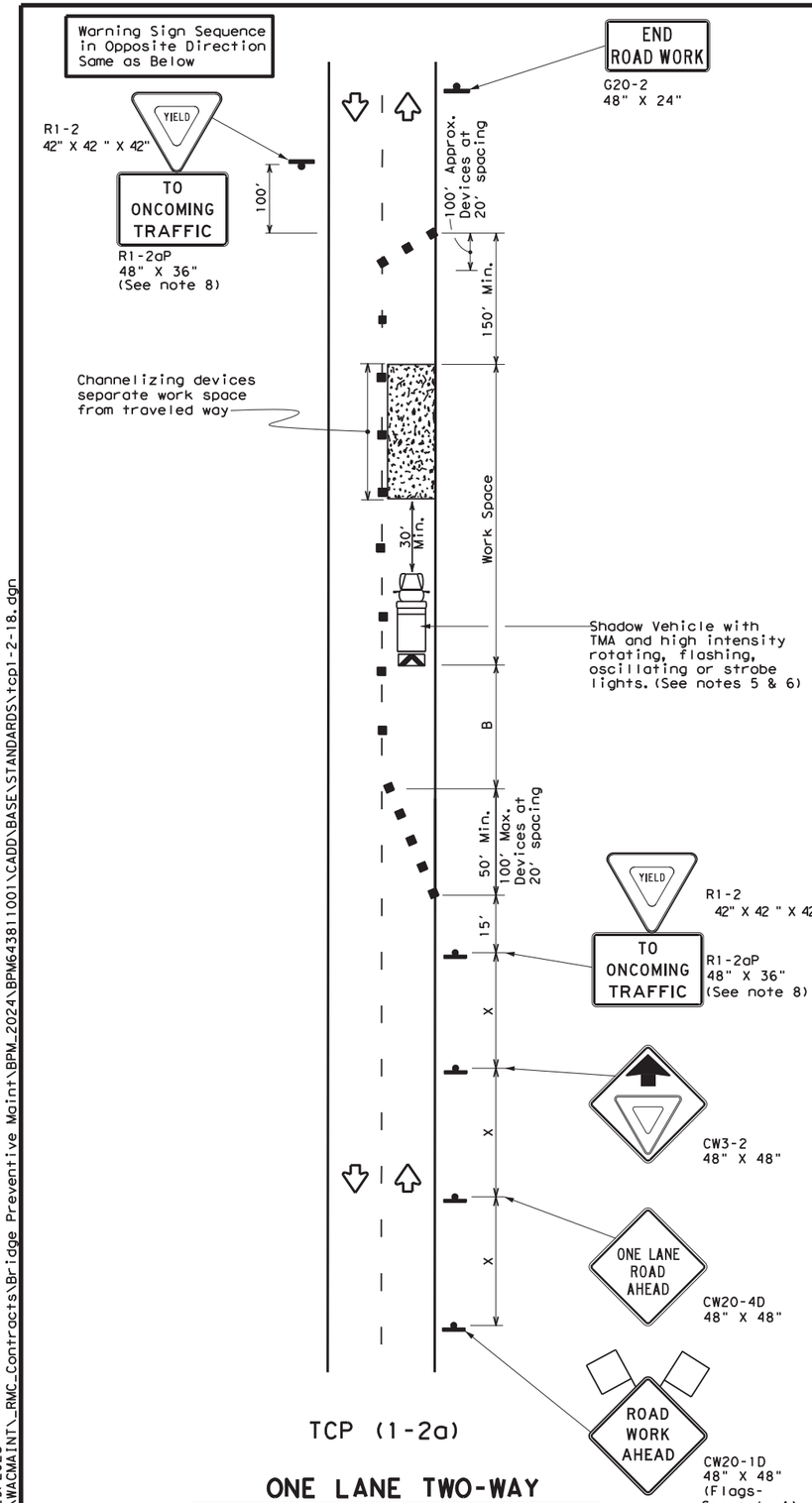
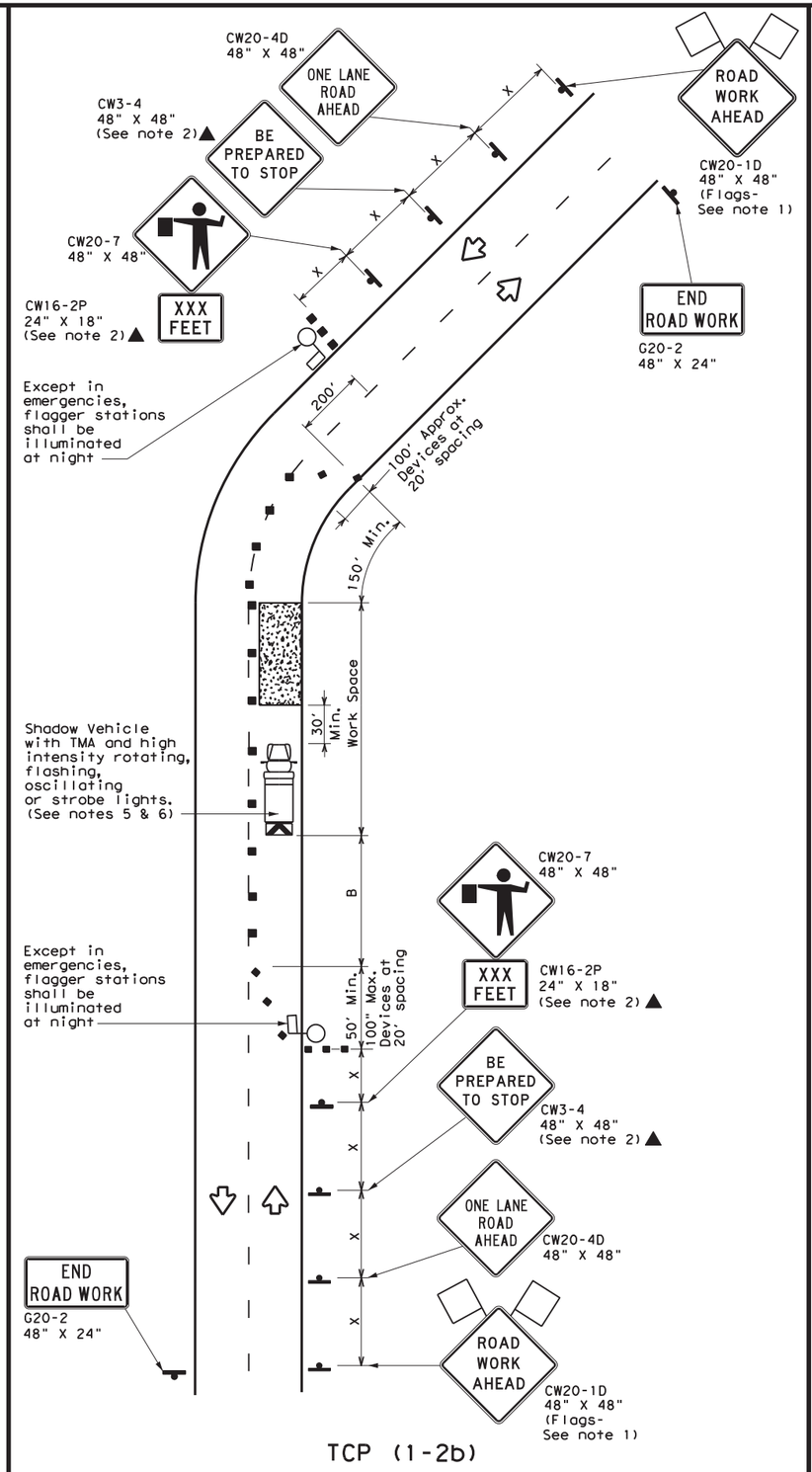


TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* 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 CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		26

DATE: 8/29/2023
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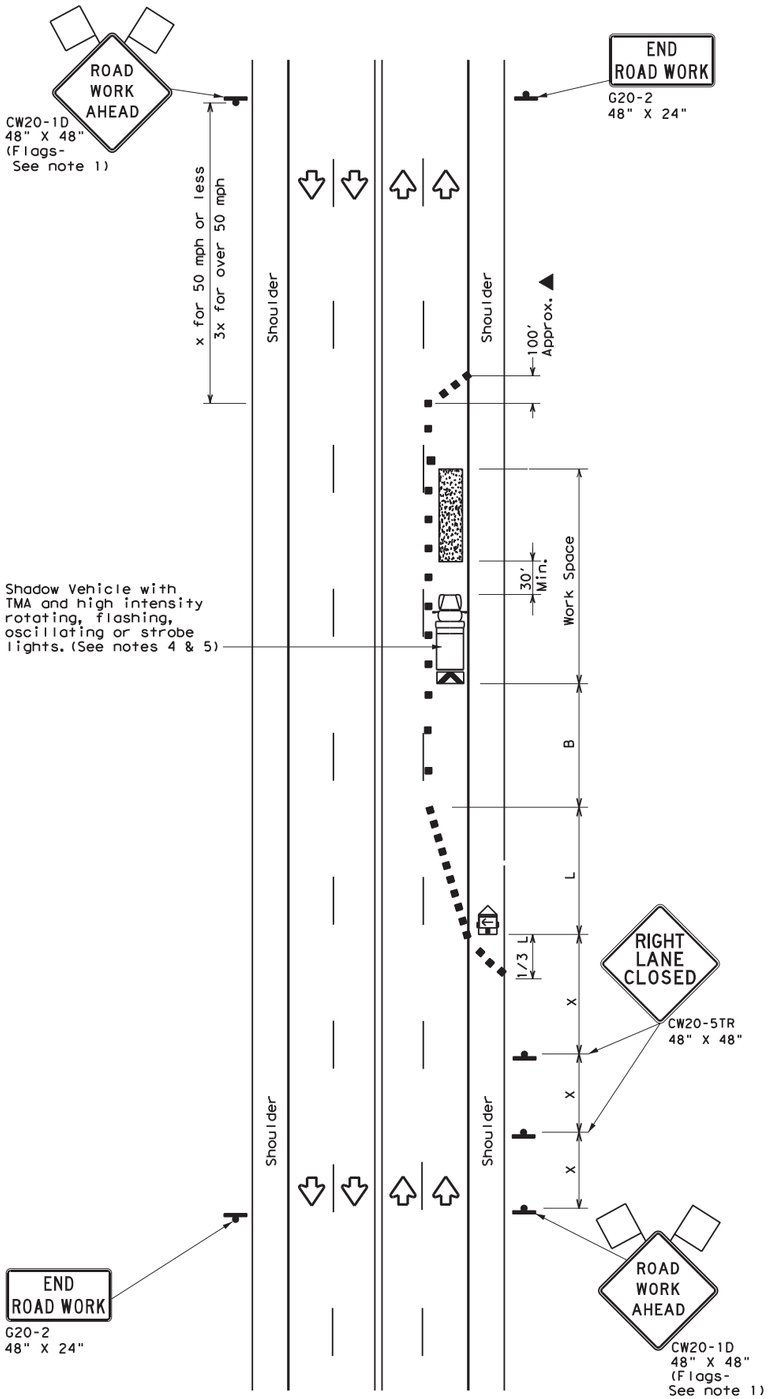
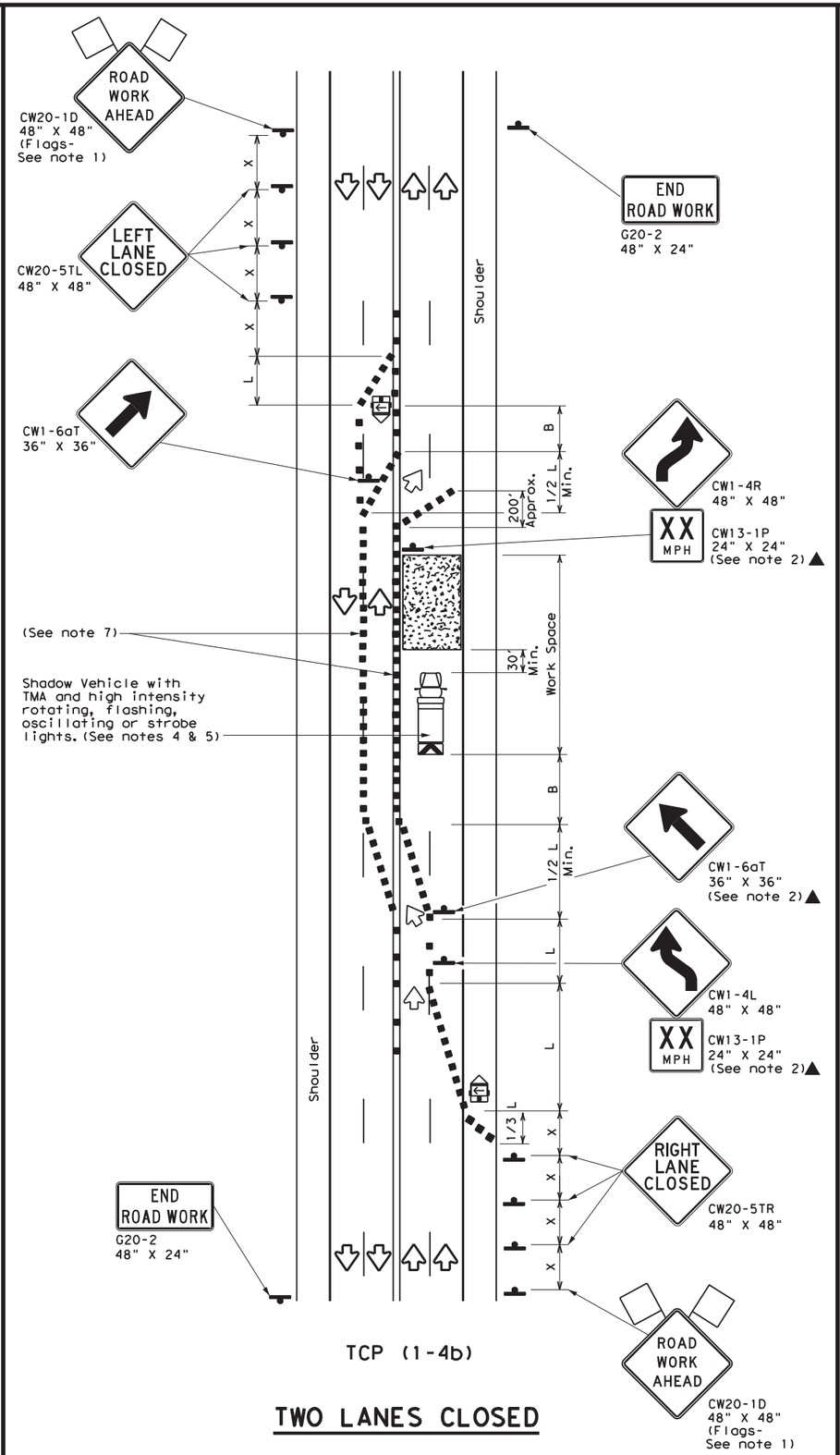


TCP (1-4a)

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
REVISIONS	6438	11	001	SH 22, ETC
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WACO	HILL, ETC		27
1-97 2-18				

DATE: 8/29/2023
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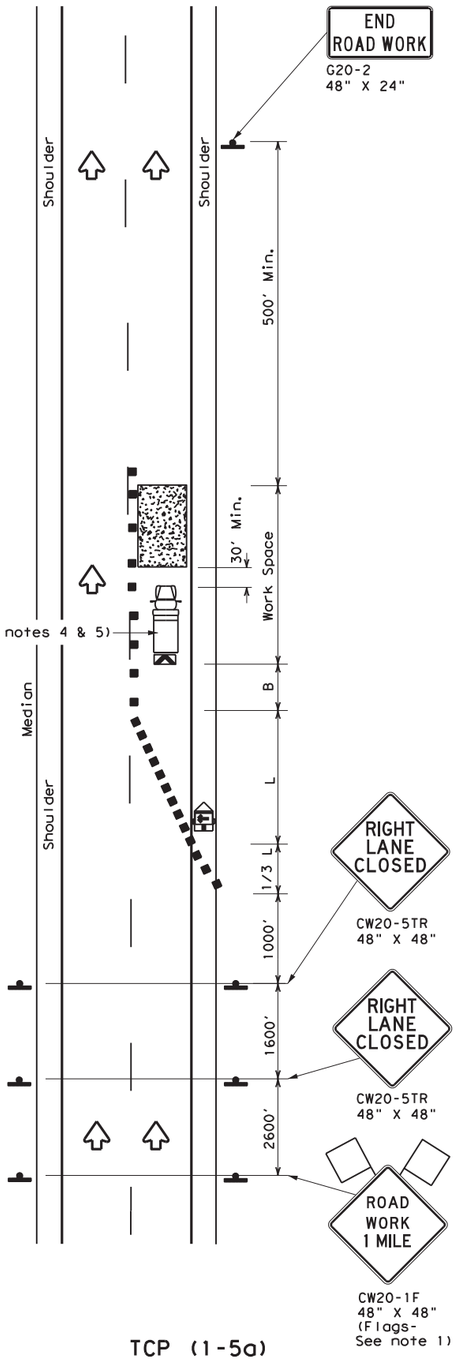
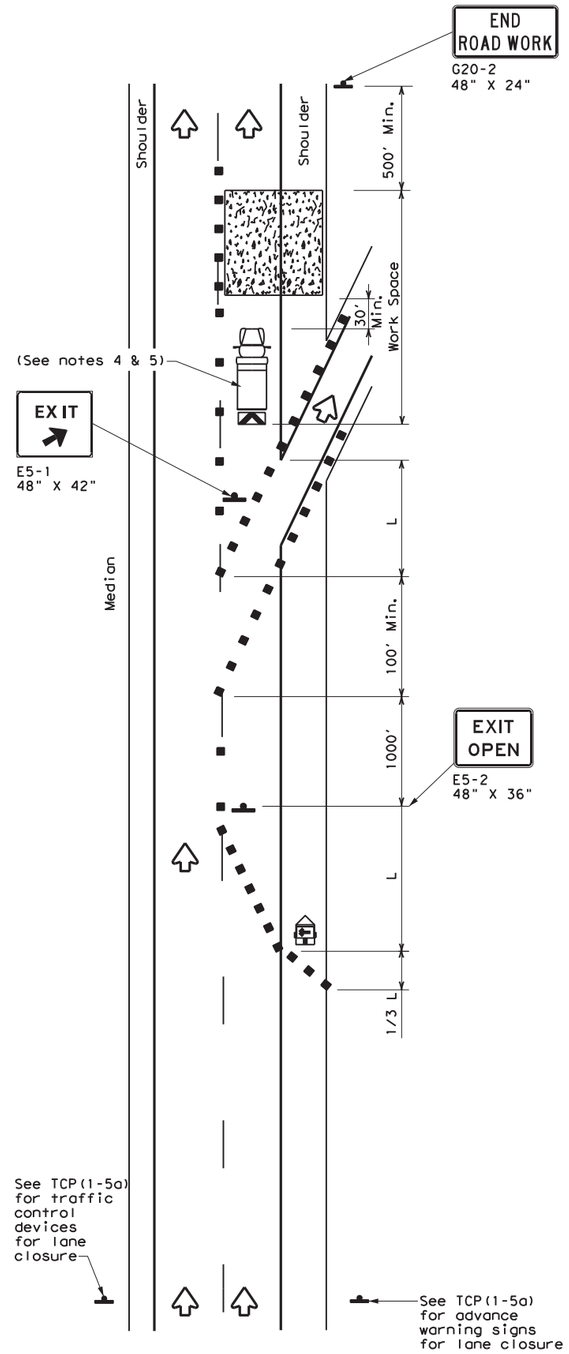


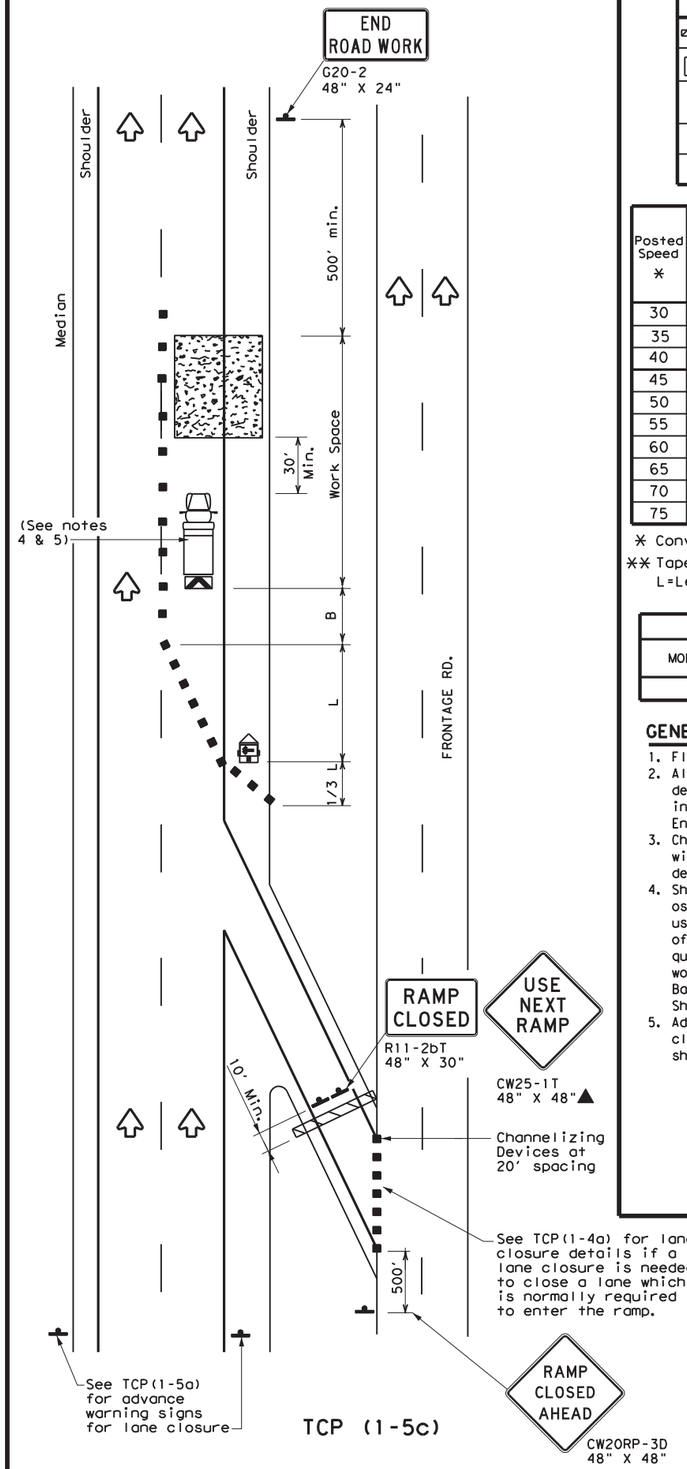
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
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 in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		28

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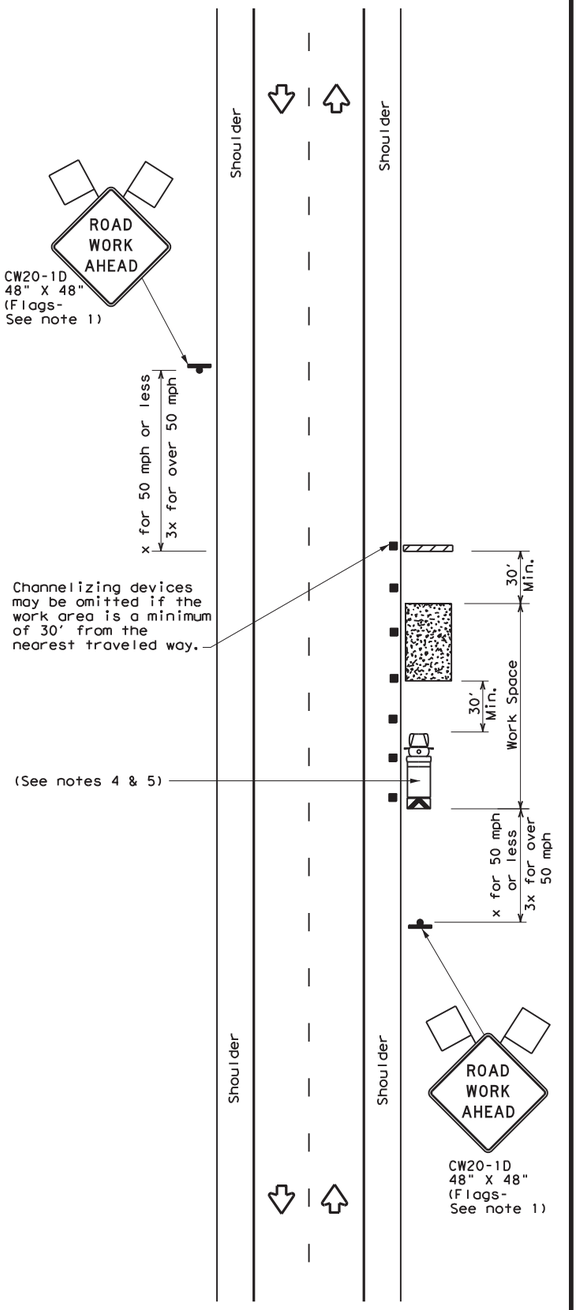
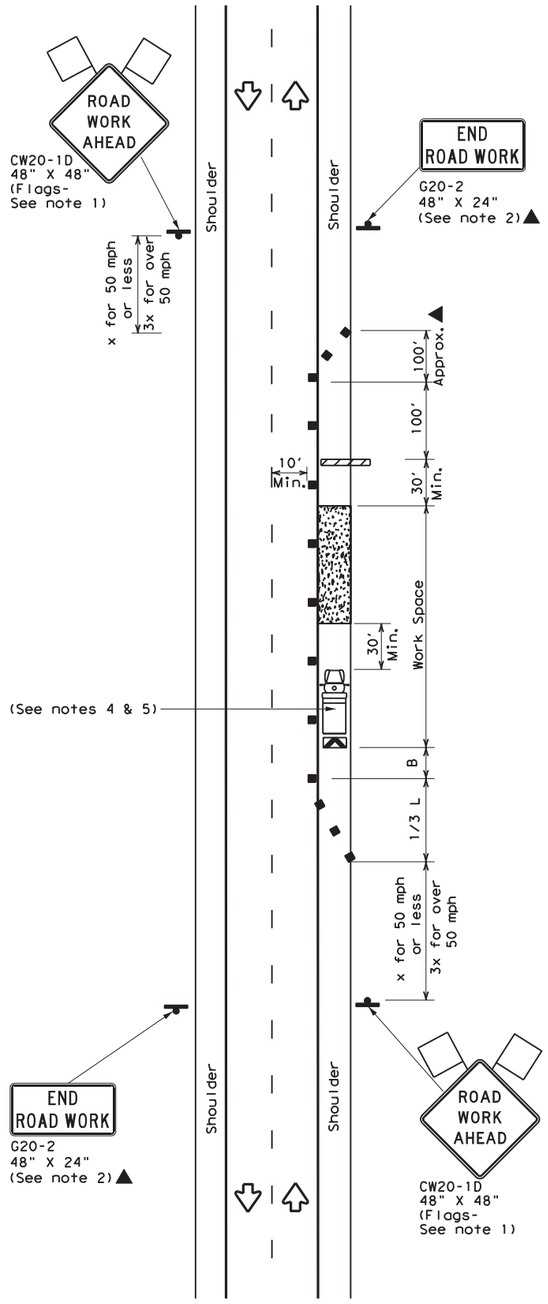
DATE: 8/29/2023
FILE: T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM6438111001\CADD\BASE\STANDARDS\tcp2-1-18.dgn



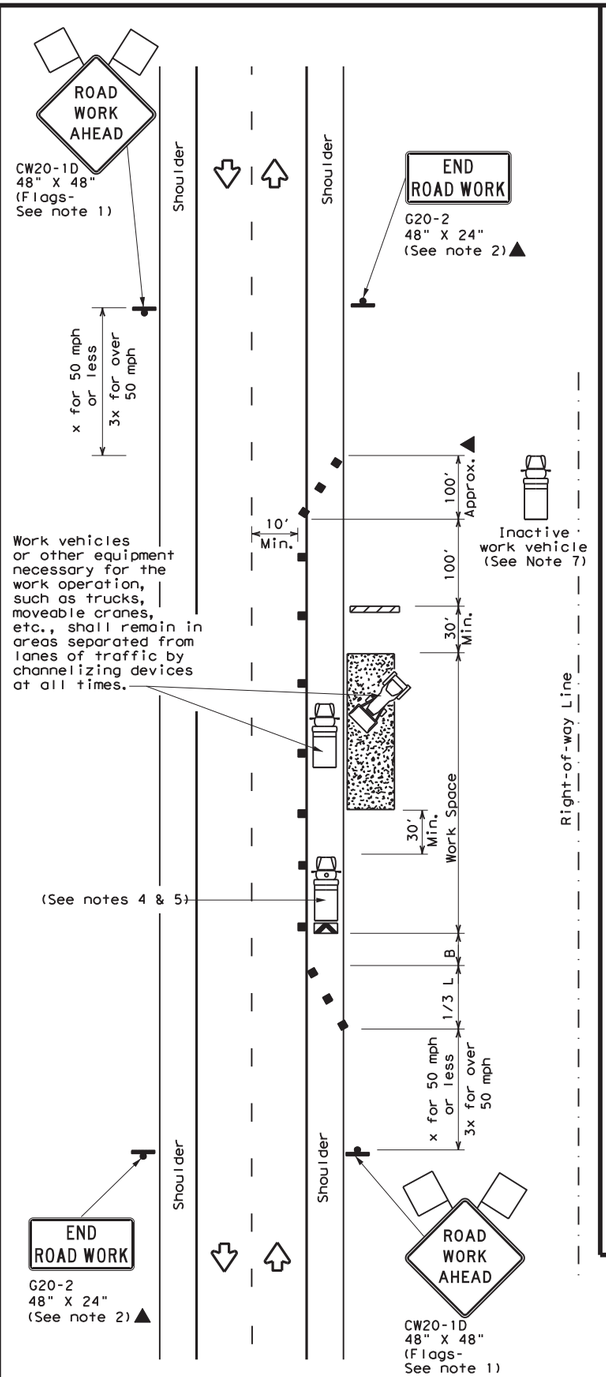
TCP (2-1a)

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 CW21-1D "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	6438	11	001	SH 22,ETC
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	WACO	HILL,ETC		29
1-97 2-18				

DATE: 8/29/2023
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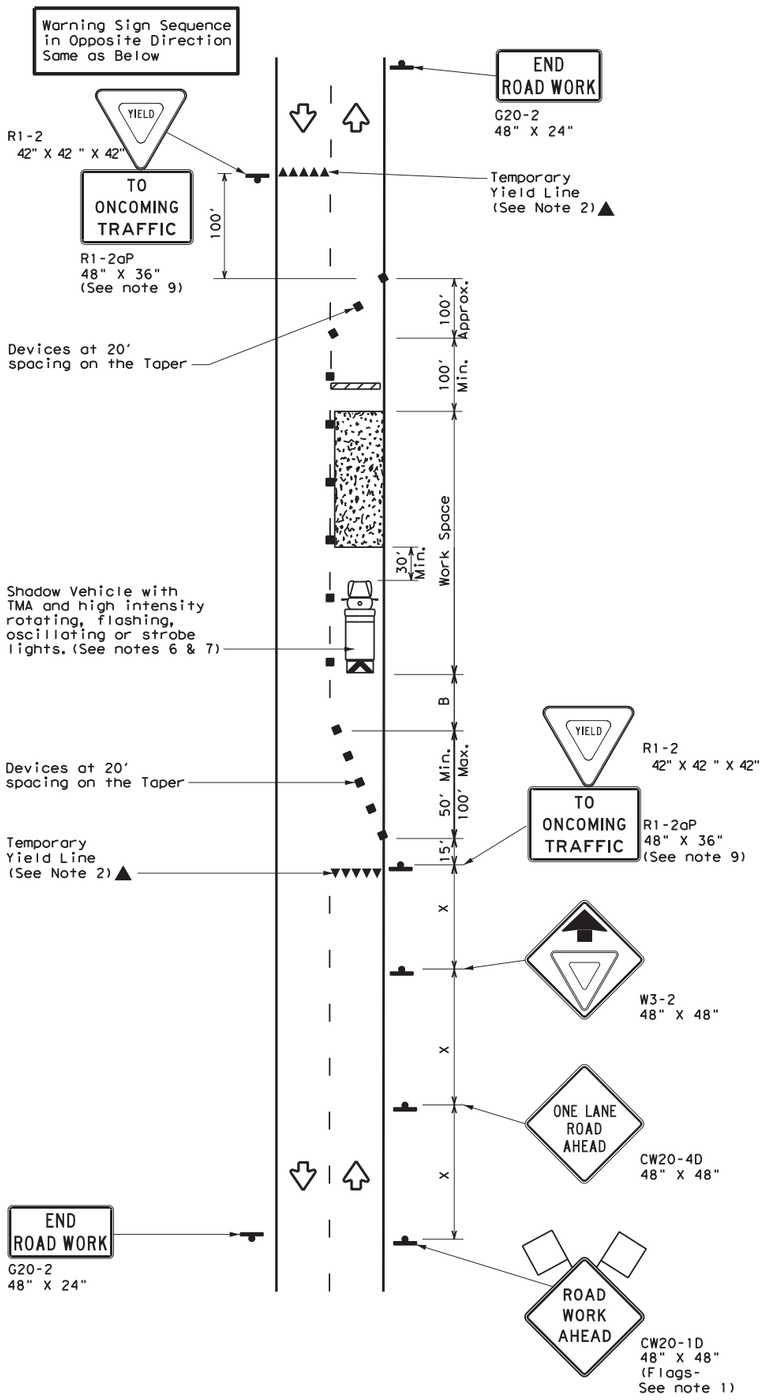
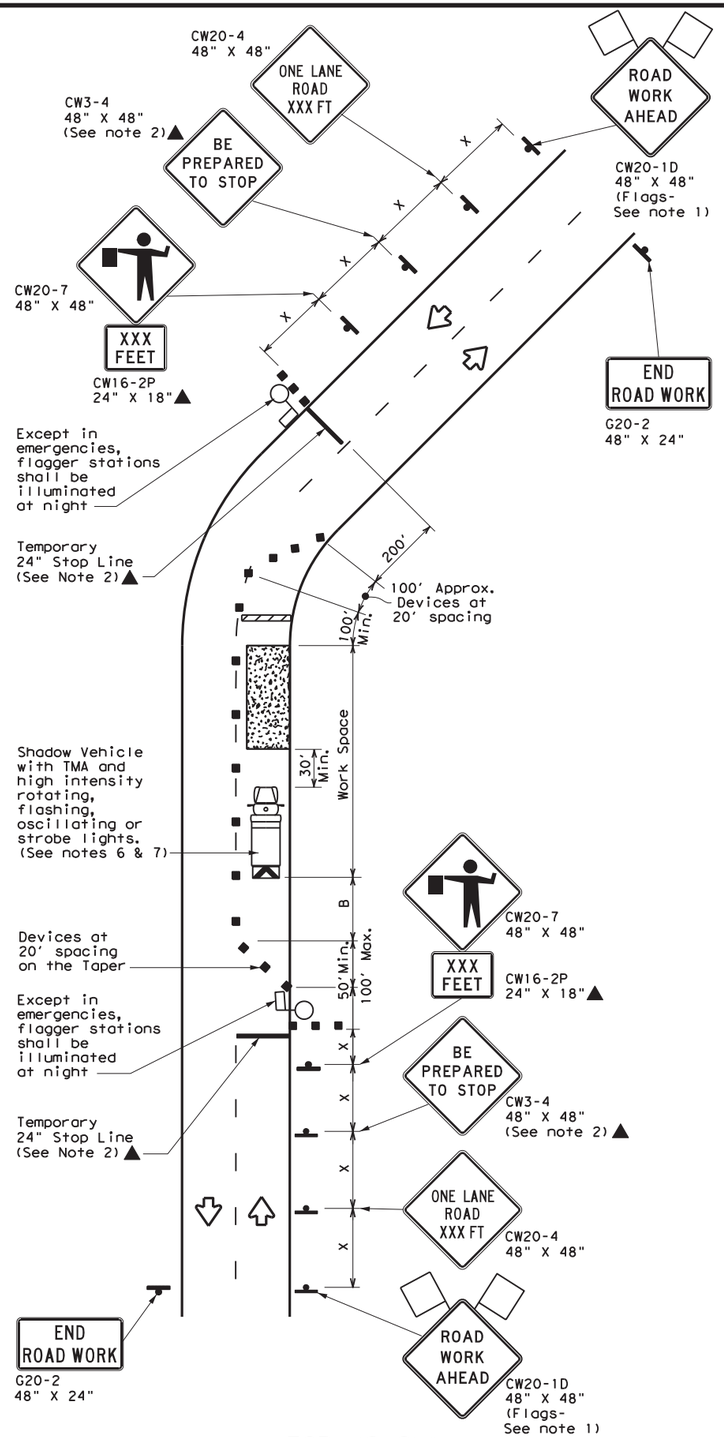


TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* 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 CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. 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.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03 1-97 2-12 4-98 2-18	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		30

DATE: 8/29/2023
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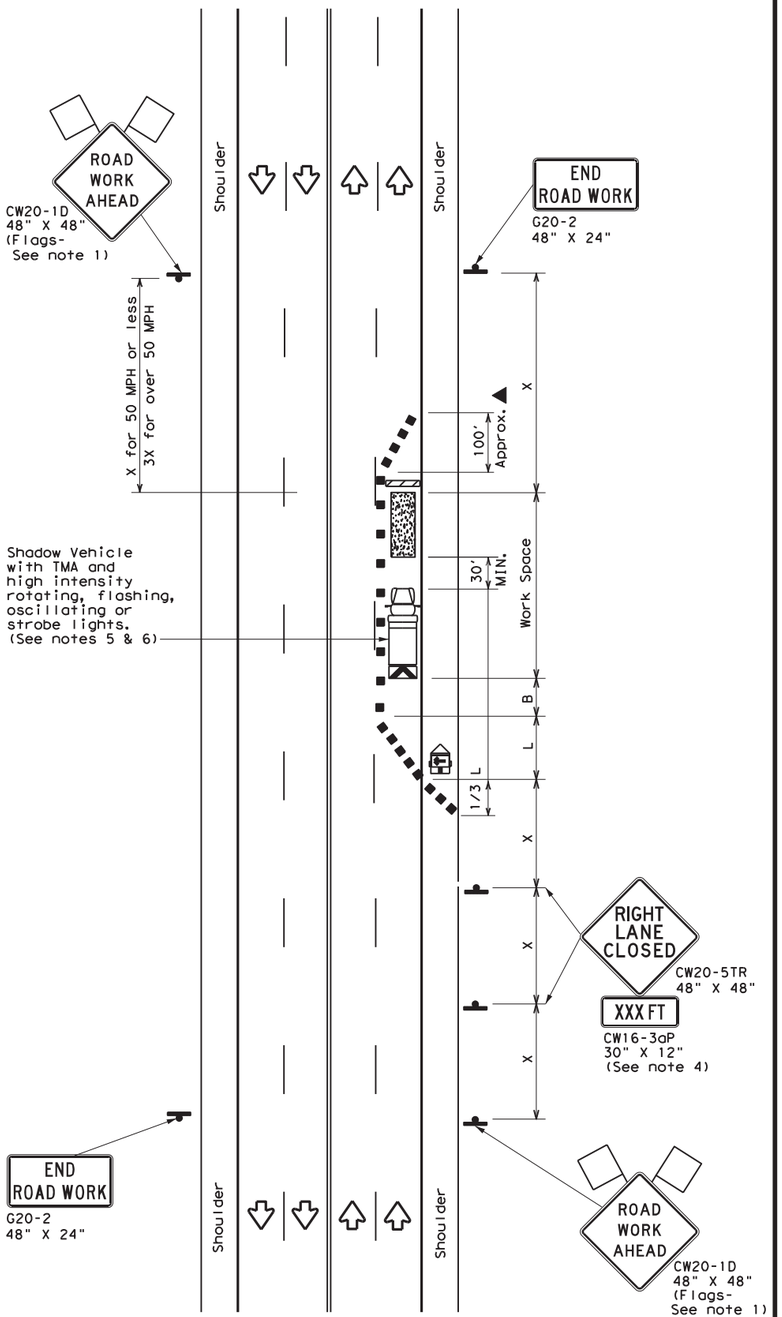
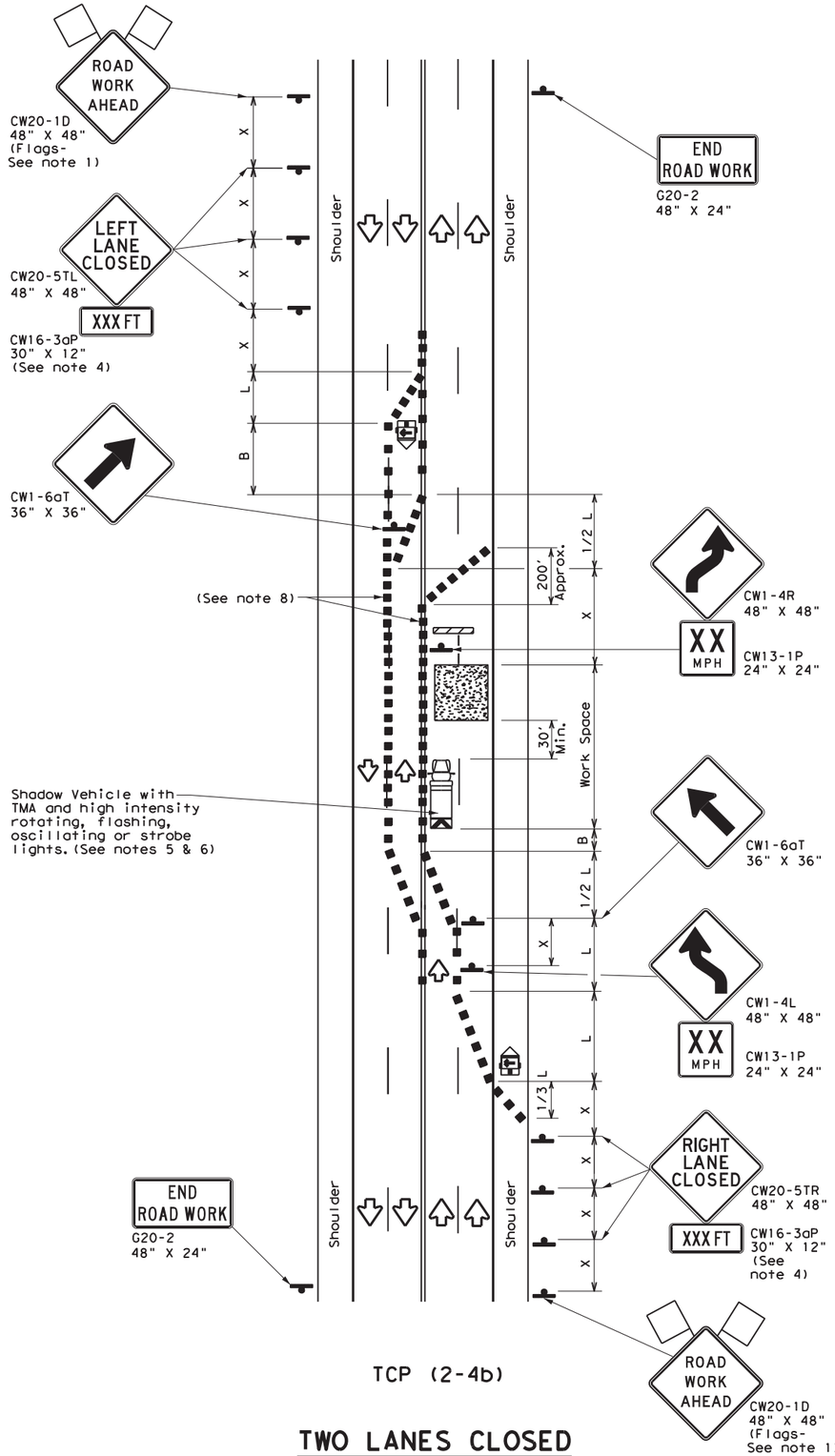


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

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 downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. 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.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. 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 to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations 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 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area 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(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	6438	11	001	SH 22, ETC
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	WACO	HILL, ETC		31

DATE: 8/29/2023
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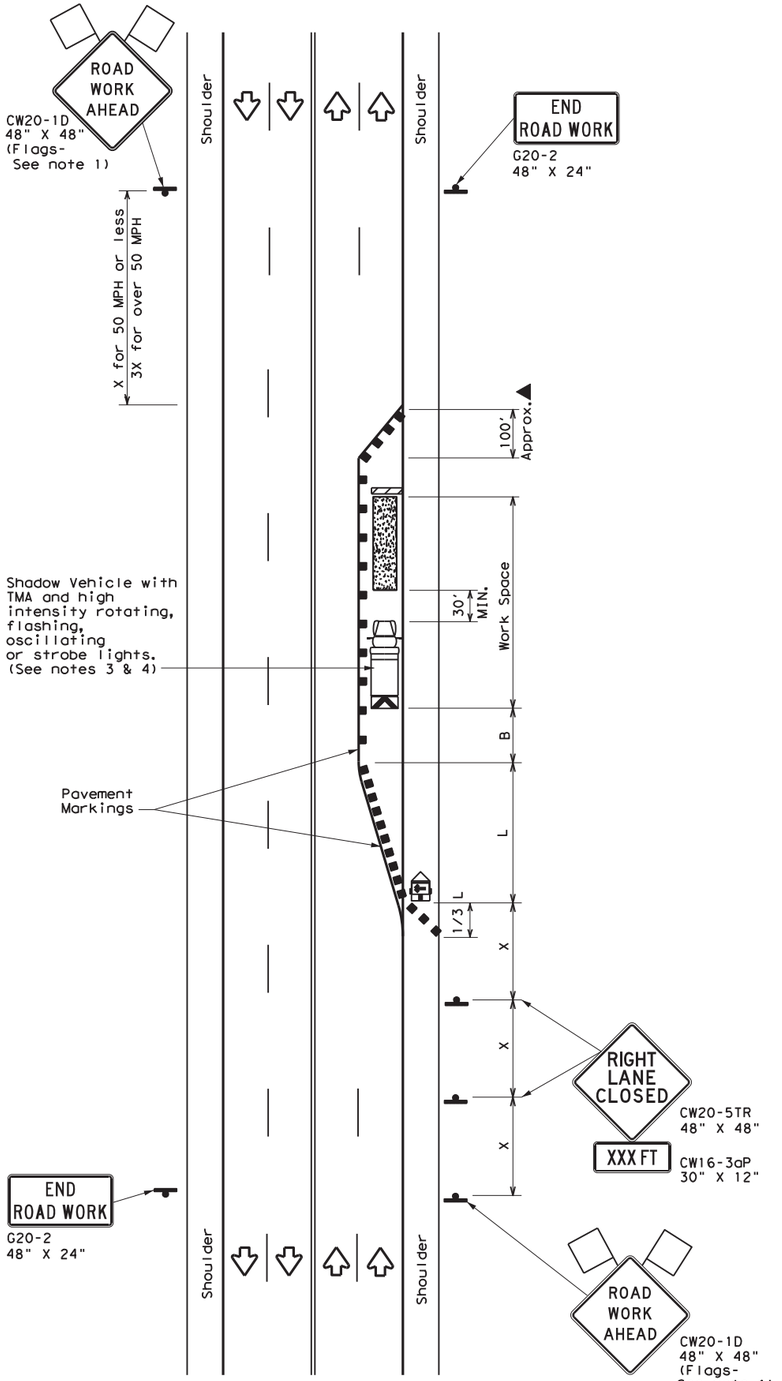
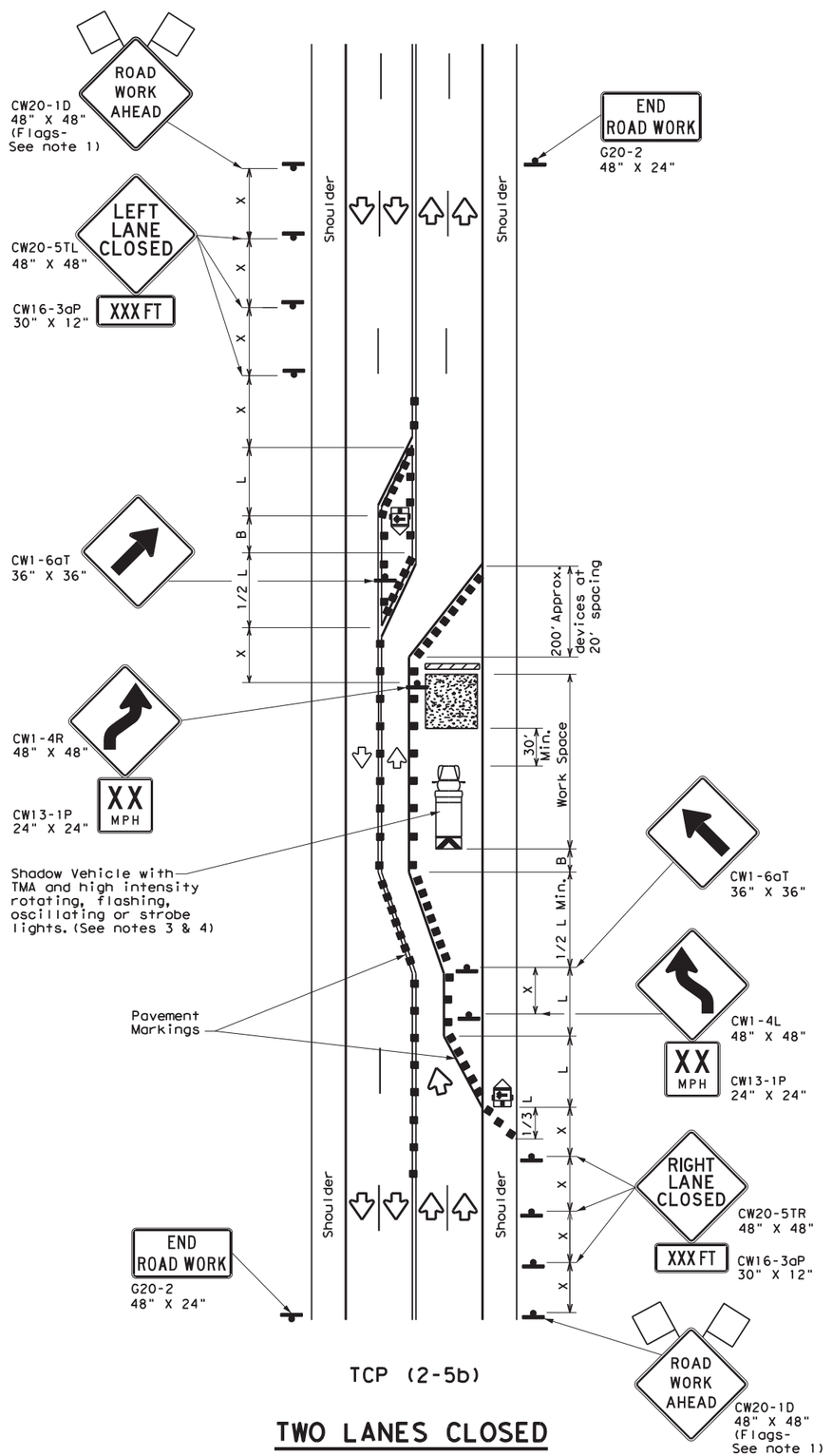


TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

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. 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 eposure 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 substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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 to protect the work space from opposing traffic, with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-18

FILE: tcp2-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 2-12	6438	11	001	SH 22,ETC
1-97 3-03	DIST	COUNTY		SHEET NO.
4-98 2-18	WACO	HILL,ETC		32

DATE: 8/29/2023
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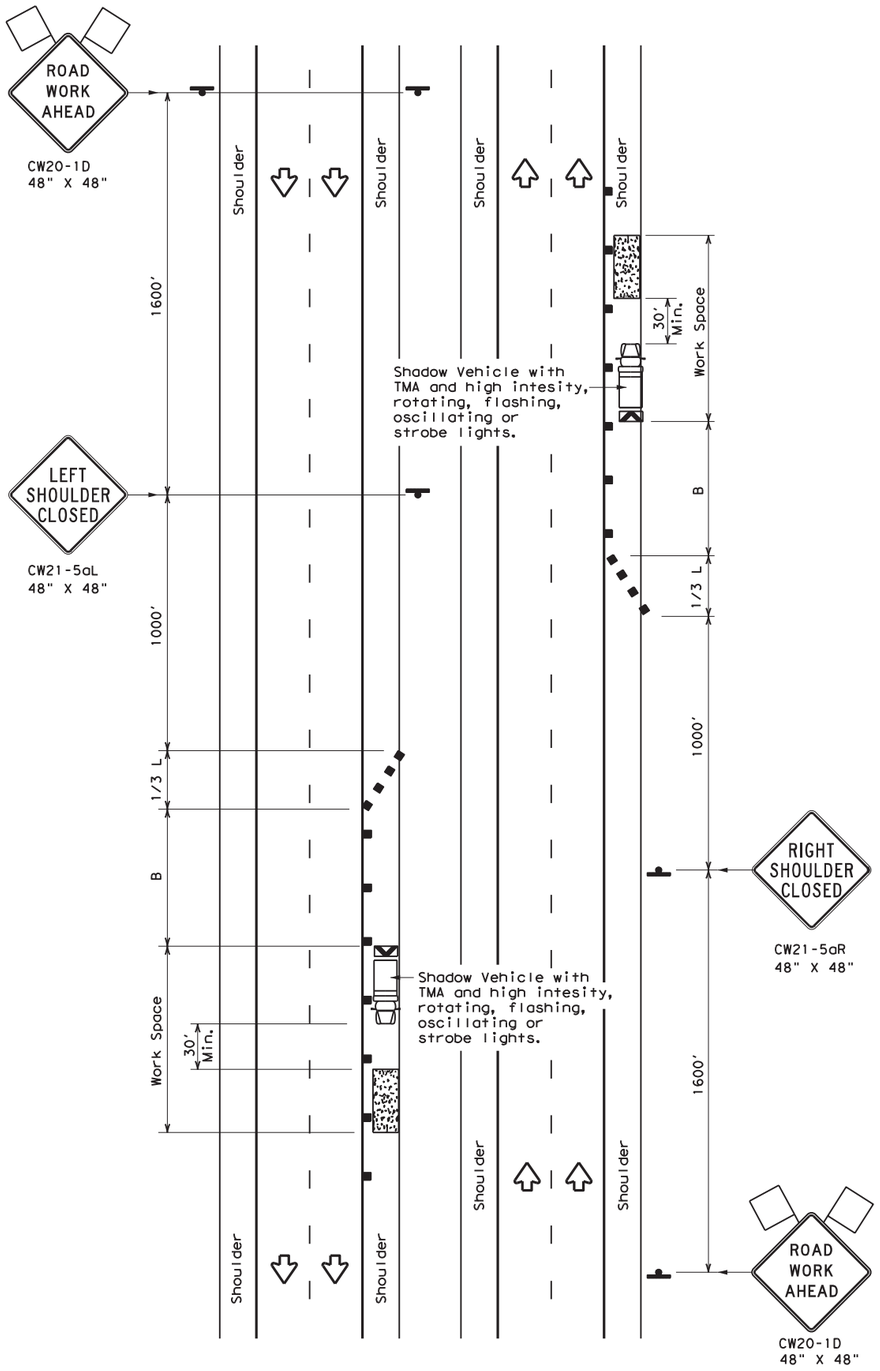
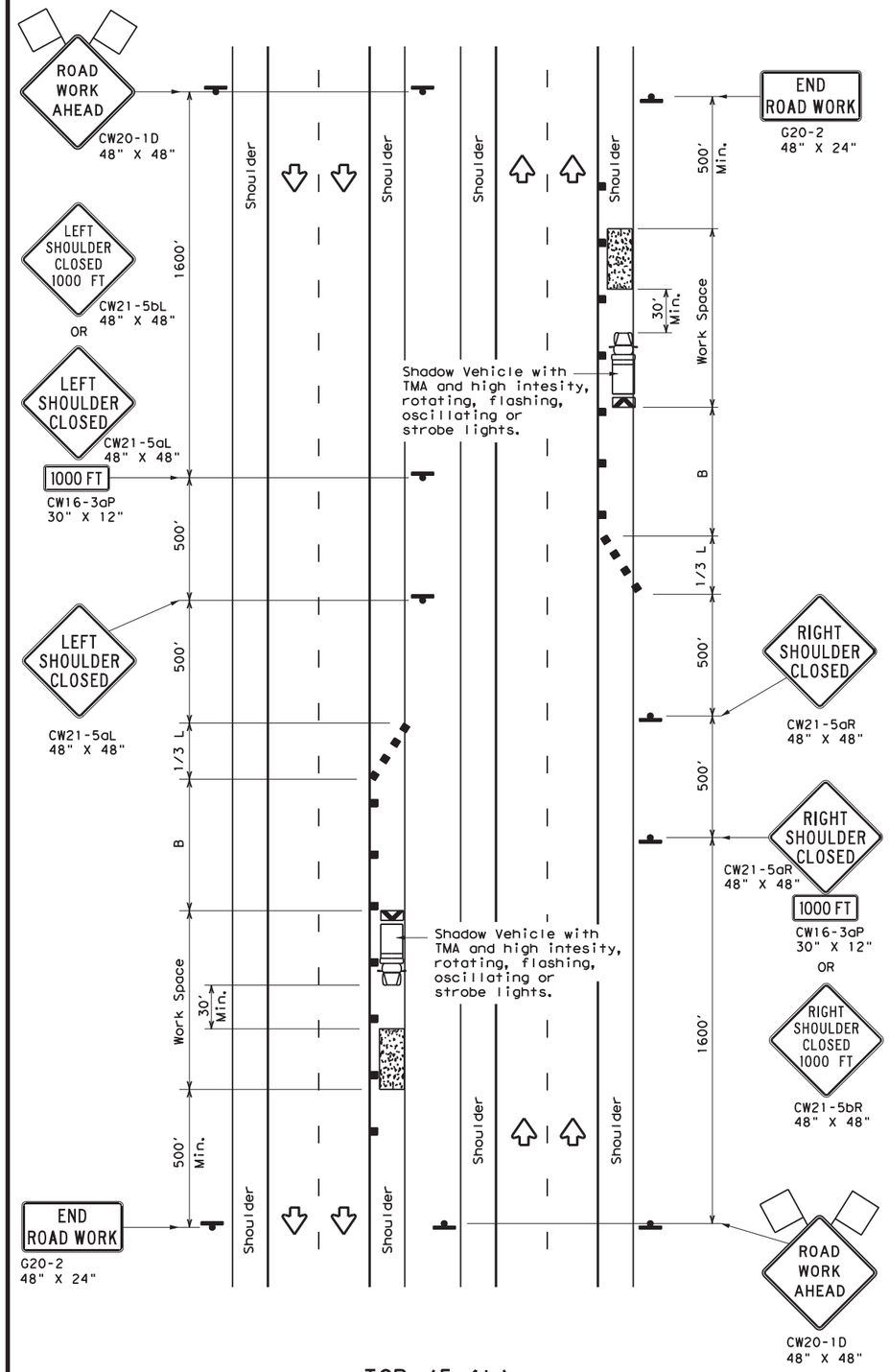


TCP (5-1a)

WORK AREA ON SHOULDER



TCP (5-1b)

WORK AREA ON SHOULDER

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	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	90'
35		205'	225'	245'	35'	70'	120'
40		265'	295'	320'	40'	80'	155'
45	L=WS	450'	495'	540'	45'	90'	195'
50		500'	550'	600'	50'	100'	240'
55		550'	605'	660'	55'	110'	295'
60		600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75		750'	825'	900'	75'	150'	540'
80		800'	880'	960'	80'	160'	615'

* 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
	TCP(5-1a)	TCP(5-1b)	TCP(5-1b)	

GENERAL NOTES

1. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30' to 100' in advance of the area of crew exposure without adversely effecting the performance or quality of the work. Type 3 barricades or drums may be substituted when workers on foot are no longer present when approved by the Engineer.
2. 28" tall or taller one-piece cones will be allowed only for Short Duration or Short Term stationary operations when workers are present to maintain the devices upright and in proper location. Intermediate Term stationary work areas should use Drums, Vertical Panels or 42" tall two-piece cones.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN SHOULDER WORK FOR FREEWAYS / EXPRESSWAYS

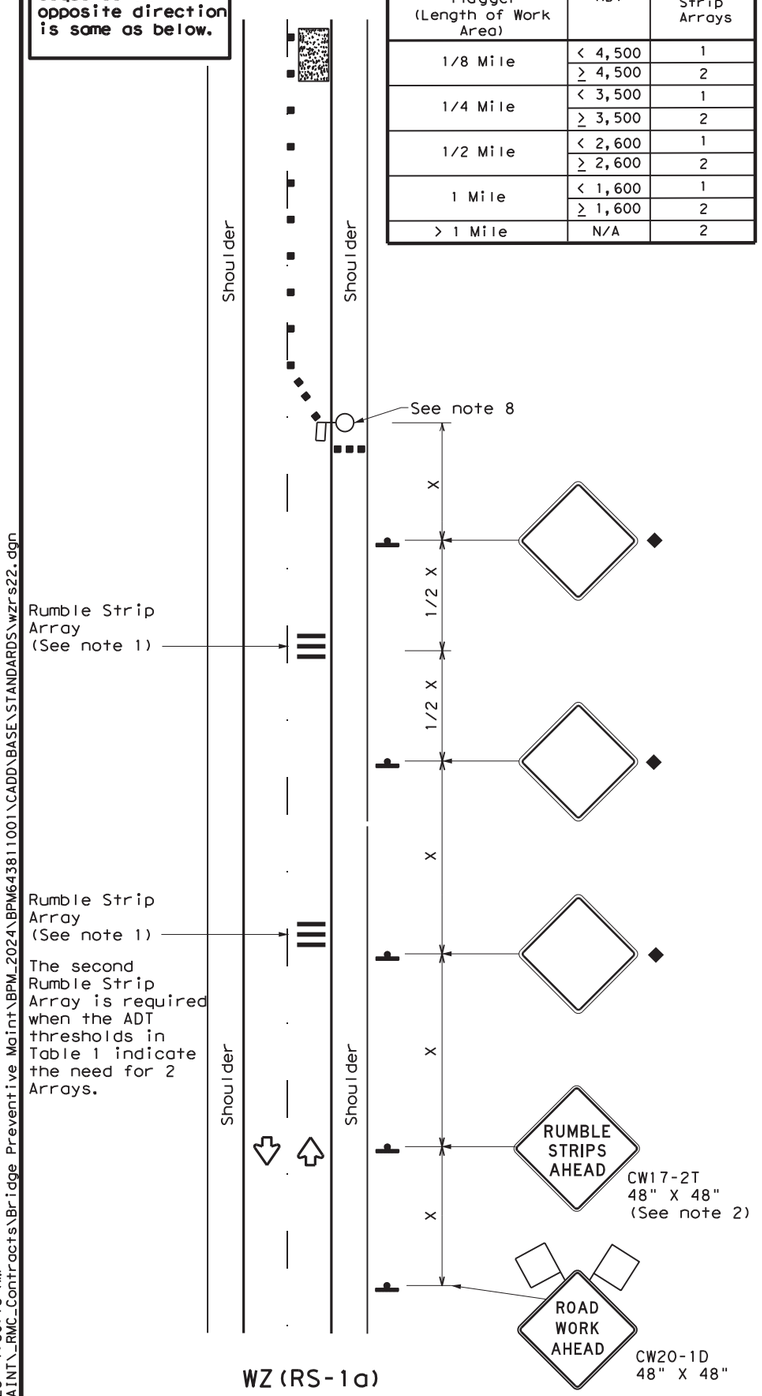
TCP(5-1)-18

FILE: tcp5-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS	6438	11	001	SH 22, ETC
2-18	DIST	COUNTY		SHEET NO.
	WACO	HILL, ETC		33

DATE: 8/29/2023 7:50:15 AM
FILE: T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM6438l1001\CADD\BASE\STANDARDS\wzrs22.dgn

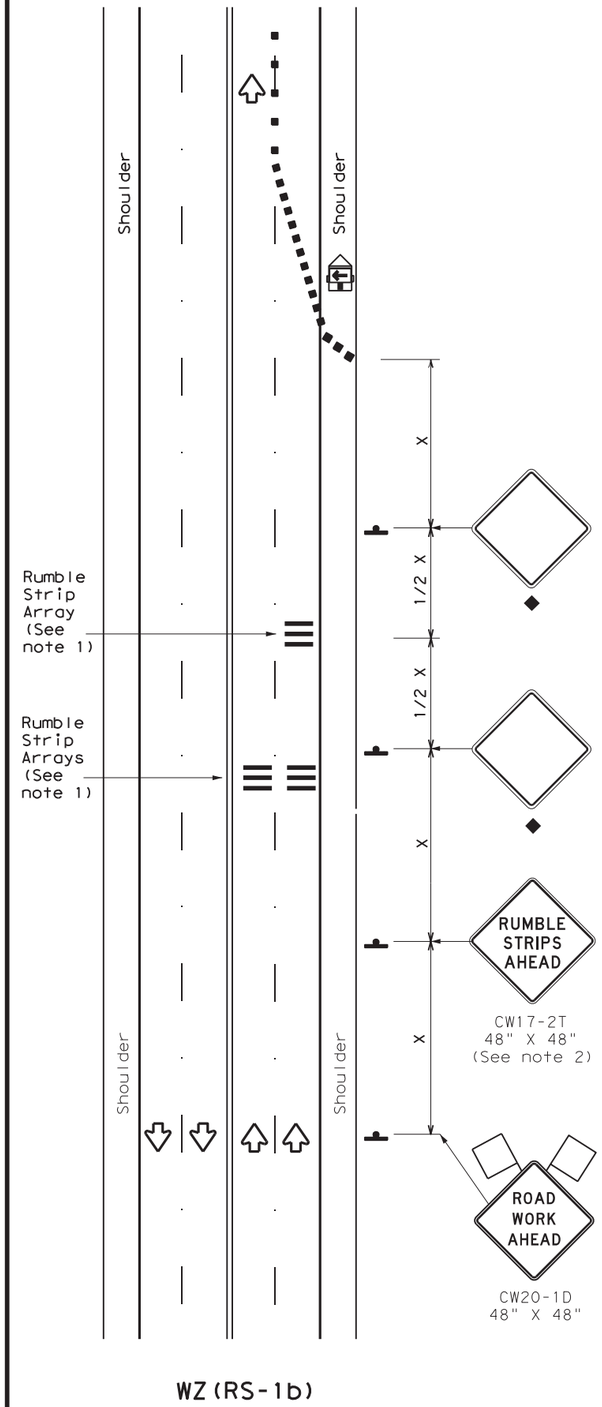
Warning sign and rumble strip sequence in opposite direction is same as below.

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Remove Temporary Rumble Strips before removing the advanced warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an Automated Flagger Assistance Device (AFAD) or a Portable Traffic Signal (PTS).
9. Replace defective Temporary Rumble Strips as directed by the Engineer.
10. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment and written direction from the Engineer.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	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
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

* For posted speeds in excess of 65 MPH, it is recommended that spacing is increased as speed limits increase. Increasing space between rumble strips will improve effectiveness.

TABLE 2	
Speed	Approximate distance between strips in an array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
= 60 MPH	20'
≥ 65 MPH	* 35' +

Texas Department of Transportation

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TEMPORARY RUMBLE STRIPS

WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		34

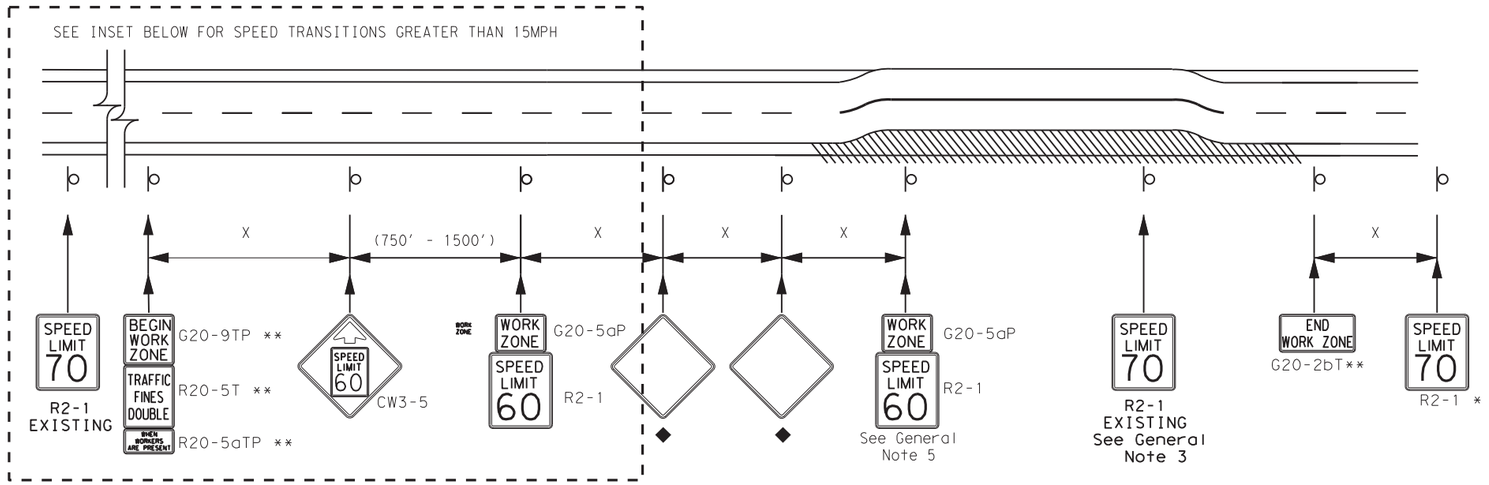
117

DATE: 8/29/2023 7:50:15 AM
FILE: T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM6438l001\CADD\BASES\STANDARDS\MNTWZSL.dgn

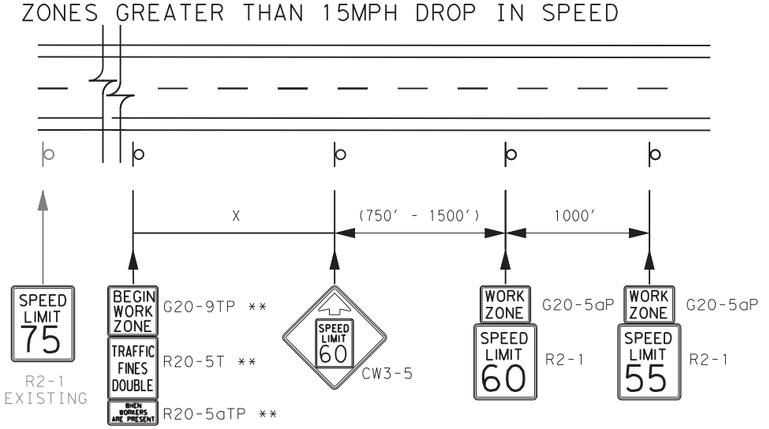
TYPICAL APPLICATION OF MAINTENANCE WORK ZONE SPEED LIMIT SIGNS

Signing shown for one direction only.

Remove all temporary speed limit signs and concealments of permanent speed limit signs when the maintenance activity has been completed and equipment has been removed from the activity site.



ALTERNATE SIGNING FOR TRANSITION OF SPEED ZONES GREATER THAN 15MPH DROP IN SPEED



* At the end of the maintenance work zone place a sign indicating the speed limit after the temporary zone ends.

** Signs should not be installed for mobile operations.

◆ Signs are for illustrative purposes only. Signs and sign spacing requirements may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

GENERAL NOTES

1. Signs may be skid mounted for long term or intermediate term work durations. Roll up signs may be used for short term, short duration or mobile operations.
2. Reduced speeds shall only be posted in the vicinity of work activity and not throughout the entire maintenance work area.
3. Cover all permanent speed limit signs within the work area that conflict with the temporary reduced speed limit. Advisory speed plaques on warning signs within the work area are not required by law to be covered.
4. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
5. Frequency of maintenance work zone speed limit signs should be:
   a. 40 mph and greater 0.2 to 2 miles
   b. 35 mph and less 0.2 to 1 mile
6. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
7. Turning signs from view or laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Speeds shown on details above are for illustration only. Maintenance work zone speed limits shall only be posted as approved for each highway maintenance activity work zone.
9. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory maintenance speed zone reduction see TxDOT form #1204M available from TRF.

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
		10′ Offset	11′ Offset	12′ Offset	On a Taper	On a Tangent		
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)

DURATION OF WORK

1. As defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6.
2. 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 lastingmore 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-term 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.

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 mtal tubing may be turned away from traffic 90 degrees when the sign message in 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 headlight 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.

SIGN DETAILS

Sign Number	Conventional Road	Expressway/ Freeway
G20-2bT	36"x18"	48"x24"
G20-5aP	24"x18"	36"x24"
G20-9TP	24"x24"	36"x30"
R20-5T	24"x30"	36"x36"
R20-5aTP	24"x12"	36"x18"
CW3-5	36"x36"	48"x48"
R2-1	24"x30"	36"x48"

Texas Department of Transportation

Traffic Safety Division Standard

MAINTENANCE WORK ZONE SPEED LIMIT SIGNS

FILE: mntwzsl.dgn	DN:	CK:	DW:	CK:
©TxDOT November 2021	CONT	SECT	JOB	HIGHWAY
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	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		35

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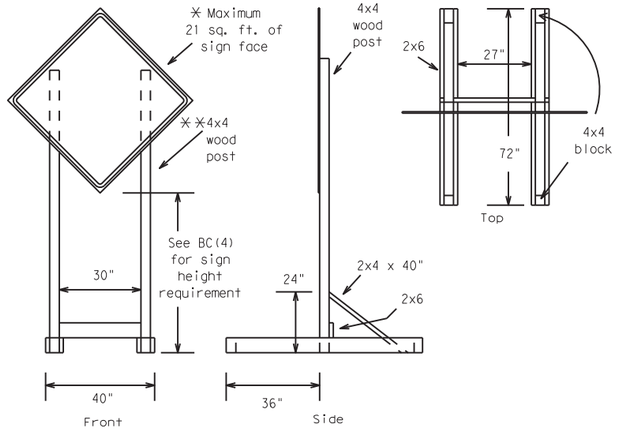
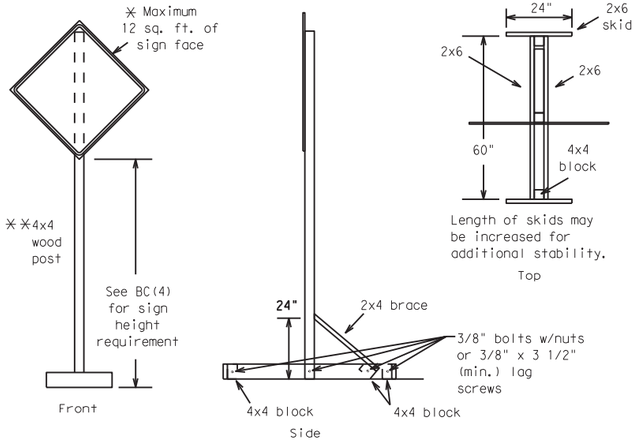
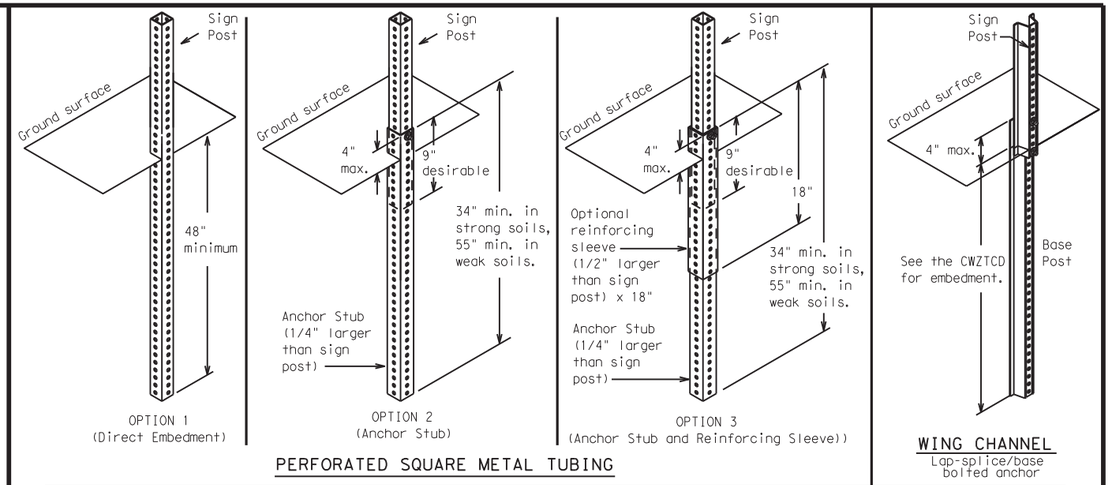




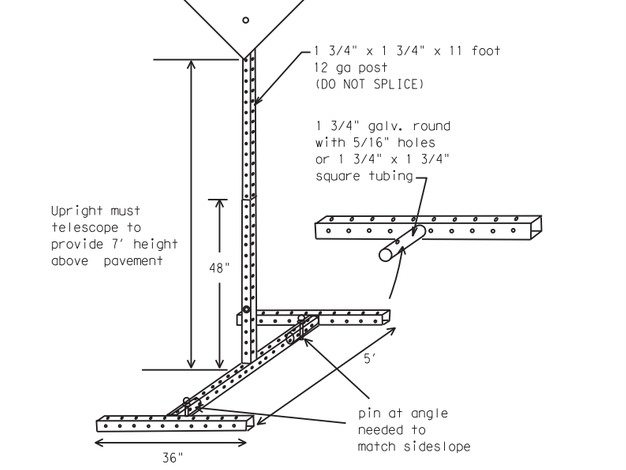
SKID MOUNTED WOOD SIGN SUPPORTS

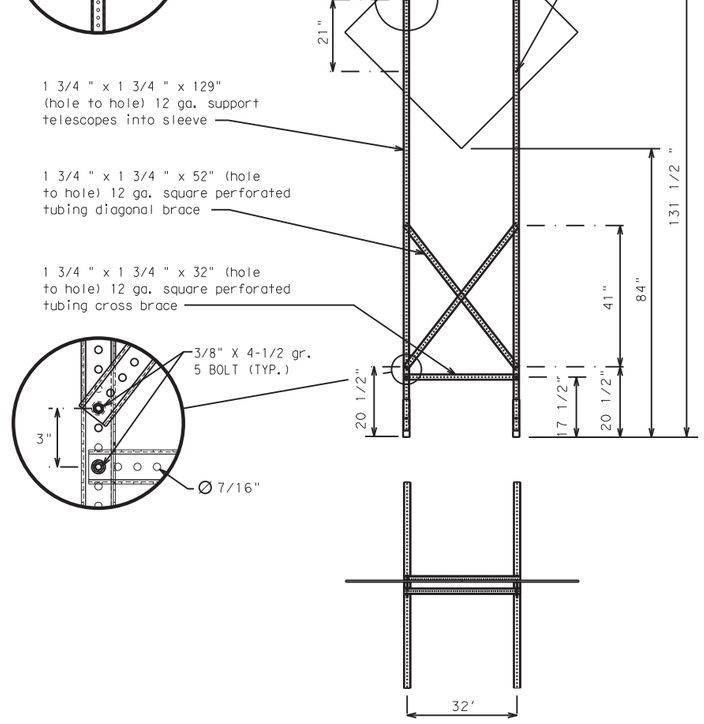
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

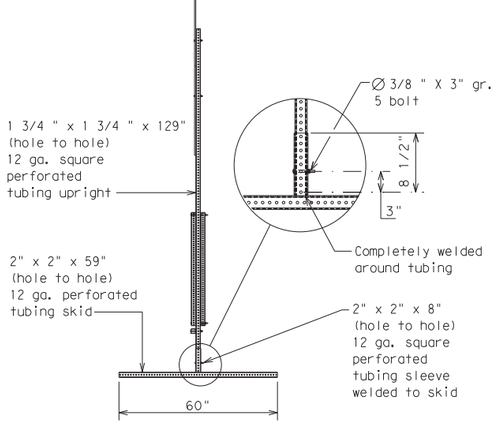


GROUND MOUNTED SIGN SUPPORTS

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 sheet 1 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.

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MAINTENANCE WORK ZONE SPEED LIMIT SIGNS

FILE: mntwzsl.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2021	CONT	SECT	JOB	HIGHWAY
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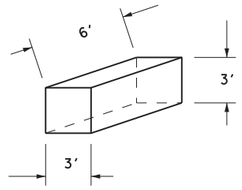
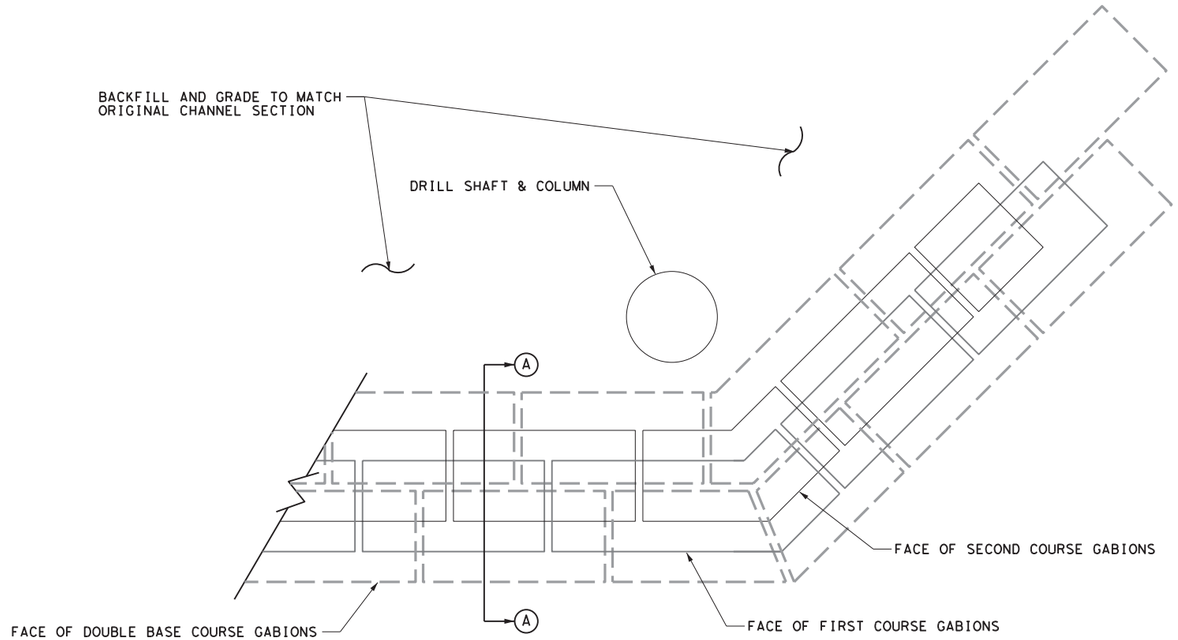
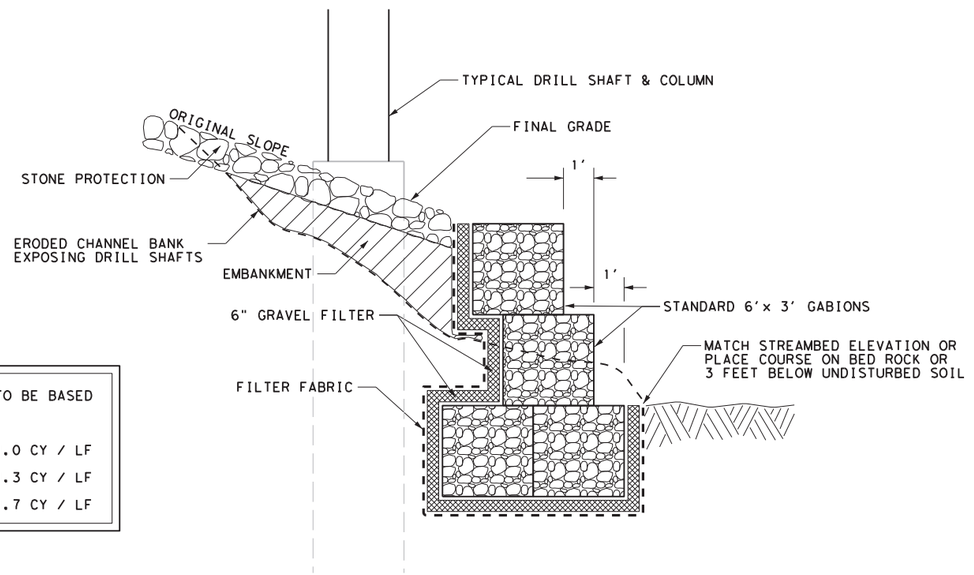
	DIST	COUNTY		SHEET NO.
	WACO	HILL, ETC		36



STANDARD GABION



PLAN VIEW



SECTION A-A

FOR ESTIMATE PURPOSE, THE CUBIC YARD OF GABION TO BE BASED ON WALL HEIGHT ABOVE A TWO GABION BASE COURSE. PER LINEAL FOOT OF WALL CALCULATES:

3' WALL (1 GABION COURSE ABOVE BASE COURSE) @ 1.0 CY / LF

6' WALL (2 GABION COURSES ABOVE BASE COURSE) @ 1.3 CY / LF

9' WALL (3 GABION COURSES ABOVE BASE COURSE) @ 1.7 CY / LF

GENERAL NOTES:

1. GABION AND REVET MATTRESS WILL BE CONSTRUCTED IN ACCORDANCE TO ITEM 459.
2. ALL GABION INSTALLATIONS ARE REQUIRED TO USE FILTER FABRIC IN ACCORDANCE TO ITEM 459.
3. IF BEDROCK IS ENCOUNTERED WITHIN THE LIMITS OF THE TOE WALL, BEGIN TOE WALL ON THE BEDROCK OR AS DIRECTED BY THE ENGINEER.
4. ALL GABION INSTALLATIONS ARE REQUIRED TO USE A MINIMUM; 4" FILTER MATERIAL.

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED
PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, PE 8/30/23
Signature of Registrant & Date

GABION DETAILS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	37
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DL	6438	11	001	
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CS				

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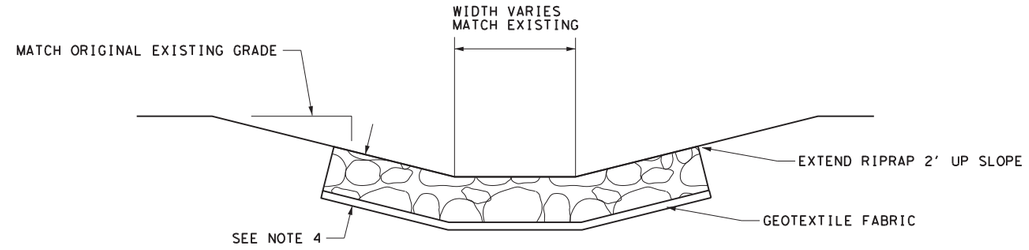
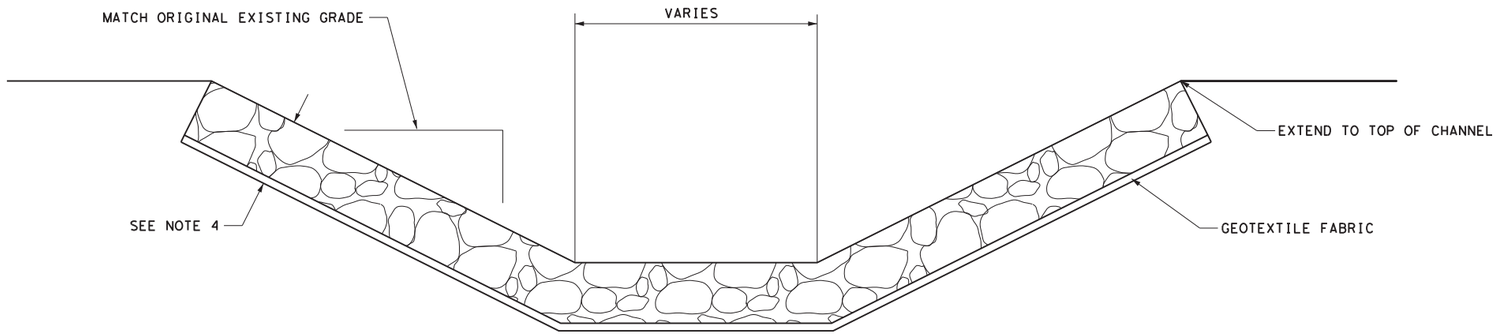
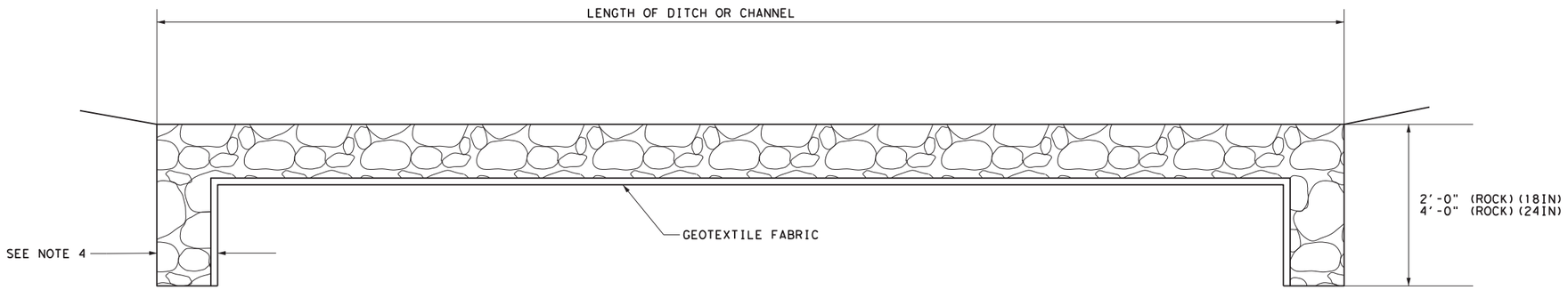


DITCH CHANNEL WITH ROCK RIPRAP TYPICAL SECTION



CHANNEL SECTIONS



DITCH LONGITUDINAL SECTIONS

GENERAL NOTES:

1. USE RIPRAP IN CHANNEL BED WHERE SHOWN ON PLANS.
2. STONE RIPRAP SHOULD BE FLUSH WITH THE FLOWLINE OF DITCH/CHANNEL AND POSITION STONE TO PROVIDE A SURFACE THAT CAN BE TRAVERSED BY ROW MOWING EQUIPMENT.
3. IF BEDROCK IS ENCOUNTERED WITHIN THE LIMITS OF THE TOEWALL, BEGIN TOEWALL ON THE BEDROCK OR AS DIRECTED.
4. THE MINIMUM DEPTH OF THE RIPRAP WILL BE GOVERNED BY THE SIZE OF THE ROCK RIPRAP PLACED. 18 IN RIPRAP WILL REQUIRE A MINIMUM DEPTH OF 18IN AND 24 IN RIPRAP WILL REQUIRE A MINIMUM DEPTH OF 24 IN.

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

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Charles W. Smith, PE 8/30/23
Signature of Registrant & Date

STONE PROTECTION DETAILS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
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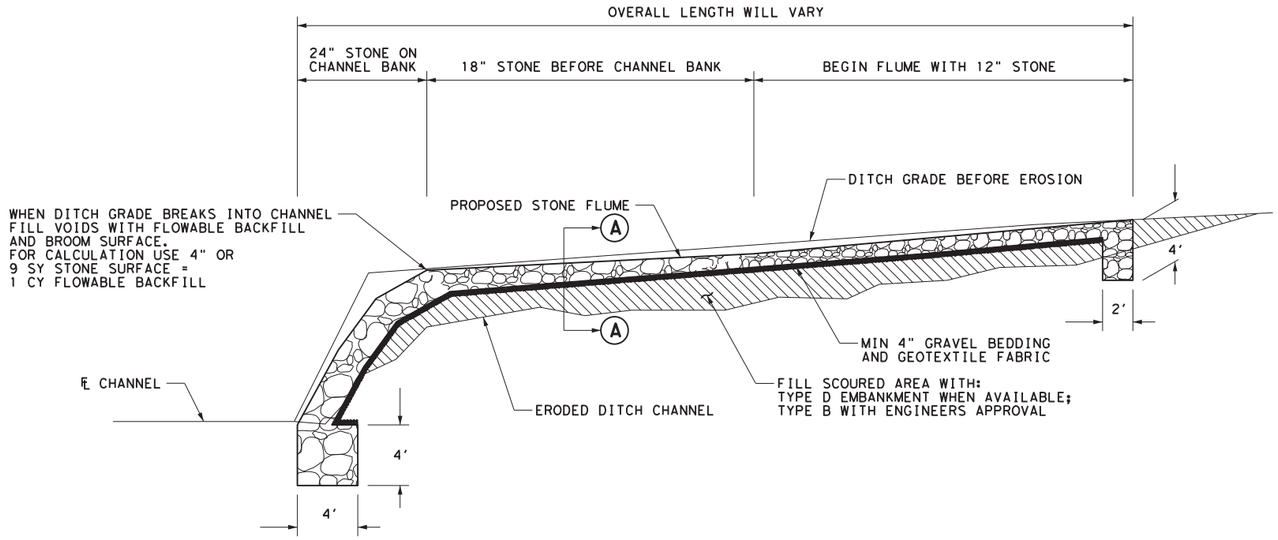


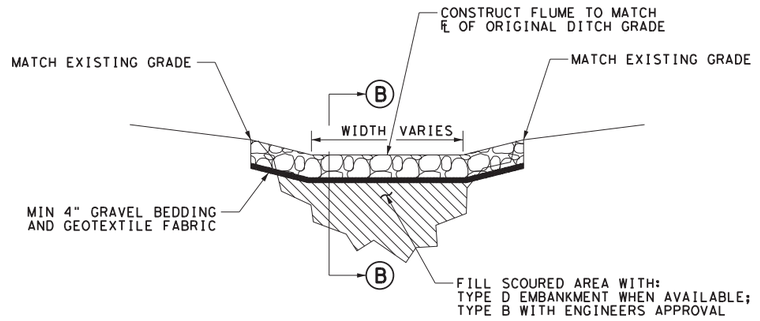
SECTION B-B

MATERIAL APPROXIMATES (LENGTH x WIDTH)
STONE GRADATION BY THIRDS ALONG FLUME

45' x 6':
12" STONE 4 CY
18" STONE 5 CY
24" STONE 7 CY
FLOWABLE FILL 1 CY
BEDDING MTRL 4 CY

60' x 8':
12" STONE 6 CY
18" STONE 9 CY
24" STONE 12 CY
FLOWABLE FILL 2 CY
BEDDING MTRL 6 CY

90' x 10':
12" STONE 12 CY
18" STONE 17 CY
24" STONE 23 CY
FLOWABLE FILL 4 CY
BEDDING MTRL 12 CY



SECTION A-A

GENERAL NOTES:

1. STONE FLUME WILL BE CONSTRUCTED IN ACCORDANCE TO ITEM 432 RIPRAP.
2. ALL STONE FLUME INSTALLATIONS ARE REQUIRED TO USE MIN 4" GRAVEL BEDDING AND FILTER FABRIC.
3. IF BEDROCK IS ENCOUNTERED WITHIN THE LIMITS OF THE TOE WALL, BEGIN TOE WALL ON THE BEDROCK OR AS DIRECTED.
4. POSITION STONE TO PROVIDE AN EVEN SURFACE WITH MINIMAL VOIDS.
5. GRADE SITE TO MOVE DITCH RUNOFF AND ANY STRUCTURE DRAINAGE TO FLUME FOR DISCHARGE INTO CHANNEL.

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Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

STONE FLUME DETAILS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
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CS				

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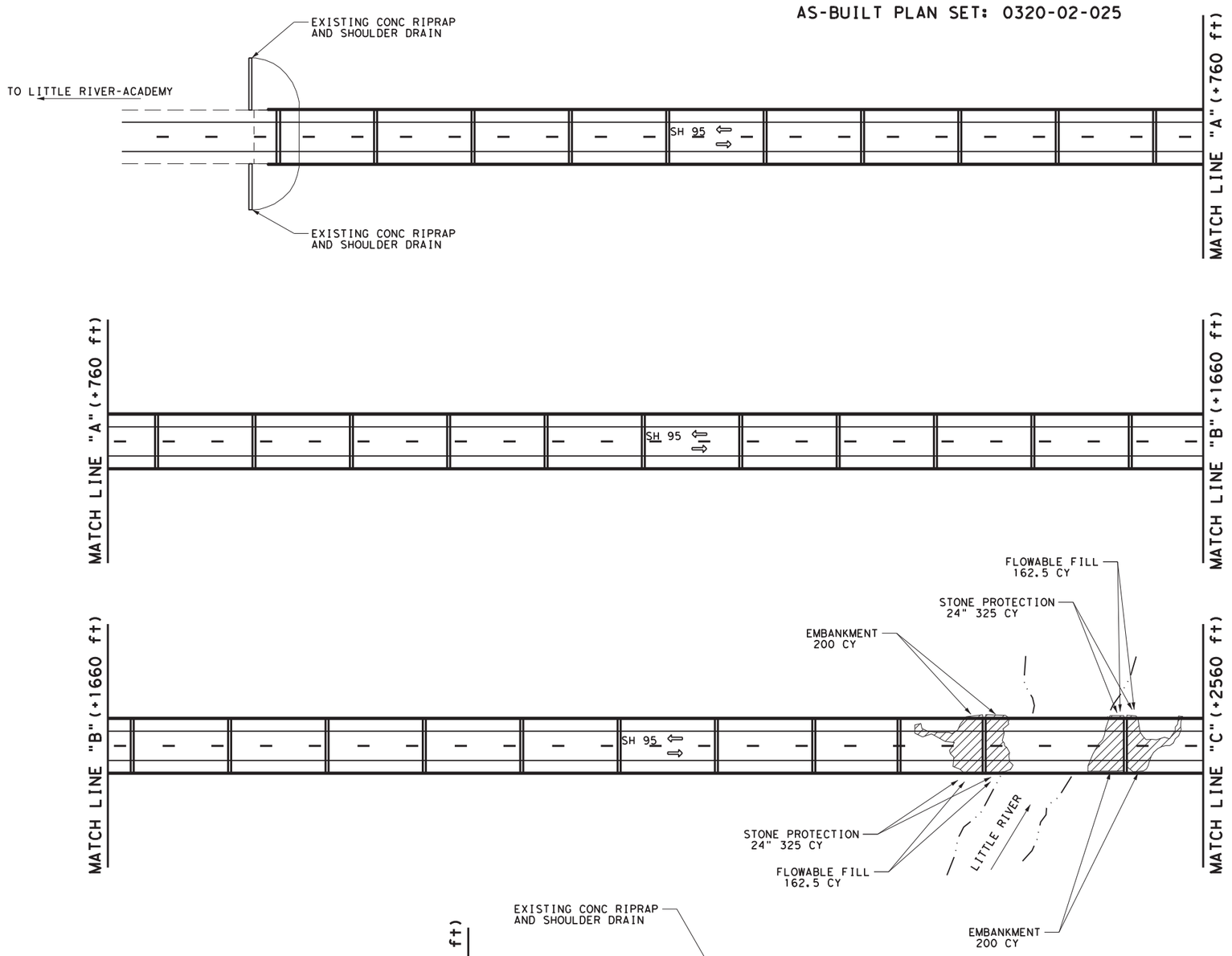


LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
9. NO WORK IS ALLOWED IN THE RIVER, ALL OPERATIONS MUST STAY OUT OF WATER. CONTACT ENGINEER OR WACO DISTRICT ENVIRONMENTAL STAFF AT (254) 867-2737, PRIOR TO ANY ACTIVITY THAT CONTACTS LITTLE RIVER WATER.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	400
0401 6001	FLOWABLE BACKFILL	CY	325.0
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	650
0752 6015	TREE AND BRUSH REMOVAL	AC	0.2

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: SH 95 @ LITTLE RIVER
NBI#: 09-014-0-0320-02-100
DIMENSIONS: 2742'x 44' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 30.9725689/-97.34445875

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

BELL COUNTY
STRUCTURE LAYOUT
SH 95 @ LITTLE RIVER
NBI# 09-014-0-0320-02-100

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	
GRAPHICS	CONTROL	SECTION	JOB	40
DL	6438	11	001	
CHECK				
CS				

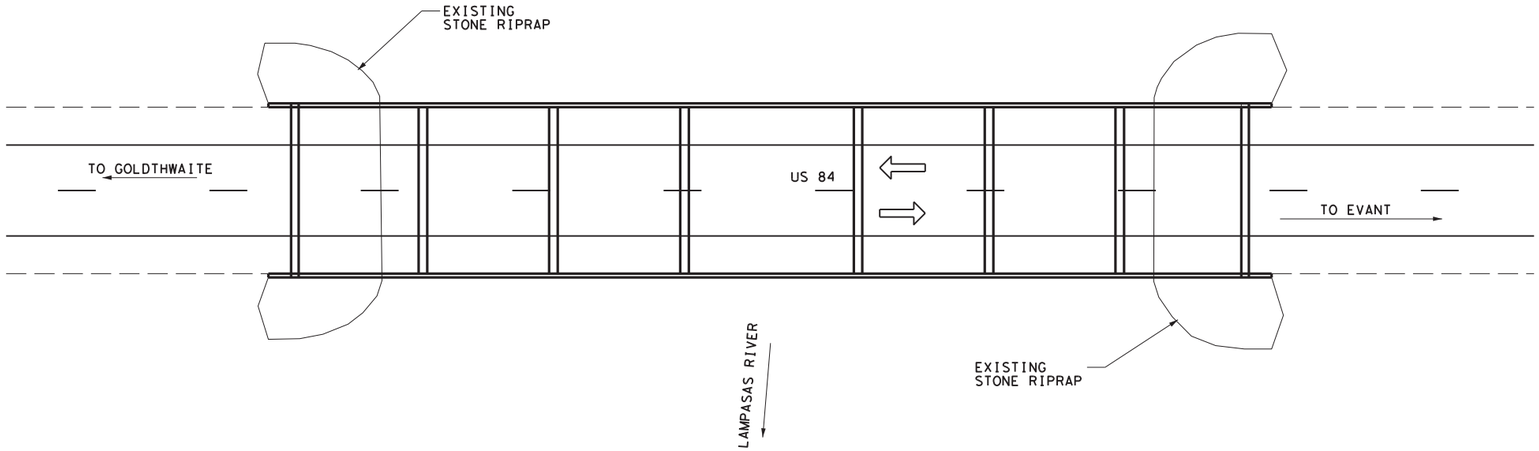
...\0320-02-100.dgn

FOR LOCATION REPAIR DETAILS REFER TO:

LAYOUT & DETAILS EROSION AND CONCRETE REPAIR (US 84 OVER LAMPASAS RIVER)

LAYOUT & DETAILS CONCRETE DECK REPAIR (US 84 OVER LAMPASAS RIVER)

AS-BUILT PLAN SET: 0055-02-001



NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: US 84 @ LAMPASAS RIVER
NBI#: 09-098-0-0055-02-028
DIMENSIONS: 253'x 44' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.48000157/-98.27348904

LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
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8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0401 6001	FLOWABLE BACKFILL	CY	1.13
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	7.2
0429 6009	CONC STR REPAIR (STANDARD)	SF	132

CONTRACTOR'S INFORMATION ONLY

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, PE 8/30/23
Signature of Registrant & Date

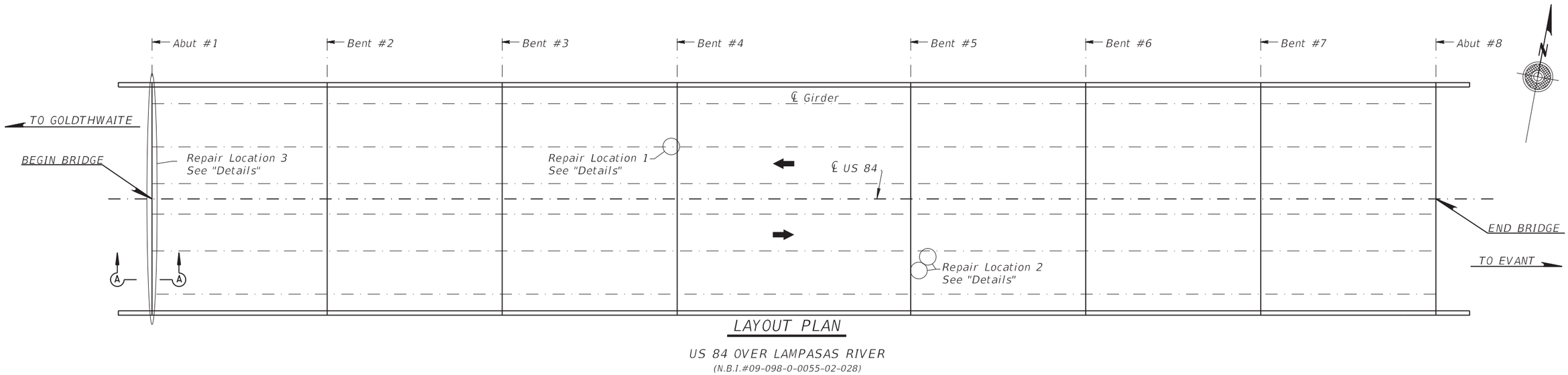
Texas Department of Transportation

HAMILTON COUNTY
STRUCTURE LAYOUT
US 84 @ LAMPASAS RIVER
NBI# 09-098-0-0055-02-028

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	41
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

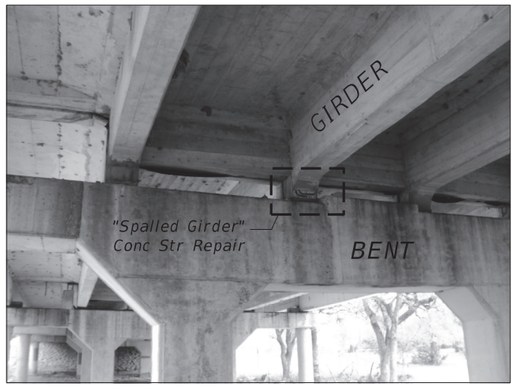
...\0055-02-028.dgn



LAYOUT PLAN

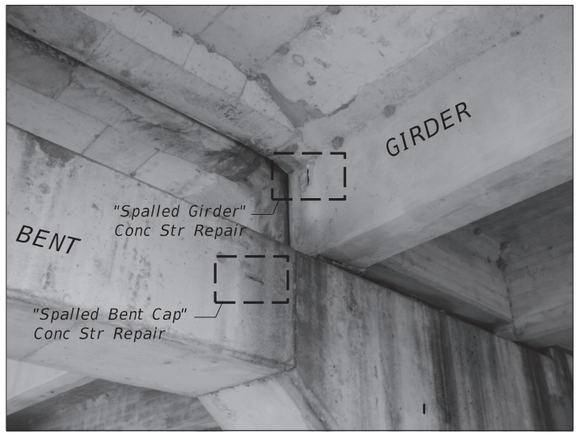
US 84 OVER LAMPASAS RIVER

(N.B.I.#09-098-0-0055-02-028)



① SPALL REPAIR AT GIRDER

(SEE LAYOUT FOR SPALL LOCATION)



② SPALL REPAIR AT GIRDER AND CAP

(SEE LAYOUT FOR SPALL LOCATIONS)

US 84 OVER LAMPASAS RIVER
253'-0" OVERALL LENGTH
6 - 34'-6" T BEAMS SPANS
1 - 46'-0" T BEAMS SPANS
44'-0" RDWY. RAIL TY. T1 MOD

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair spalled/Delaminated Girder and Interior Bent Caps.

Provide materials as outlined in the CONCRETE REPAIR MANUAL.

Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Material".

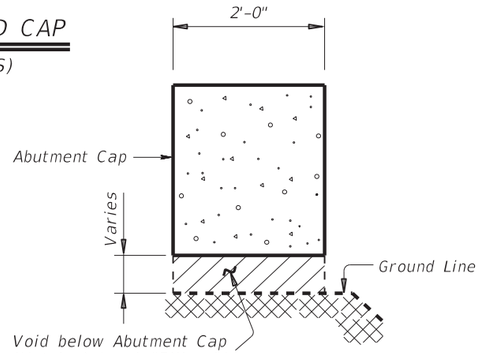
All materials and labor required for repairing spalled/ delaminated areas shall be included in the price bid per SF for Item: CONC STR REPAIR (VERTICAL & OVERHEAD).

All materials and labor required for filling viods below Abutment Cap with Flowable fill, including forming and installation, shall be included in the price bid per CY for Item 401, FLOWABLE BACKFILL.

Re-working Base material and compaction will be subsidary to varoius bid items.

ESTIMATED QUANTITIES

ITEM	429-6007	401-6001
LOCATION	CONC STR REPAIR (VERTICAL & OVERHEAD)	FLOWABLE BACKFILL
	S.F.	C.Y.
LOCATION 1		1.13
LOCATIONS 2 & 3	7.2	
TOTAL	7.2	1.13



SECTION A-A

ELEVATION

③ (SEE LAYOUT FOR LOCATION)

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

Texas Department of Transportation

LAYOUT & DETAILS
EROSION AND CONCRETE REPAIR

US 84 OVER LAMPASAS RIVER

(STR# 028)

FILE: LampasasRep.dgn	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: APR 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	42
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED
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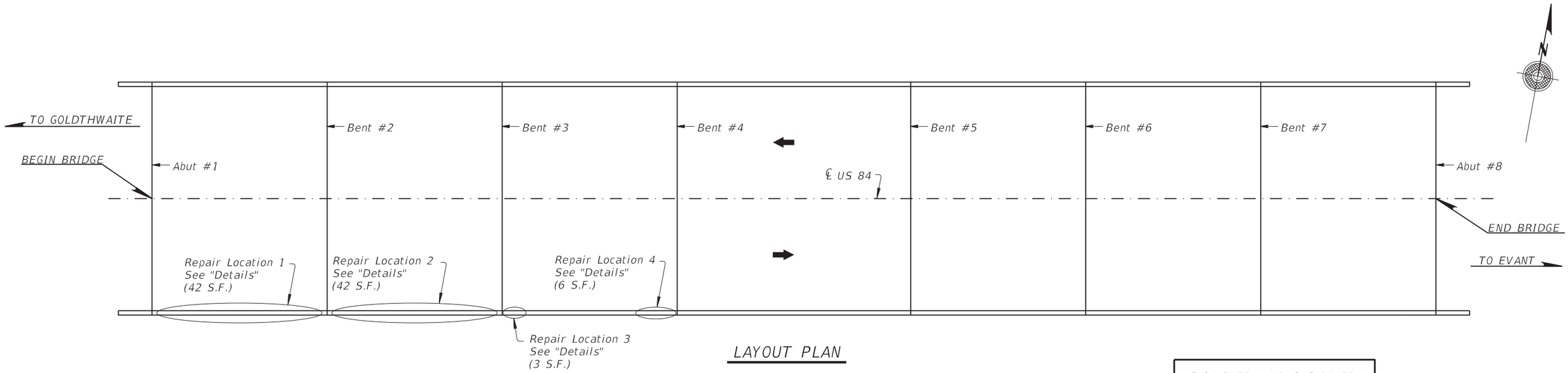
ACC:



LAYOUT PLAN

US 84 OVER LAMPASAS RIVER

(N.B.I.#09-098-0-0055-02-028)

US 84 OVER LAMPASAS RIVER
253'-0" OVERALL LENGTH
6 - 34'-6" T BEAMS SPANS
1 - 46'-0" T BEAMS SPANS
44'-0" RDWY. RAIL TY. T1 MOD

SCALING CONCRETE DECK REPAIR DETAILS

SHOWING LIMITS OF SCALING REPAIR AT DECK EDGE

ESTIMATED QUANTITIES

ITEM	429-6009
LOCATION	CONC STR REPAIR (STANDARD)
	S.F.
LOCATIONS 1 -4	132.0
TOTAL	132.0

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair shelling/Delaminated Deck.

Provide materials as outlined in the CONCRETE REPAIR MANUAL.

Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Material".

All material and labor required for repairing spalls shall be included in the price bid per SF for Item: CONC REPAIR (STANDARD).

Provide Materials as outlined in CONCRETE REPAIR MANUAL.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023

Ross L Langdale, P.E.

Texas Department of Transportation
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LAYOUT & DETAILS
CONCRETE DECK REPAIR

US 84 OVER LAMPASAS RIVER

(STR# 028)

FILE: LampasasConcRep.dgn	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: APR 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	43
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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LEVELS DISPLAYED
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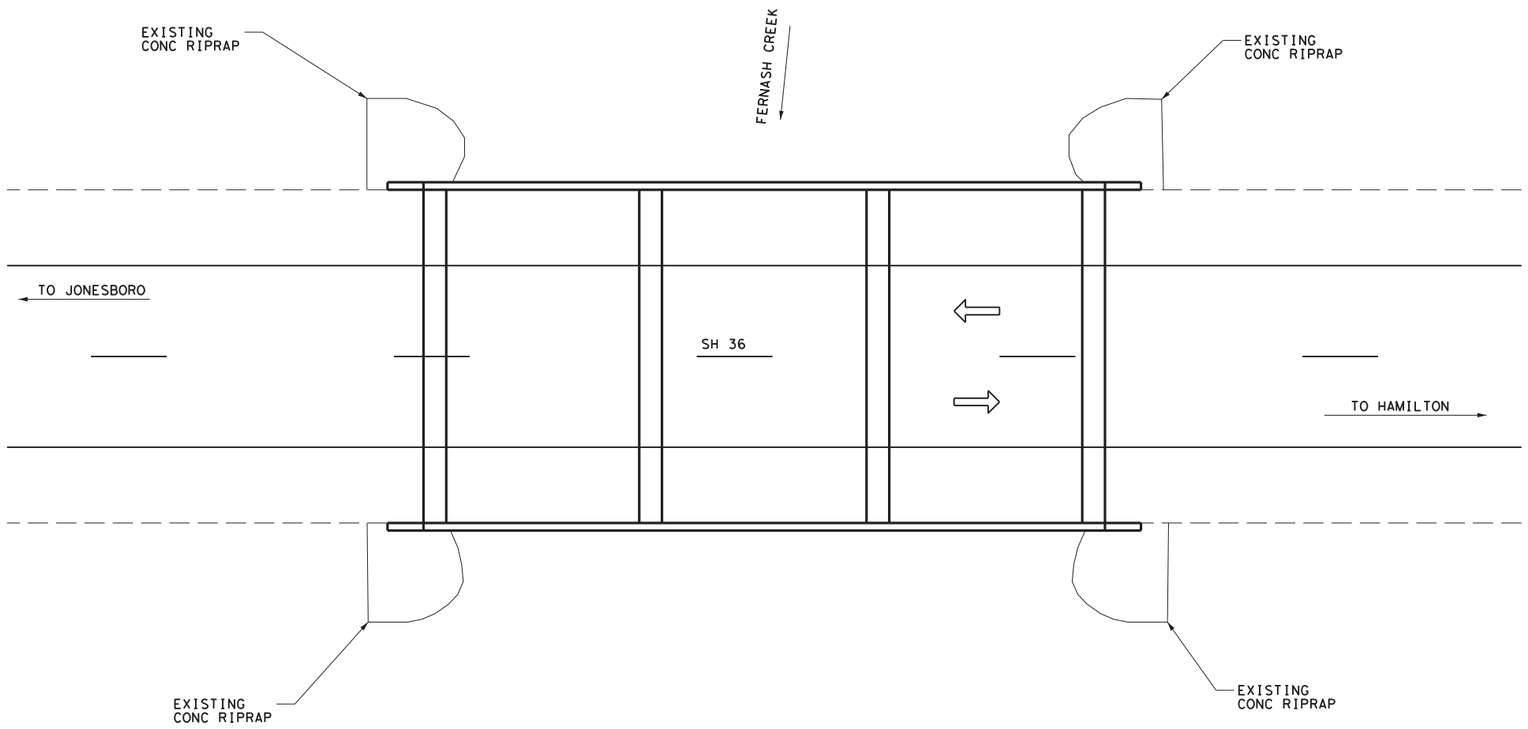
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

FOR LOCATION REPAIR DETAILS REFER TO:

LEAD BEARING SHEET REPLACEMNET DETAILS (SH 36 @ FERNASH CREEK)

AS-BUILT PLAN SET: 0183-03-025



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
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4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
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ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0495 6001	RAISING EXIST STRUCT	LS	0.5
0784 6001	REP STL BRIDGE MEMBERS	LS	1

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: SH 36 @ FERNASH CREEK
NBI#: 09-098-0-0183-03-022
DIMENSIONS: 90'x 44' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.66007002/-98.00963791

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

HAMILTON COUNTY STRUCTURE LAYOUT

SH 36 @ FERNASH CREEK

NBI# 09-098-0-0183-03-022

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	44
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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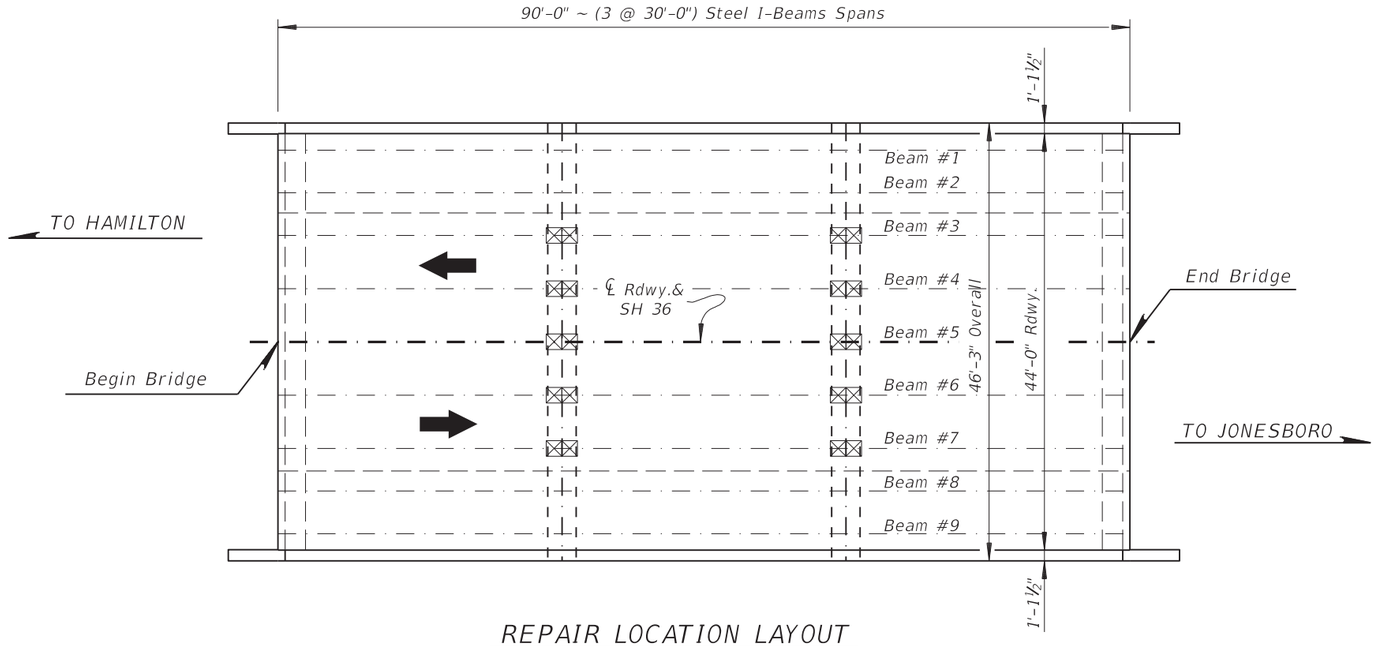

SH 36 OVER FERNASH CREEK
90'-0" OVERALL LENGTH
(3 @ 30'-0") STEEL I-BEAMS SPANS
44'-0" ROADWAY

REPAIR LOCATION LAYOUT
SH 36 OVER FERNASH CREEK

(NBI # 09-098-0-0183-03-022)

☒ = Location for Lead Bearing Sheet Replacement at Interior Bents within original structure. Omit Abutment and widening locations at Interior Bents.

ESTIMATED QUANTITIES

ITEM	495-6001	784-6001	*
STR. #022 SH 36 OVER FERNASH CREEK	RAISING EXIST STRUCT	REP STL BRIDGE MEMBERS	LEAD SHEETS
	LS	LS	EA
STEEL BEARING SHEETS	0.5	1	20
TOTAL	0.5	1	20

* For Contractor's Information Only

GENERAL NOTES:

Refer to LEAD BEARING SHEET REPLACEMENT LAYOUT for locations and additional information.
Obtain approval for all tools, equipment, materials and techniques proposed for use to replace lead sheets.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023

Tom L. Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

LEAD BEARING SHEET REPLACEMENT DETAILS
SH 36 @ FERNASH CREEK

(STR.#022)

FILE: FERNASHBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAR. 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	45
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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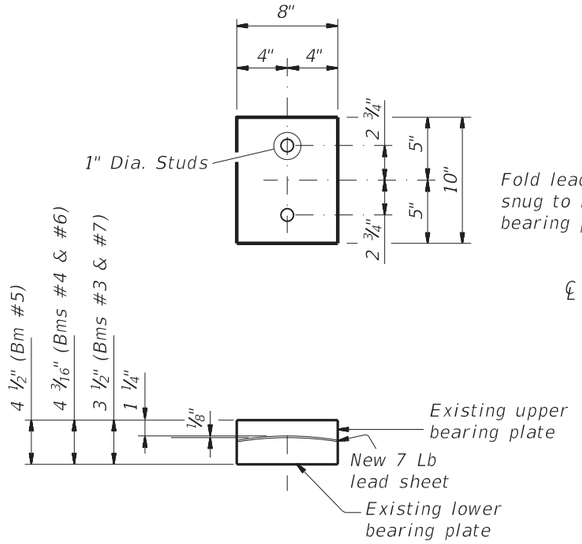
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

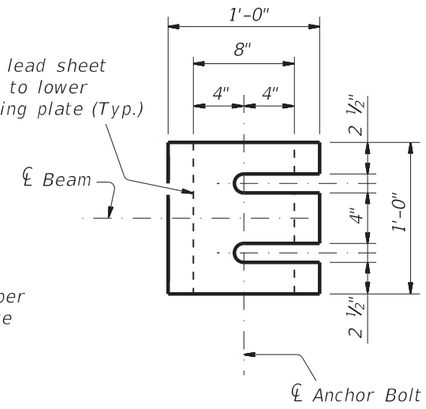
TYPICAL RUSTED STEEL BEARINGS

(SHOWING CONDITION OF STEEL BEARING/LEAD SHEET)



STEEL I-BEAM LOCATIONS

EXISTING STEEL BEARING PLATE DETAILS



STEEL I-BEAM LOCATIONS

LEAD BEARING SHEET DETAILS

Note:
Contractor to field verify lead sheet size prior to ordering materials.

REPAIR PROCEDURE:

1. Perform lead bearing sheet replacement in phases. Close traffic lane above beams being raised. See Traffic Control Plan Narrative.
2. Raise beams approximately ½" max to facilitate lead bearing sheet replacement in accordance with Item 495. "Raising Existing Structures".
3. Replace lead bearing sheets between bearing plates. Bearing sheet replacement is paid for as Item 784, "Steel Member Repair".
4. Fold lead sheets as shown in Lead Bearing Sheet Detail.
5. Break upper bearing plate free of flange and apply heavy duty corrosion inhibiting lubricant. Lubricant shall be "Bastik Never – Seez Mariners Choice" or equivalent as approved by Engineer.
6. Lower beams until fully supported on bearings.
7. Remove jacks and restore traffic.

GENERAL NOTES:

Refer to LEAD BEARING SHEET REPLACEMENT LAYOUT for locations and additional information.
Obtain approval for all tools, equipment, materials and techniques proposed for use to replace lead sheets.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L. Langdale, P.E.

SHEET 2 OF 2 SHEETS

Texas Department of Transportation
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LEAD BEARING SHEET REPLACEMENT DETAILS

SH 36 @ FERNASH CREEK

(STR.#022)

FILE: FERNASHBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAR. 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	46
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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LEVELS DISPLAYED
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17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

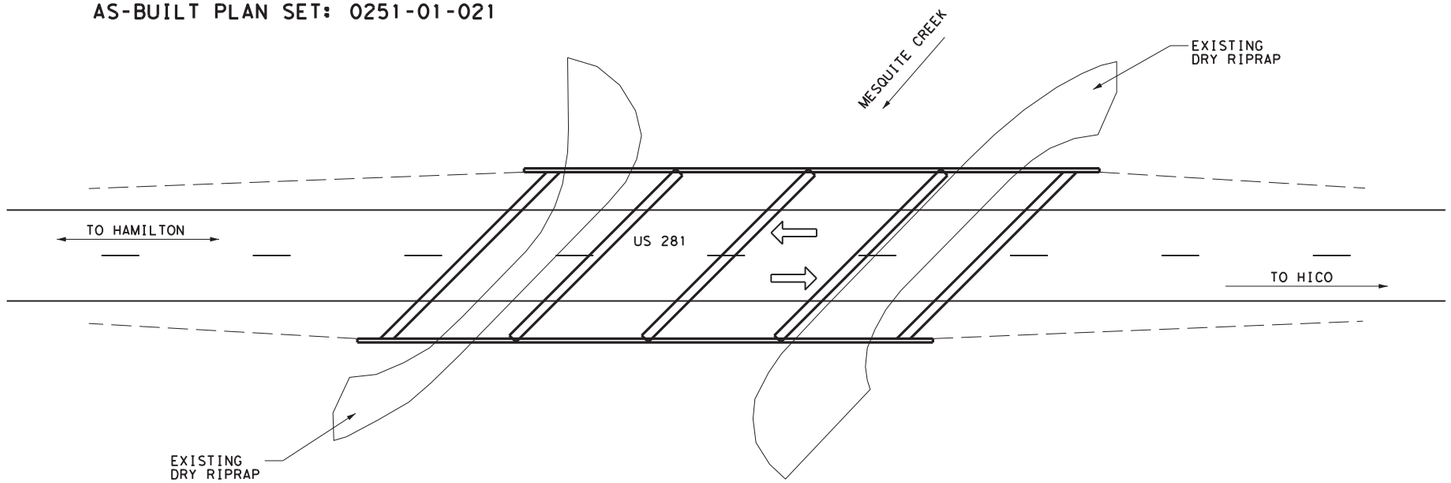
FOR LOCATION REPAIR DETAILS REFER TO:

LEAD BEARING SHEET REPLACEMENT DETAILS (US 281 @ MESQUITE CREEK)

SUPPLEMENTAL SUBSTRUCTURE DETAILS (US 281 @ MESQUITE CREEK)

CONCRETE STRUCTURE REPAIR DETAILS (US 281 @ MESQUITE CREEK)

AS-BUILT PLAN SET: 0251-01-021



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	3
0446 6051	SPOT CLEAN & PAINT EXT STR(SPL PRT SYS)	EA	3
0495 6001	RAISING EXIST STRUCT	LS	0.5
0784 6001	REP STL BRIDGE MEMBERS	LS	2
7306 6002	BRIDGE SUBSTRUCTURE CLEANING (BENT)	EA	3

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: US 281 @ MESQUITE CREEK
NBI#: 09-098-0-0251-01-039
DIMENSIONS: 140'x 44' BRIDGE
SKEW: 45° SKEW
GPS LAT/LON: 31.82856614/-98.11534289

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, PE 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

HAMILTON COUNTY
STRUCTURE LAYOUT
US 281 @ MESQUITE CREEK
NBI# 09-098-0-0251-01-039

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	47
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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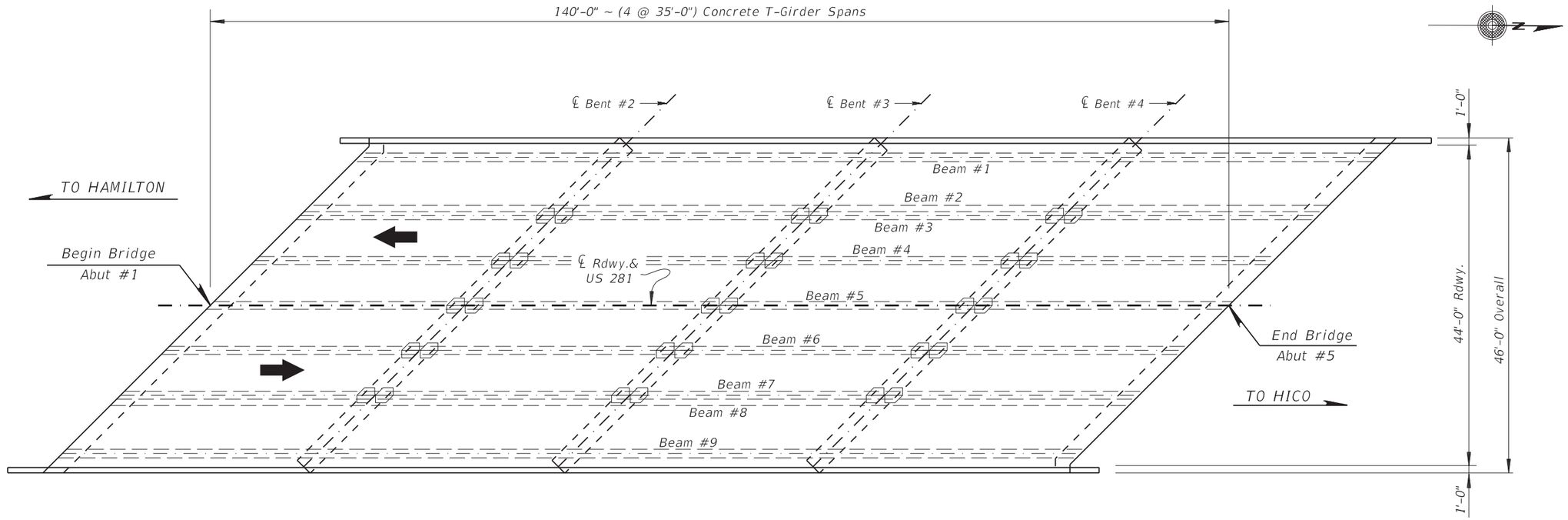

REPAIR LOCATION LAYOUT

US 281 OVER MESQUITE CREEK

(NBI # 09-098-0-0251-01-039)

US 281 OVER MESQUITE CREEK
140'-0" OVERALL LENGTH
(4 @ 35'-0") CONC. T-BEAM SPANS
44'-0" ROADWAY

= Location for Lead Bearing Sheet Replacement
at Interior Bents within original structure.
Omit Abutment and widening locations at Interior Bents.

ESTIMATED QUANTITIES

ITEM	495-6001	784-6001	*
STR. #039 US 281 OVER MESQUITE CREEK	RAISING EXIST STRUCT	REP STL BRIDGE MEMBERS	LEAD SHEETS
	LS	LS	EA
STEEL BEARING SHEETS	0.5	1	30
TOTAL	0.5	1	30

* For Contractor's Information Only

GENERAL NOTES:

Refer to LEAD BEARING SHEET REPLACEMENT LAYOUT for locations and additional information.
Obtain approval for all tools, equipment, materials and techniques proposed for use to replace lead sheets.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation
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LEAD BEARING SHEET REPLACEMENT DETAILS

US 281 @ MESQUITE CREEK

(STR. #039)

FILE: MESOBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	48
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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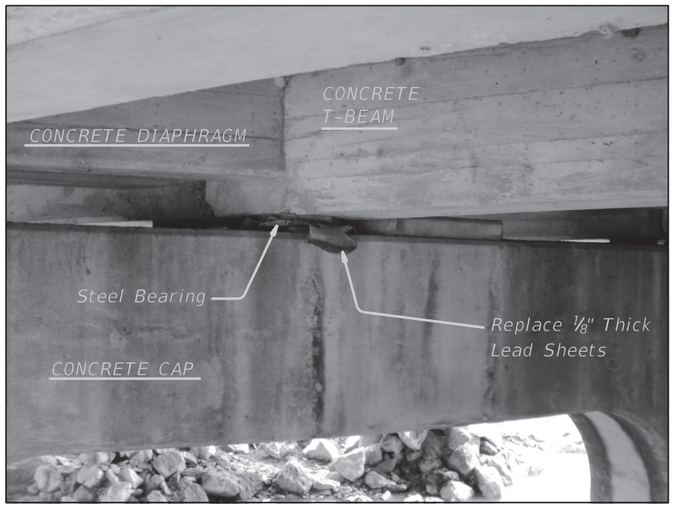
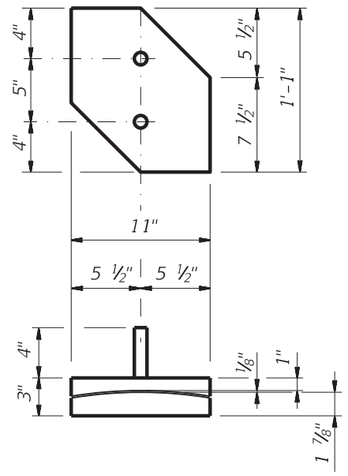
ACC:



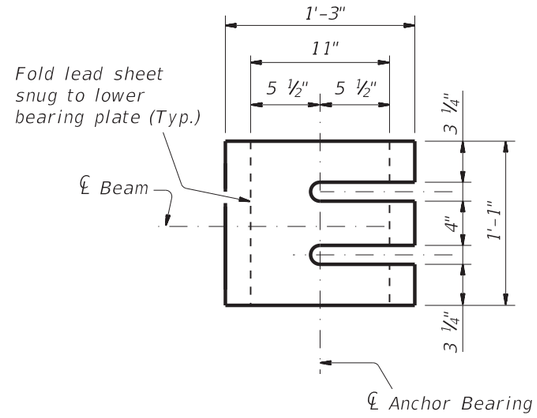
EXISTING STEEL BEARINGS

(SHOWING CONDITION OF STEEL BEARING/LEAD SHEET)



CONCRETE T-BEAM LOCATIONS

EXISTING STEEL BEARING PLATE DETAILS



CONCRETE T-BEAM LOCATIONS

LEAD BEARING SHEET DETAILS

Note:
Contractor to field verify lead sheet size prior to ordering materials.

REPAIR PROCEDURE:

1. Perform lead bearing sheet replacement in phases. Close traffic lane above beams being raised. See Traffic Control Plan Narrative.
2. Raise beams approximately ½" max to facilitate lead bearing sheet replacement in accordance with Item 495. "Raising Existing Structures".
3. Replace lead bearing sheets between bearing plates. Bearing sheet replacement is paid for as Item 784, "Steel Member Repair".
4. Fold lead sheets as shown in Lead Bearing Sheet Detail.
5. Break upper bearing plate free of flange and apply heavy duty corrosion inhibiting lubricant. Lubricant shall be "Bastik Never – Seez Mariners Choice" or equivalent as approved by Engineer.
6. Lower beams until fully supported on bearings.
7. Remove jacks and restore traffic.

GENERAL NOTES:

Refer to LEAD BEARING SHEET REPLACEMENT LAYOUT for locations and additional information.
Obtain approval for all tools, equipment, materials and techniques proposed for use to replace lead sheets.

STATE OF TEXAS
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8/30/2023
Ross Langdale, P.E.

SHEET 2 OF 2 SHEETS

Texas Department of Transportation

LEAD BEARING SHEET REPLACEMENT DETAILS

US 281 @ MESQUITE CREEK

(STR. #039)

FILE: MESOBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	49
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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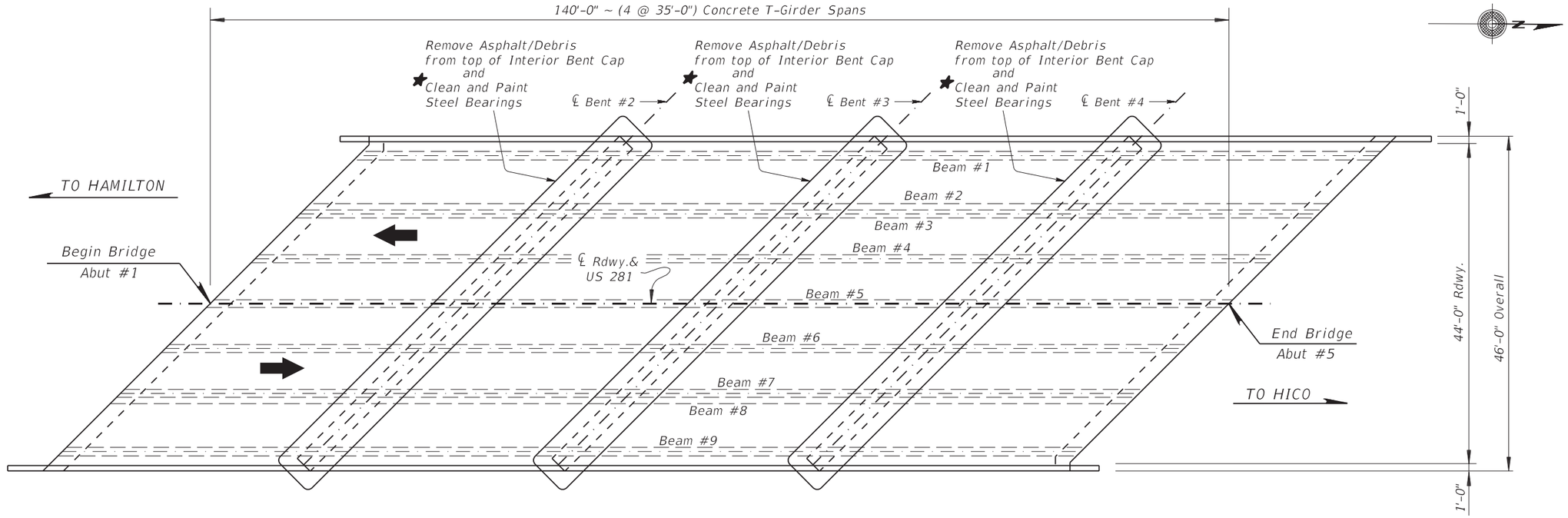

US 281 OVER MESQUITE CREEK

(NBI # 09-098-0-0251-01-039)

US 281 OVER MESQUITE CREEK
140'-0" OVERALL LENGTH
(4 @ 35'-0") CONC. T-BEAM SPANS
44'-0" ROADWAY

★ Locations = 18 Steel Bearings per Interior Bent.
(54 Total)

SPECIAL PROTECTION SYSTEM

Apply 0.5-1.0 mil DFT of penetrating seal to specified surfaces.
Apply minimum 4.0 mils DFT topcoat to specified surfaces.
Apply an additional 14-18 WFT protection coat of HRCSA to all exposed bearing surfaces after other coats will allow it.

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to completely remove all asphalt/debris from top of Interior Bent Caps.

All materials and labor required for cleaning and painting Bearing Plates shall be included in the price bid per LS for Item: SPOT CLEAN & PAINT EXT STR (SPL PRT SYS).

All materials and labor required for removing asphalt/debris from Interior Bent Caps shall be included in the price bid per EA for Item: 7306, BRIDGE SUBSTRUCTURE CLEANING (BENT).

ESTIMATED QUANTITIES

ITEM	446-6051	784-6001	7306-6002
STR. #039 US 281 OVER MESQUITE CREEK	ⓘ SPOT CLEAN & PAINT EXT STR (SPL PRT SYS)	REP STL BRIDGE MEMBERS	BRIDGE SUBSTRUCTURE CLEANING (BENT)
	EA	LS	EA
INTERIOR BENTS	3	1	3
TOTAL	3	1	3

ⓘ High Ratio calcium sulfonate alkyd (HRCSA) in accordance with Item 446.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023

Ross L Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

SUPPLEMENTAL SUBSTRUCTURE DETAILS

US 281 @ MESQUITE CREEK

(STR. #039)

FILE: MESQBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	50
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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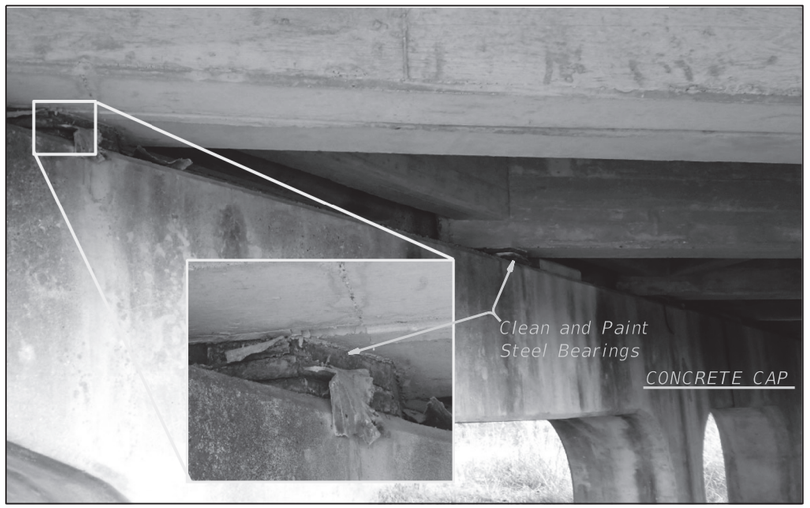
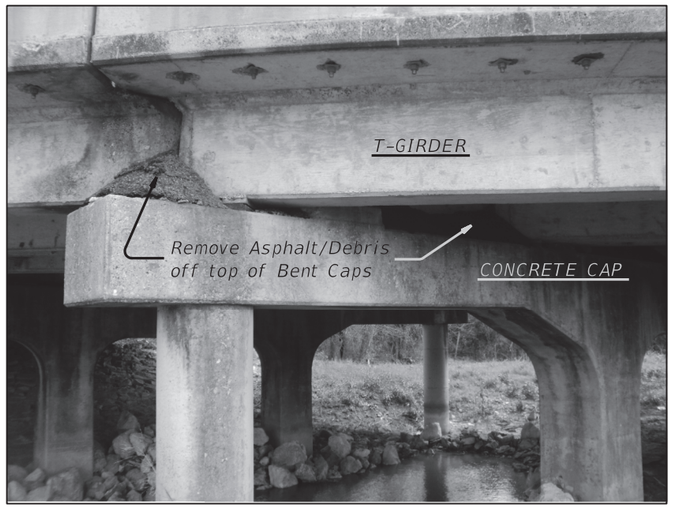


EXISTING STEEL BEARINGS

(SHOWING CONDITION OF RUSTED STEEL BEARINGS AT INTERIOR BENTS)



EXISTING SUBSTRUCTURE (BENTS)

(SHOWING ASPHALT/DEBRIS BUILD-UP ON TOP OF INTERIOR BENT CAPS)

SHEET 2 OF 2 SHEETS

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SUPPLEMENTAL SUBSTRUCTURE DETAILS

US 281 @ MESQUITE CREEK

(STR. #039)

FILE: MESQBEARING.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT	
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT #		SHEET
REVISIONS	WACO	6	BPM 643811001		51
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

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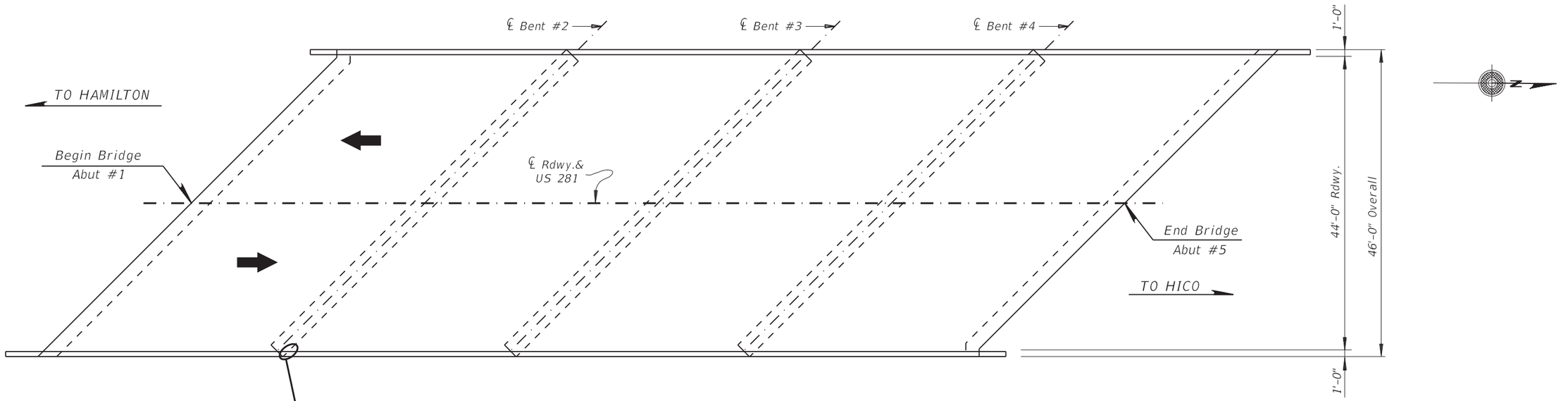

US 281 OVER MESQUITE CREEK

(NBI # 09-098-0-0251-01-039)

US 281 OVER MESQUITE CREEK
140'-0" OVERALL LENGTH
(4 @ 35'-0") CONC. T-BEAM SPANS
44'-0" ROADWAY

INTERIOR BENT CAP REPAIR

⚠ SHOWING LIMITS OF SPALL REPAIR @ BENT #2

⚠ Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.

ESTIMATED QUANTITIES

ITEM	429-6007
STR. #039 US 281 OVER MESQUITE CREEK	CONC. STR REPAIR (VERTICAL & OVERHEAD)
	S.F.
BENT #2	3.0
TOTAL	3.0

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair spalled/Delaminated Interior Bent Caps.

Provide materials as outlined in the CONCRETE REPAIR MANUAL.

Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Materials".

All materials and labor required for repairing spalled/ Delaminated area shall be included in the price bid per SF for Item: CONC STR REPAIR (VERTICAL & OVERHEAD)

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L. Langdale, P.E.

Texas Department of Transportation

CONCRETE STRUCTURE REPAIR DETAILS

US 281
(MESQUITE CREEK)

(STR# 039)

FILE: MESOREP.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	52
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED
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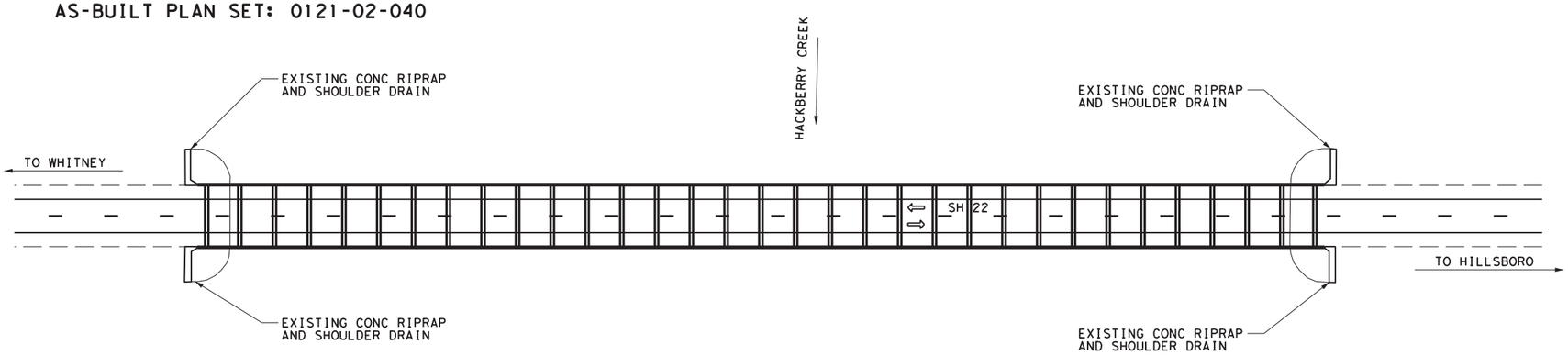
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

FOR LOCATION REPAIR DETAILS REFER TO:

CONCRETE STRUCTURE REPAIR DETAILS (SH 22 OVER HACKBERRY CREEK)

LAYOUT AND DETAILS FOR CLEANING AND SEALING
EXPANSION JOINTS (SH 22 OVER HACKBERRY CREEK)

AS-BUILT PLAN SET: 0121-02-040

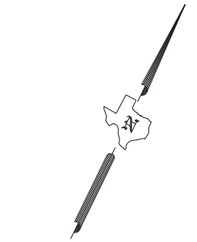


NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: SH 22 @ HACKBERRY CREEK
NBI#: 09-110-0-0121-02-051
DIMENSIONS: 800'x 44' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 32.0063695/-97.14884261

LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL



GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0351 6012	FLEXIBLE PAVEMENT STRUCTURE REPAIR(2")	SY	196
0356 6021	PAV JT UNDERSEAL (24")	LF	440
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	565
0429 6009	CONC STR REPAIR (STANDARD)	SF	600
0438 6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	440

CONTRACTOR'S INFORMATION ONLY

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, PE 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

HILL COUNTY
STRUCTURE LAYOUT
SH 22 @ HACKBERRY CREEK
NBI# 09-110-0-0121-02-051

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	53
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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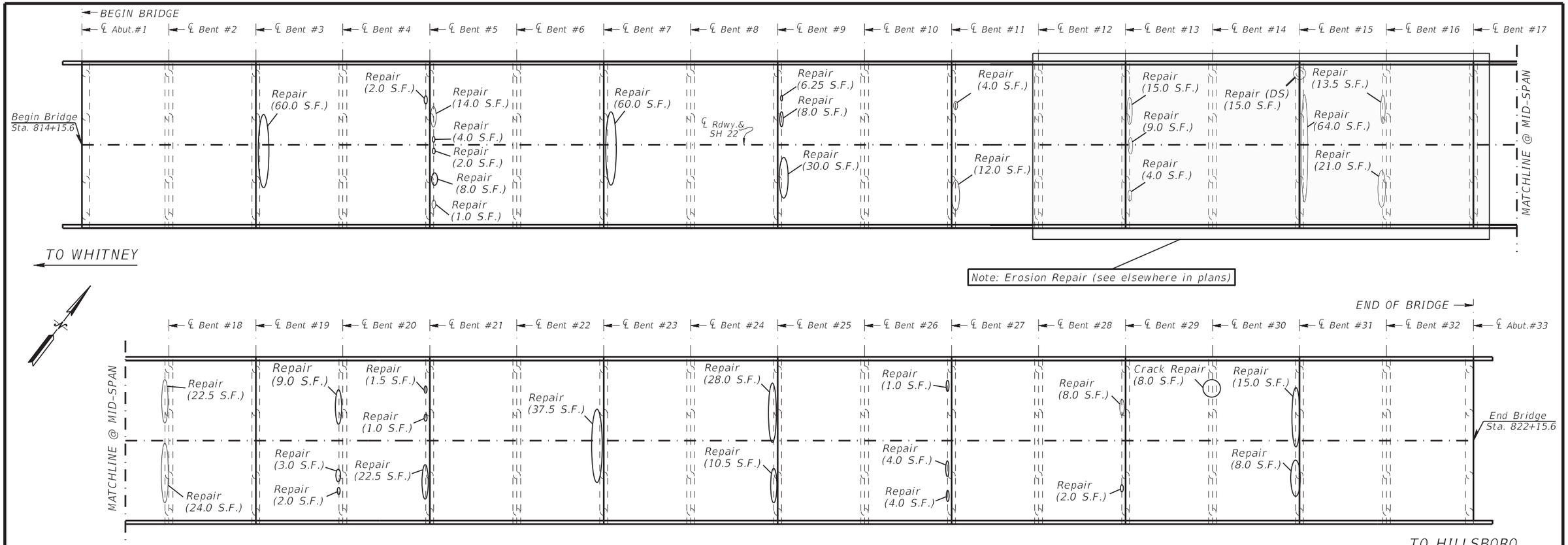

LAYOUT PLAN

SH 22 OVER HACKBERRY CREEK

(NBI # 09-110-0-0121-02-051)

SH 22 OVER HACKBERRY CREEK
800'-0" OVERALL LENGTH
(32 @ 25'-0") CONCRETE CONTINUOUS SLAB UNITS
44'-0" ROADWAY
TYPE T501 RAIL

Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.

ESTIMATED QUANTITIES

	429-6007	429-6007
LOCATION	CONC. STR REPAIR (STANDARD)	CONC. STR REPAIR (VERTICAL & OVERHEAD)
	S.F.	S.F.
STR. #051 SH 22 OVER HACKBERRY CREEK	0.0	565.0
MISC. @ EACH EXP JOINT	600.0	0.0
TOTAL	600.0	565.0

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair spalled/Delaminated Interior Bent Caps and bottom of slab locations.

Provide materials as outlined in the CONCRETE REPAIR MANUAL. Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Materials".

All materials and labor required for repairing spalled/ delaminated areas shall be included in the price bid per SF for Item: CONC STR REPAIR.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

CONCRETE STRUCTURE REPAIR DETAILS

SH 22 OVER HACKBERRY CREEK

(STR.#051)

FILE: 051SH22CONCREP.dgn	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	54
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED ACC:
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17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
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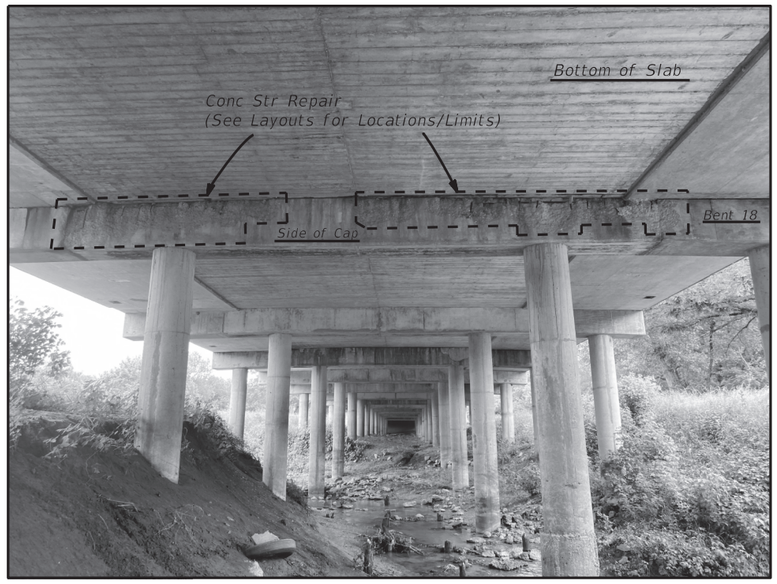
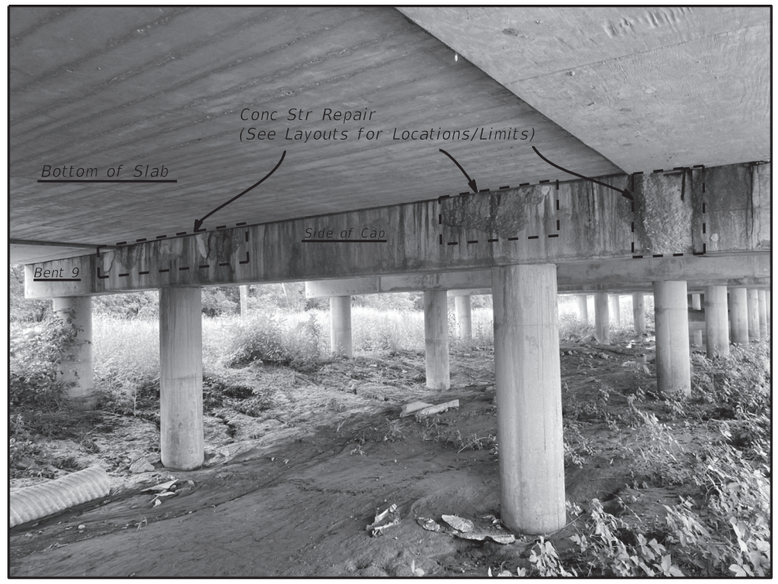
⚠ Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.



CONCRETE STRUCTURE REPAIR

⚠ SHOWING SPALLS AT SIDE OF CAP



CONCRETE STRUCTURE REPAIR

⚠ SHOWING SPALLS AT SIDE OF CAP

CONCRETE STRUCTURE REPAIR

⚠ SHOWING SPALLS AT SIDE OF CAP

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SHEET 2 OF 2 SHEETS

CONCRETE STRUCTURE REPAIR DETAILS

SH 22 OVER HACKBERRY CREEK

(STR.#051)

FILE: 051SH22CONCREP.dgn	DN: DOT	CK: DOT	DW: ZB	CK: DOT		
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT			SHEET
REVISIONS	WACO	6	BPM 643811001			55
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

...\0121-02-051_D2.dgn

8/29/2023
T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM643811001\CADD\BASE\SHEETS\HILL\0121-02-051_SH-22@HACKBERRY_CREEK\0121-02-051_D2.dgn

LEVELS DISPLAYED
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33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
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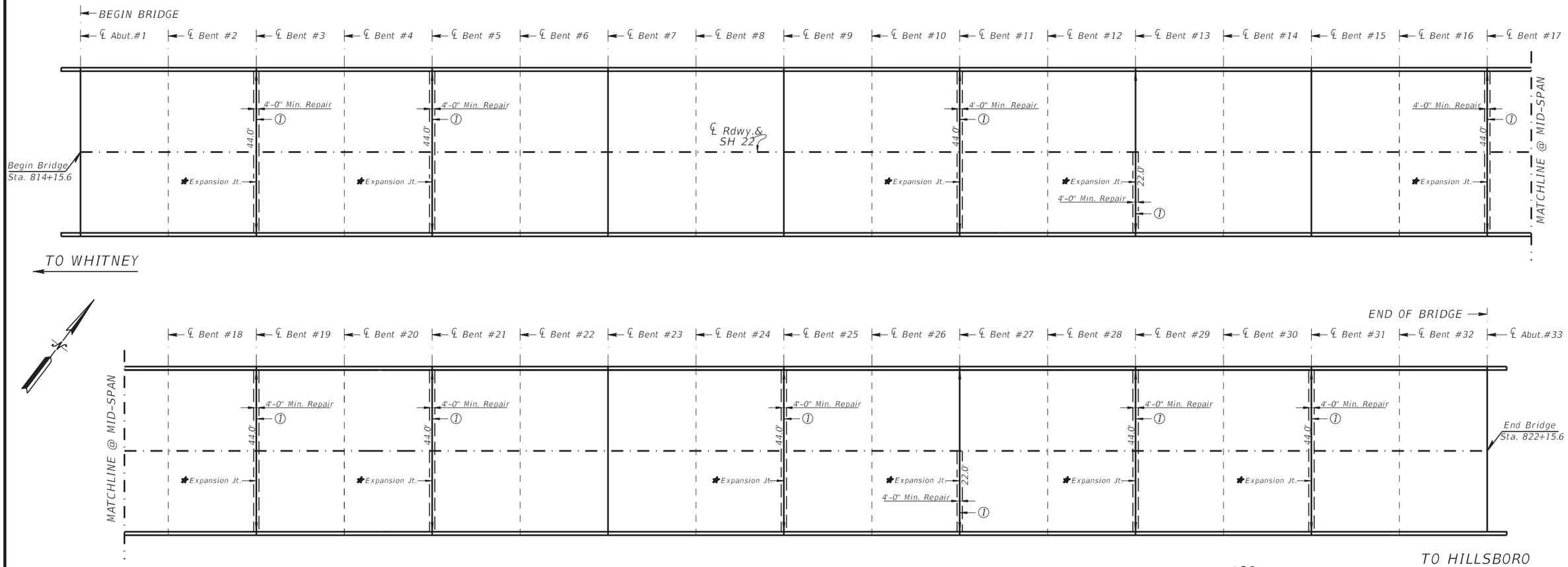
ACC:



★ Denotes Location for Cleaning and Sealing Expansion Joint.

LAYOUT PLAN
SH 22 OVER HACKBERRY CREEK
(NBI # 09-110-0-0121-02-051)

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING OF ALL DEBRIS, PROVIDING AND PLACING BACKER ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE L.F. OF "CLEANING AND SEALING OF EXISTING JOINTS (CL 3)". PROVIDING AND APPLYING TACK COAT AND PROVIDING AND PLACING FABRIC JOINT UNDERSEAL IS PAID FOR BY ITEM 356, "FABRIC UNDERSEAL" AND MEASURED BY THE L.F. OF "PAV JT UNDERSEAL".

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE THE REINFORCED FABRIC JOINT UNDERSEAL IN ACCORDANCE WITH DMS-6260 "REINFORCED FABRIC JOINT UNDERSEAL" OR DMS-6220, "FABRIC FOR UNDERSEALS".

NOTES:

PLACE TACK COAT OR BINDER AS REQUIRED BY THE FABRIC UNDERSEAL MANUFACTURER'S INSTALLATION INSTRUCTIONS.

USE TY-C DENSE-GRADED HMA WITH UNDERSEAL FOR THE REPLACEMENT OF REMOVED SAWED-CUT EXISTING PAVEMENT.

① Saw-Cut and remove Existing Pavement to Concrete Deck. Install Fabric Joint Underseal as per directed.

SH 22 OVER HACKBERRY CREEK
800'-0" OVERALL LENGTH
(32 @ 25'-0") CONCRETE CONTINUOUS SLAB UNITS
44'-0" ROADWAY
46'-0" OVERALL
TYPE T501 RAIL

ESTIMATED QUANTITIES

ITEM	351-6012	356-6021	438-6002
LOCATION	FLEXIBLE PAVEMENT STRUCTURE REPAIR (2.5")	PAV JT UNDERSEAL (24")	CLEANING AND SEALING EXIST JOINTS (CL 3)
	S.Y.	L.F.	L.F.
STR. #051 SH 22 OVER HACKBERRY CREEK	196.0	440.0	440.0
TOTAL	196.0	440.0	440.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L. Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS
SH 22 OVER HACKBERRY CREEK
(STR.#051)

FILE: 051SH22JTS.dgn	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	56
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

...\0121-02-051_D3.dgn

LEVELS DISPLAYED ACC:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
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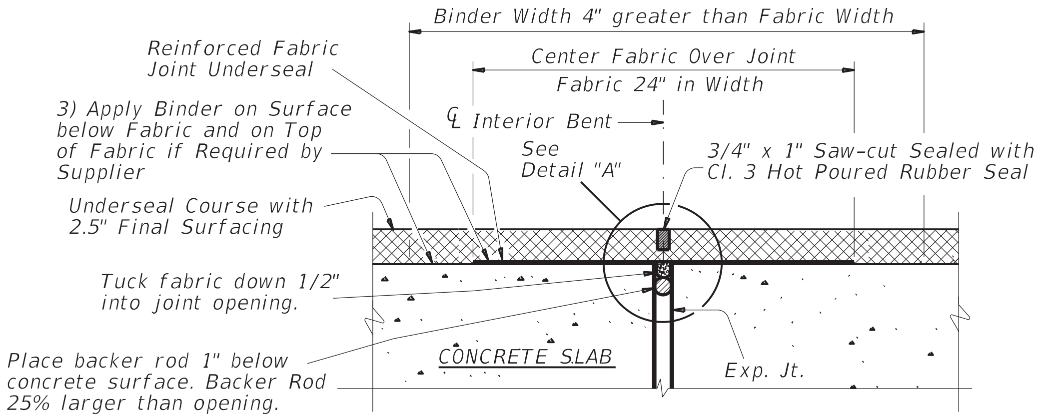
8/29/2023
T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM643811001\CADD\BASE\SHEETS\HILL\0121-02-051_SH-22@HACKBERRY_CREEK\0121-02-051_D3.dgn

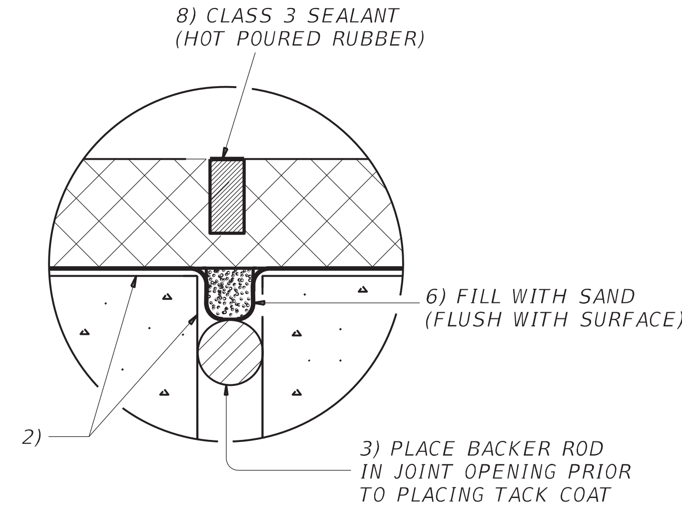
8/29/2023
T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM643811001\CADD\BASE\SHEETS\HILL\0121-02-051_SH-22@HACKBERRY_CREEK\0121-02-051_D4.dgn

3) A tack coat must be applied if the surface has been milled.



INTERIOR BENT LOCATION

FABRIC JOINT SEAL WITH HOT POURED RUBBER



DETAIL "A"

PROCEDURES:

1) PRIOR TO THE PLACEMENT OF THE FABRIC JOINT UNDERSEAL. CLEAN JOINT OPENING OF ALL OLD EXPANSIONS MATERIAL/DEVICES, BITUMINOUS MATERIALS, DIRT, GREASE, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS".

2) REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, AROUND THE JOINT OPENING WITH TYPE II POLYMER CONCRETE IN ACCORDANCE WITH DMS-6140, "POLYMER CONCRETE FOR JOINT SYSTEMS". THIS WORK WILL BE PAID FOR BY ITEM 429 "CNC STR REP (STANDARD)".

3) PLACE TACK COAT OR BINDER AS REQUIRED BY THE FABRIC JOINT UNDERSEAL MANUFACTURER'S INSTALLATION INSTRUCTIONS. PLACE BACKER ROD IN JOINT OPENING PRIOR TO PLACING TACK COAT.

4) PLACE REINFORCED FABRIC JOINT UNDERSEAL CENTERED OVER JOINT OPENING. TUCK FABRIC DOWN APPROXIMATELY 1/2" INTO THE JOINT OPENING. INSTALL UNDERSEAL IN ACCORDANCE WITH MANUFACTURED RECOMMENDATIONS.

5) WHEN USING THE SELF-ADHESIVE TYPE FABRIC UNDERSEAL, PRESSURE ROLL FABRIC JOINT UNDERSEAL TO IMPROVE ADHESION.

6) JUST PRIOR TO PAVING, FILL TUCKED IN PORTION OF UNDERSEAL WITH SAND FLUSH WITH SURFACE. APPLY A TACK COAT TO FABRIC JOINT UNDERSEAL AS REQUIRED BY THE MANUFACTURER'S INSTRUCTIONS. MARK LOCATION OF CENTERLINE OF JOINT ON CURB OR BARRIER AS APPROVED.

7) AFTER THE ASPHALTIC CONCRETE PAVEMENT OPERATIONS ARE COMPLETE, SAW CUT 1" INTO THE ASPHALT AT CENTERLINE OF JOINT. MAKE MULTIPLE SAW CUTS TO CREATE A 3/4" JOINT OPENING OR MATCH THE EXISTING JOINT OPENING. WHICHEVER IS GREATER. DO NOT DAMAGE THE UNDERSEAL.

8) SEAL THE JOINT OPENING WITH A CLASS 3, "HOT POURED RUBBER". SEAL FLUSH WITH THE TOP OF THE ASPHALTIC CONCRETE PAVEMENT.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L. Langdale, P.E.

SHEET 2 OF 2 SHEETS

Texas Department of Transportation
© 2023

LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS

SH 22 OVER HACKBERRY CREEK

(STR.#051)

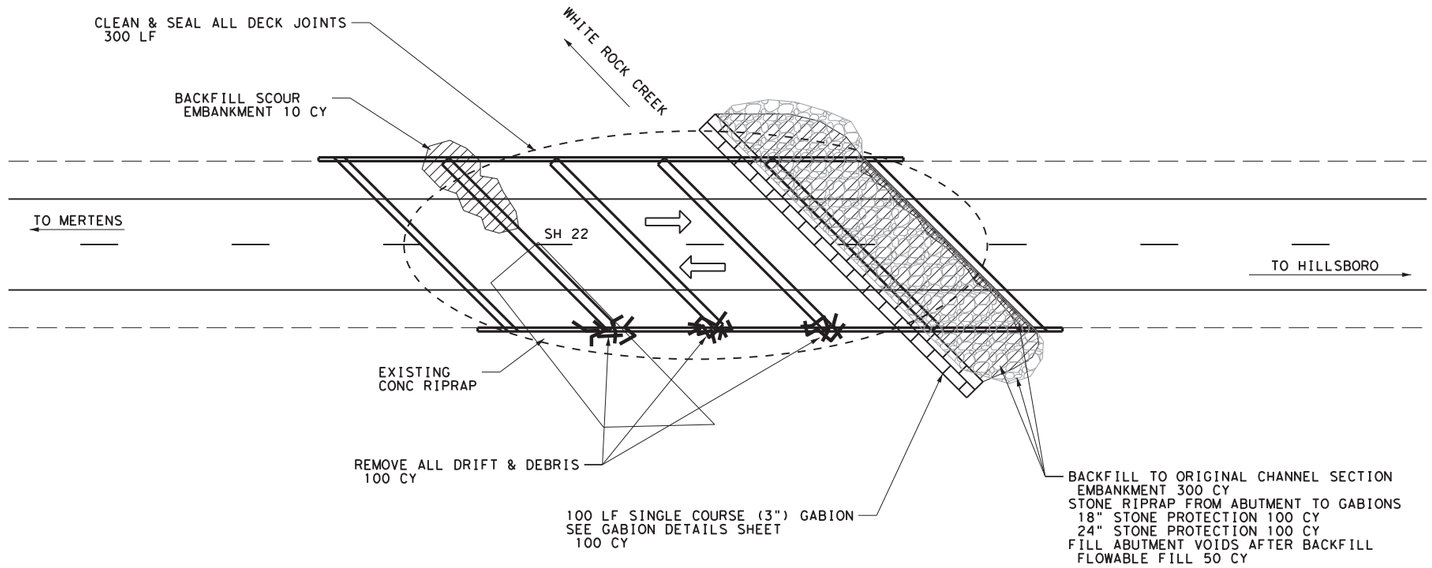
FILE: 051SH22JTS.dgn	DN: DOT		CK: DOT	DW: ZB		CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT			SHEET
REVISIONS	WACO	6	BPM 643811001			57
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC		6438	11	001	SH 22,ETC

...\0121-02-051_D4.dgn

FOR LOCATION REPAIR DETAILS REFER TO:

CONCRETE STRUCTURE REPAIR DETAILS (SH 22 OVER WHITE ROCK CREEK)

AS-BUILT PLAN SET: 0121-03-027



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT

NTS

DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	310
0401 6001	FLOWABLE BACKFILL	CY	54
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	86
0432 6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	100
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	100
0438 6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	300
0459 6001	GABIONS (GALV)	CY	100
7000 6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	100

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: SH 22 @ WHITE ROCK CREEK
NBI#: 09-110-0-0121-03-012
DIMENSIONS: 142.5'x 44' BRIDGE
SKEW: 45° SKEW
GPS LAT/LON: 32.03961307/-96.98255933

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

HILL COUNTY
STRUCTURE LAYOUT
SH 22 @ WHITE ROCK CREEK
NBI# 09-110-0-0121-03-012

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22,ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL,ETC	58
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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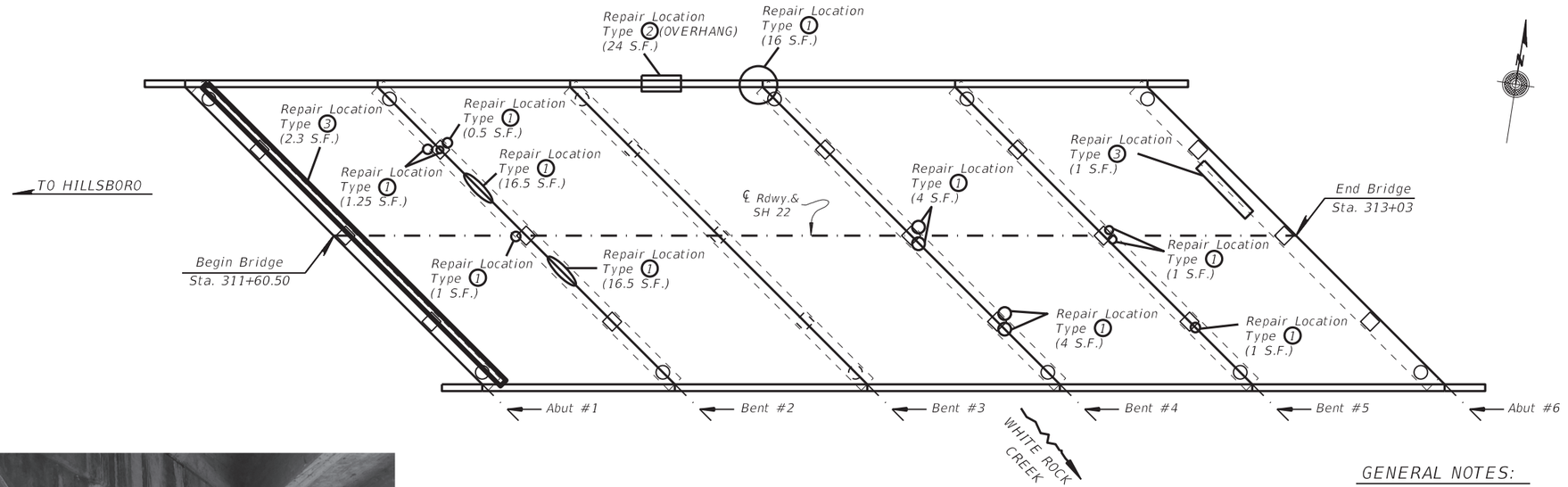
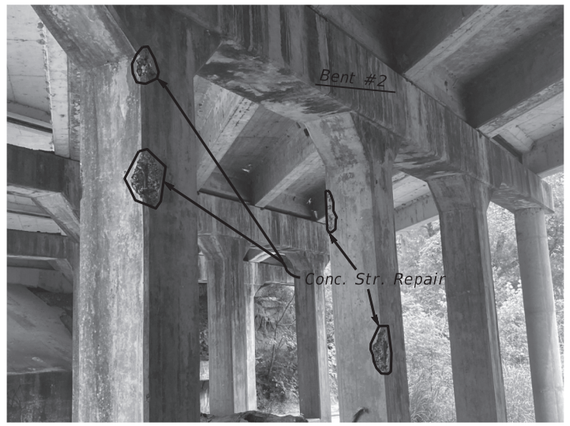


SH 22 WHITE ROCK CREEK
142'-6" OVERALL LENGTH
(5 @ 28'-6") CONCRETE T-BEAM BRIDGE 45° RFS
44'-0" ROADWAY
TYPE 4 RAIL

LAYOUT PLAN
SH 22 OVER WHITE ROCK CREEK

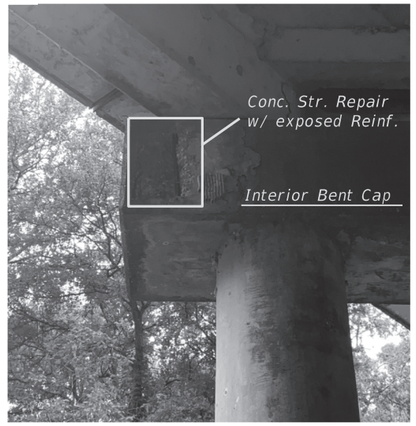
(NBI # 09-110-0-0121-03-012)



REPAIR TYPE - INTERIOR COLUMNS

⚠ SHOWING LIMITS OF SPALLS AT INTERIOR BENT

⚠ Note: Details are shown as a guide. Constractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.



REPAIR - SPALLED END OF CAP

⚠ SHOWING LIMITS OF SPALLS AT END OF INTERIOR BENT CAP

GENERAL NOTES:

Obtain approval for all tools , equipment, materials and techniques proposed for use to repair spalled/Delaminated Slab & Interior Bent Caps.

All materials and labor required for filling voids below Abutment Cap will be included in the price bid per CY for FLOWABLE BACKFILL.

All materials and labor required for repairing spalled/ Delaminated area shall be included in the price bid per SF for Item: CONC STR REPAIR (VERTICAL & OVERHEAD)

ITEM	401-6001	429-6007
LOCATION	FLOWABLE BACKFILL	CONC. STR REPAIR (VERTICAL & OVERHEAD)
	C.Y.	S.F.
REPAIR LOCATION TYPE 1		62.0
REPAIR LOCATION TYPE 2		24.0
REPAIR LOCATION TYPE 3	4.0	
TOTAL	4.0	86.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

Texas Department of Transportation

CONCRETE STRUCTURE REPAIR DETAILS

SH 22 OVER WHITE ROCK CREEK

(STR.#012)

FILE: SH22CONCREP.DGN	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	59
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

...\0121-03-012_D1.dgn

8/29/2023
T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM643811001\CADD\BASE\SHEETS\HILL\0121-03-012_SH-22@WHITE_ROCK_CREEK\0121-03-012_D1.dgn

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33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 ACC:

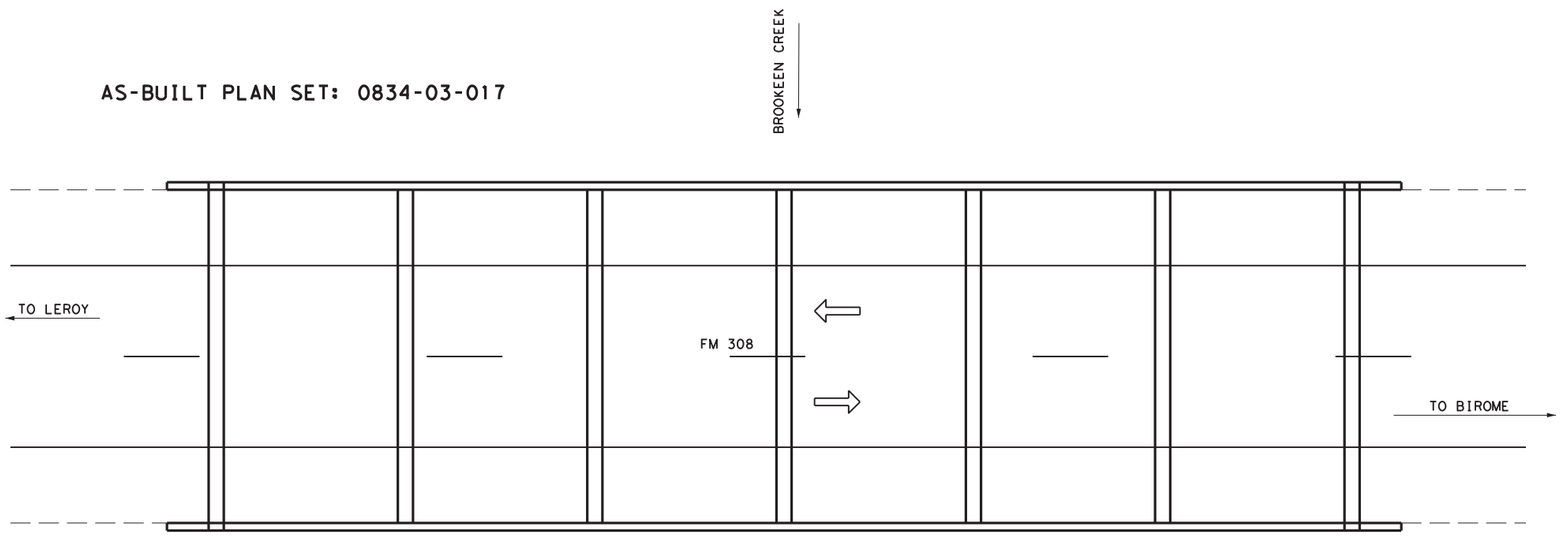
FOR LOCATION REPAIR DETAILS REFER TO:

CONCRETE STRUCTURE REPAIR DETAILS (FM 308 OVER BROOKEEN CREEK)

EROSION REPAIR DETAILS (FM 308 OVER BROOKEEN CREEK)

PILE ENCASEMENT DETAILS (FM 308 OVER BROOKEEN CREEK)

AS-BUILT PLAN SET: 0834-03-017



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0104 6009	REMOVING CONC (RIPRAP)	SY	31
0132 6019	EMBANKMENT (VEHICLE)(ORD COMP)(TY B)	CY	109
0401 6001	FLOWABLE BACKFILL	CY	1
0420 6070	CL C CONC (PILE ENCASEMENT)	CY	12.3
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	79
0432 6002	RIPRAP (CONC)(5 IN)	CY	17
0432 6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	521
0432 6035	RIPRAP (STONE PROTECTION)(24 IN)	CY	131
0459 6001	GABIONS (GALV)	CY	100

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: FM 308 @ BROOKEEN CREEK
NBI#: 09-110-0-0834-03-018
DIMENSIONS: 150'x 44' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.79612321/-96.97517678

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

HILL COUNTY
STRUCTURE LAYOUT
FM 308 @ BROOKEEN CREEK
NBI# 09-110-0-0834-03-018

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22,ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL,ETC	60
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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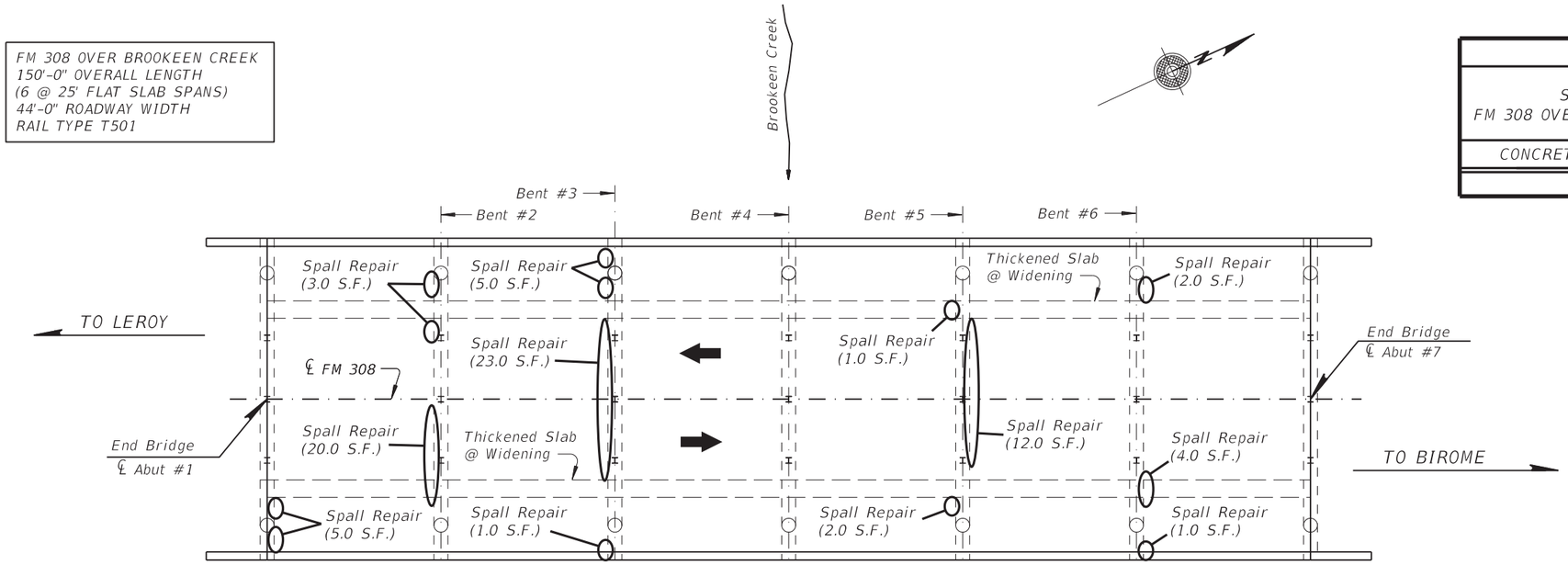
FM 308 OVER BROOKEEN CREEK
150'-0" OVERALL LENGTH
(6 @ 25' FLAT SLAB SPANS)
44'-0" ROADWAY WIDTH
RAIL TYPE T501



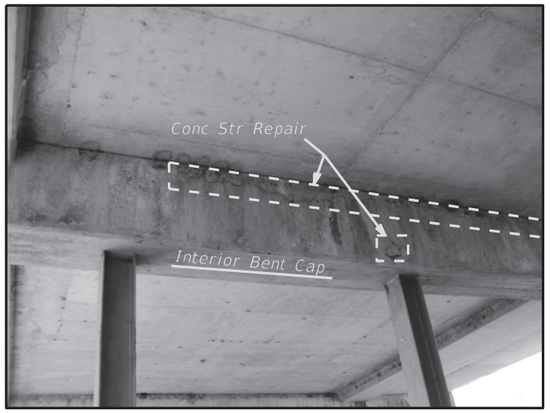
ESTIMATED QUANTITIES

ITEM	429-6007
STR. #018 FM 308 OVER BROOKEEN CREEK	CONC. STR REPAIR (VERTICAL & OVERHEAD)
	S.F.
CONCRETE CAP REPAIR	79.0
TOTAL	79.0

FM 308 @ BROOKEEN CREEK

NBI NO. 09-110-0-0834-03-018

⚠ Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.



INTERIOR BENT CAP REPAIR

SHOWING TYPICAL DELAMINATION AT TOP OF BENT CAPS

INTERIOR BENT CAP REPAIR

⚠ SHOWING MISC. SPALLS AT BENT CAPS
NOTE: ABUTMENT CAP ~ SIMILAR

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair spalled/Delaminated Interior Bent Caps.

Provide materials as outlined in the CONCRETE REPAIR MANUAL.

Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Materials".

All materials and labor required for repairing spalled/ Delaminated area shall be included in the price bid per SF for Item: CONC STR REPAIR (VERTICAL & OVERHEAD)

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

Texas Department of Transportation
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CONCRETE STRUCTURE REPAIR DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: BrookRep.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	61
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HILL,ETC	6438	11 001	SH 22,ETC

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8/29/2023
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LEVELS DISPLAYED
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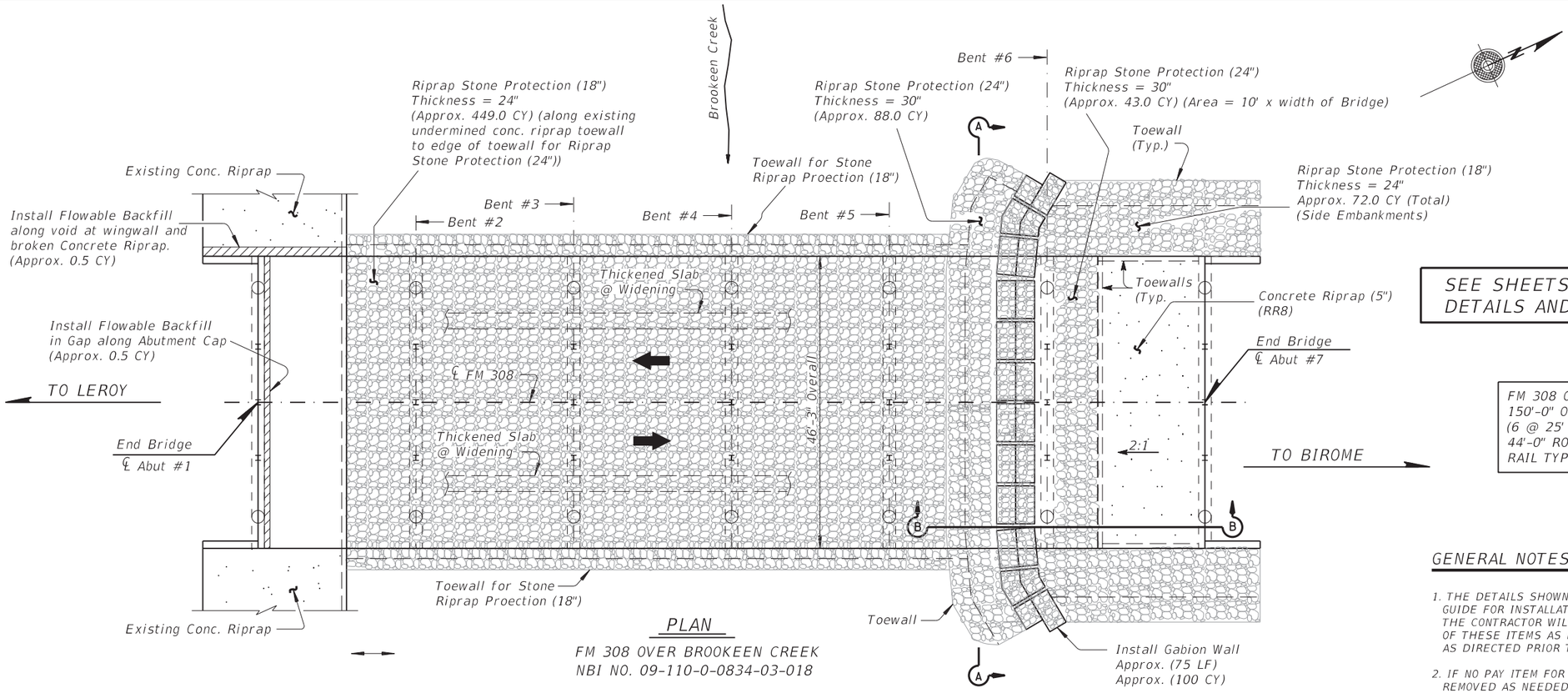


PLAN

FM 308 OVER BROOKEEN CREEK
NBI NO. 09-110-0-0834-03-018

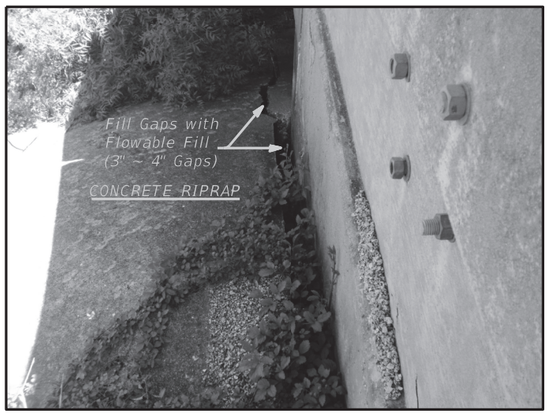
SEE SHEETS 2 AND 3 FOR ADDITIONAL DETAILS AND TYPICAL SECTIONS.

FM 308 OVER BROOKEEN CREEK
150'-0" OVERALL LENGTH
(6 @ 25' FLAT SLAB SPANS)
44'-0" ROADWAY WIDTH
RAIL TYPE T501

NOTE: DETAILS ARE SHOWN AS A GUIDE.
CONTRACTOR TO FIELD VERIFY LIMITS OF REPAIR
PRIOR TO ORDERING MATERIALS.

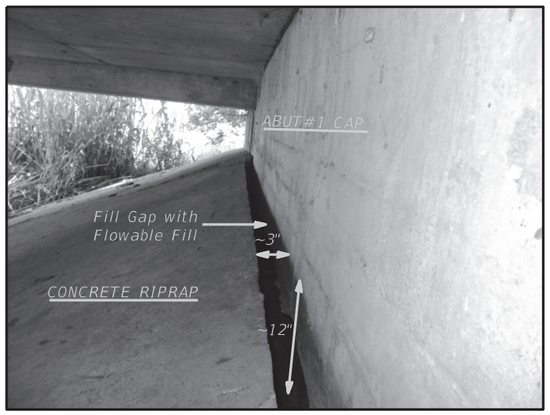
GENERAL NOTES:

1. THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF RIPRAP STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF THESE ITEMS AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
2. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED AS NEEDED TO PLACE RIPRAP. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
3. ALL EXCAVATION, GRADING, BACKFILLING AND FINISHING OF SOIL WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.



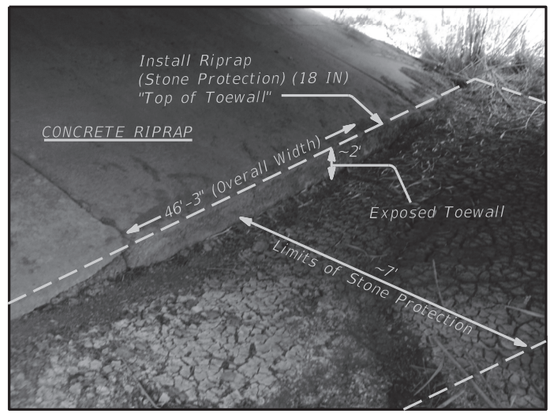
CONCRETE RIPRAP REPAIR AT SW WINGWALL

(SHOWING GAP BETWEEN WINGWALL AND RIPRAP)
(SHOWING BROKEN CONCRETE RIPRAP)



CONCRETE RIPRAP REPAIR AT ABUT. CAP #1

(SHOWING GAP BETWEEN RIPRAP AND CAP)



EROSION REPAIR AT RIPRAP TOEWALL

(SHOWING LIMITS OF STONE PROTECTION)

STATE OF TEXAS
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126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023

SHEET 1 OF 3 SHEETS

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EROSION REPAIR DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: SCOURREP1.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT			
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT				SHEET
REVISIONS	WACO	6	BPM 643811001				62
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	HILL, ETC		6438	11	001	SH 22, ETC	

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8/29/2023
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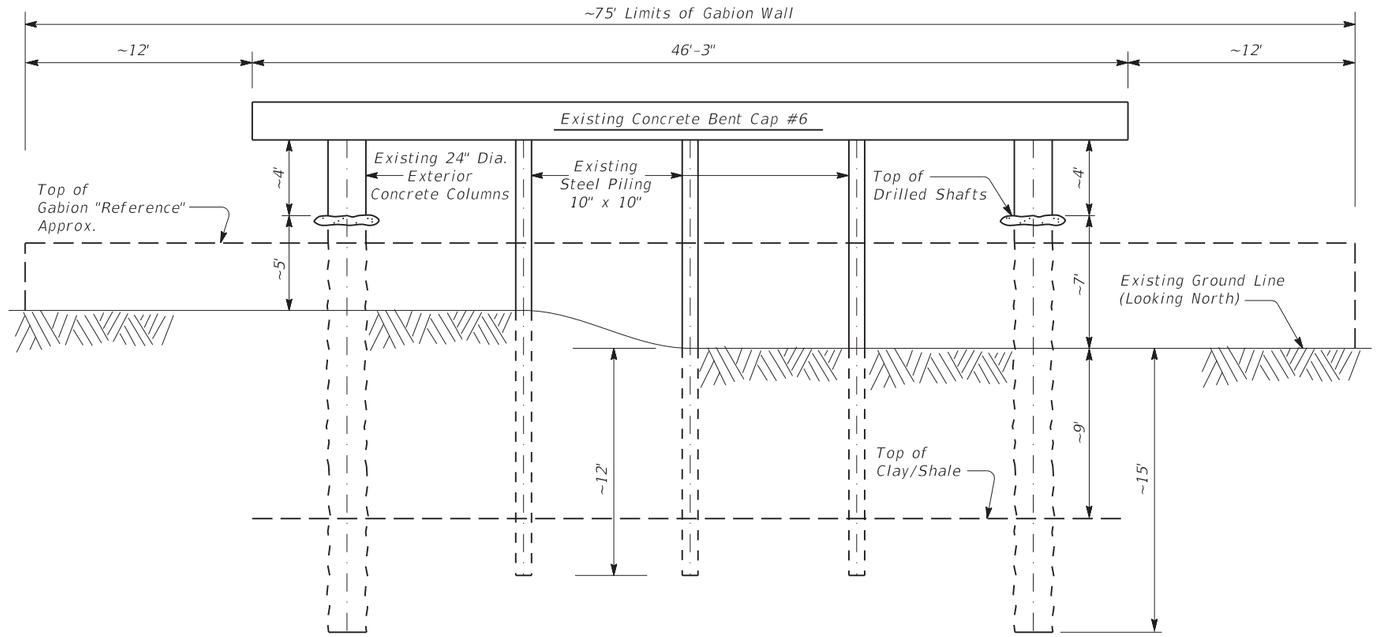
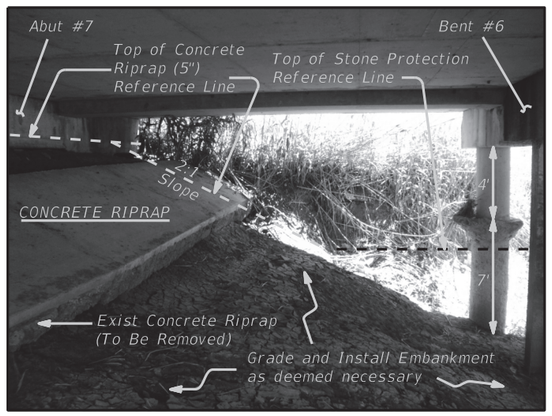


SECTION A-A

Bent #6 - Looking North

EROSION REPAIR AT INTERIOR BENT #6

(SHOWING APPROX. LIMITS OF GABION WALL)
(LOOKING NE)



EROSION REPAIR AT ABUT. #7

(SHOWING LIMITS OF RIPRAP STONE PROTECTION AT SPAN #6)
(LOOKING EAST)

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0104-6009	REMOVING CONC (RIPRAP)	S.Y.	31
0132-6019	EMBANKMENT (VEHICLE) (ORD COMP) (TY B)	C.Y.	109
0401-6001	FLOWABLE BACKFILL	C.Y.	1
0432-6002	RIPRAP (CONC) (5 IN)	C.Y.	17
0432-6033	RIPRAP (STONE PROTECTION) (18 IN)	C.Y.	521
0432-6035	RIPRAP (STONE PROTECTION) (24 IN)	C.Y.	131
0459-6001	GABIONS (GALV)	C.Y.	100

Note: Perform Pile Encasement Repair prior to Gabion and Stone Protection installation.

STATE OF TEXAS
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PROFESSIONAL ENGINEER
8/30/2023

SHEET 2 OF 3 SHEETS

EROSION REPAIR DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: SCOURREP1.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	63
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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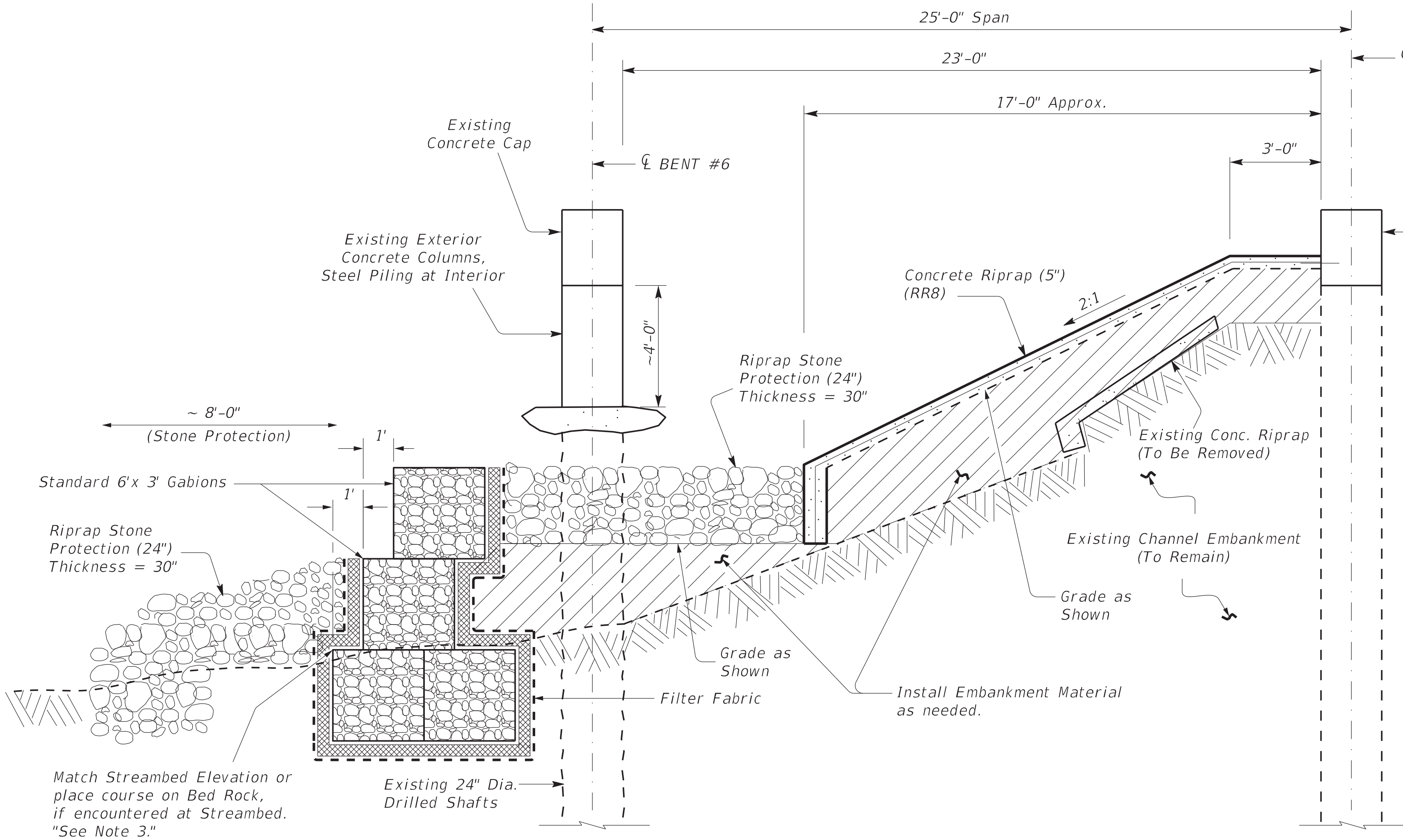
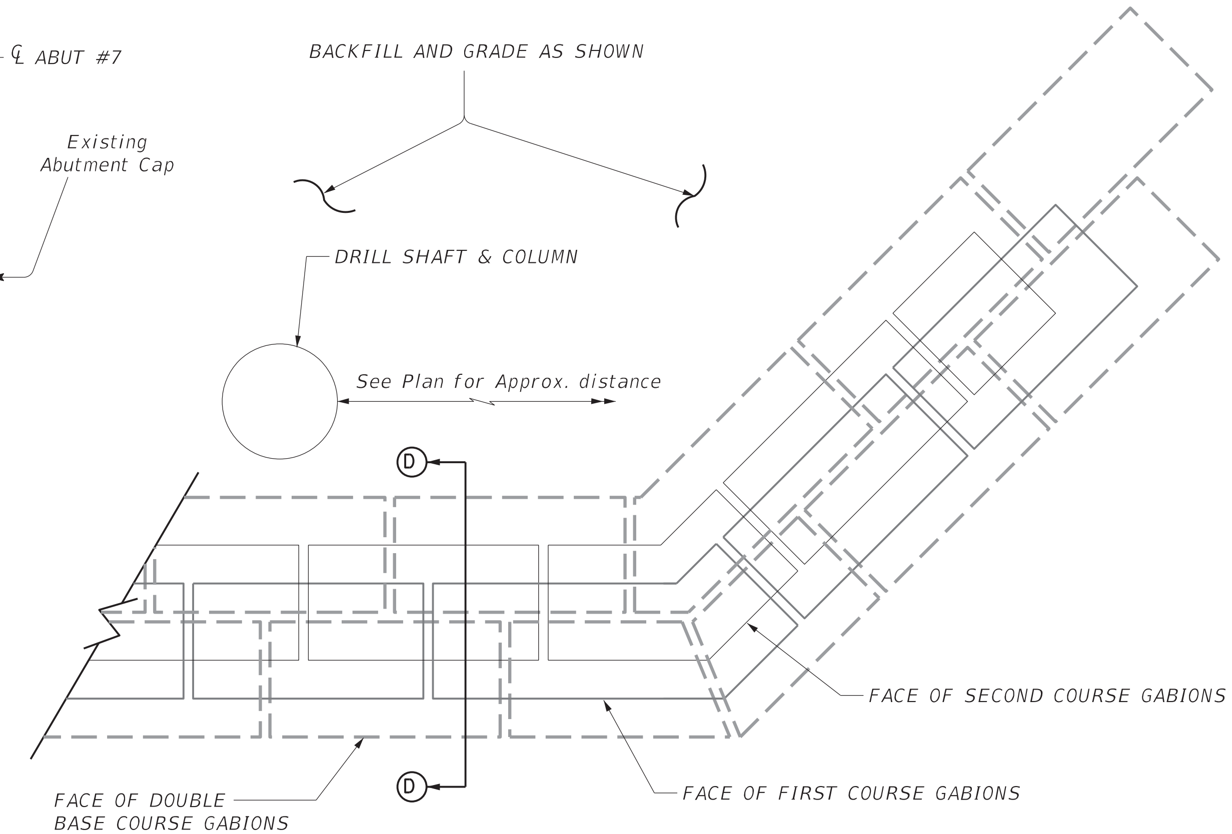


SECTION B-B

(Gabion Wall Courses may vary along Bent #6).
(See ESTIMATED GABION WALL COURSES)



PLAN VIEW

GENERAL NOTES FOR GABIONS:

1. GABION AND REVET MATTRESS WILL BE CONSTRUCTED IN ACCORDANCE TO ITEM 459.
2. ALL GABION INSTALLATIONS ARE REQUIRED TO USE FILTER FABRIC IN ACCORDANCE TO ITEM 459.
3. IF BEDROCK IS ENCOUNTERED WITHIN THE LIMITS OF THE TOE WALL, BEGIN TOE WALL ON THE BEDROCK OR AS DIRECTED BY THE ENGINEER.
4. ALL GABION INSTALLATIONS ARE REQUIRED TO USE A MINIMUM; 4" FILTER MATERIAL.

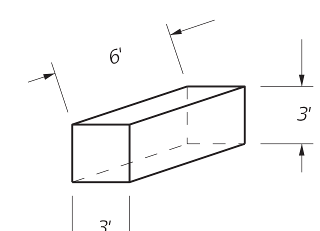
ESTIMATED GABION WALL COURSES

FOR ESTIMATE PURPOSE, THE CUBIC YARD OF GABION TO BE BASED ON WALL HEIGHT ABOVE A TWO GABION BASE COURSE. PER LINEAL FOOT OF WALL CALCULATES:

3' WALL (1 GABION COURSE ABOVE BASE COURSE) @ 1.0 CY / LF

6' WALL (2 GABION COURSES ABOVE BASE COURSE) @ 1.3 CY / LF

9' WALL (3 GABION COURSES ABOVE BASE COURSE) @ 1.7 CY / LF



STANDARD GABION

SHEET 3 OF 3 SHEETS

STATE OF TEXAS
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8/30/2023
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Texas Department of Transportation

EROSION REPAIR DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: SCOURREP1.DGN	DN: DOT		CK: DOT		DW: GNH	CK: DOT	
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT				SHEET
REVISIONS	WACO	6	BPM 643811001				64
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	HILL,ETC		6438	11	001	SH 22,ETC	

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8/29/2023
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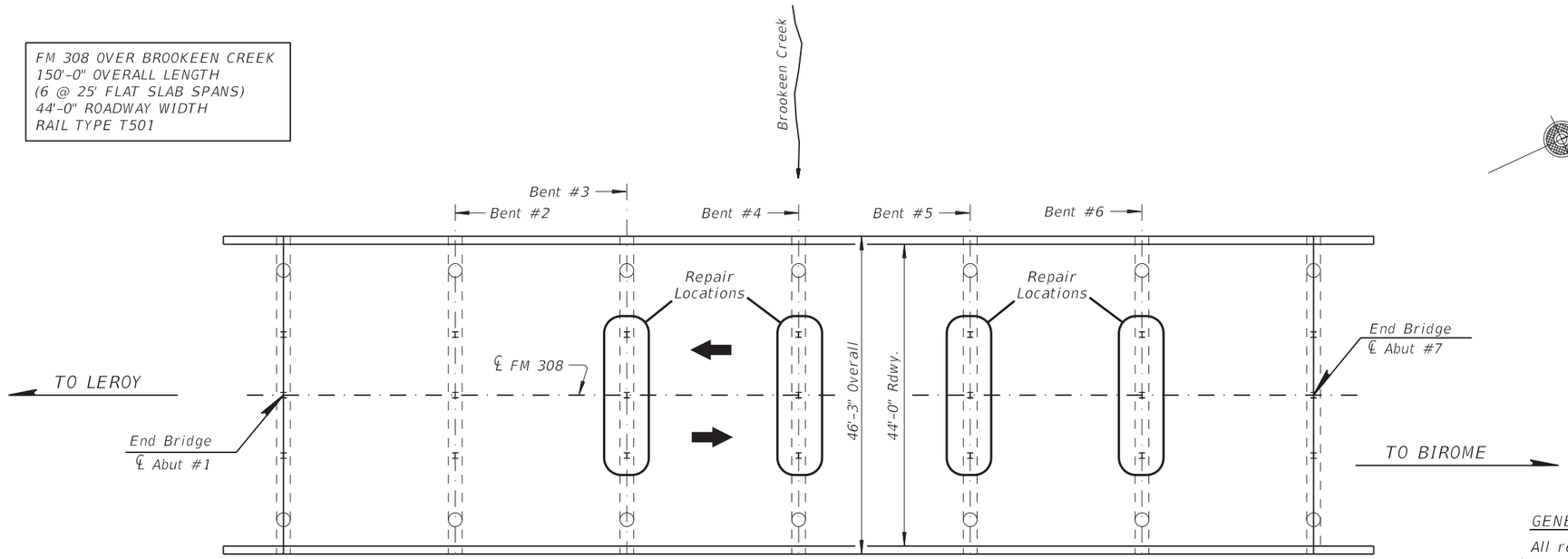
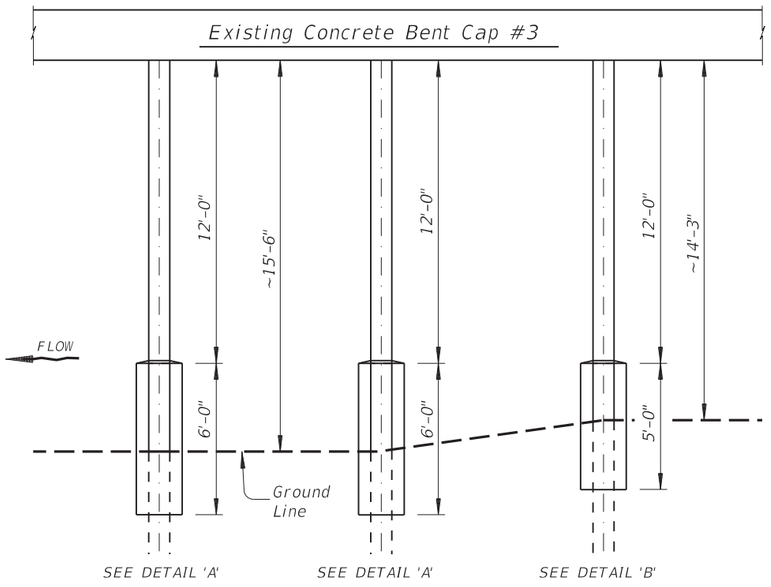
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

FM 308 OVER BROOKEEN CREEK
150'-0" OVERALL LENGTH
(6 @ 25' FLAT SLAB SPANS)
44'-0" ROADWAY WIDTH
RAIL TYPE T501

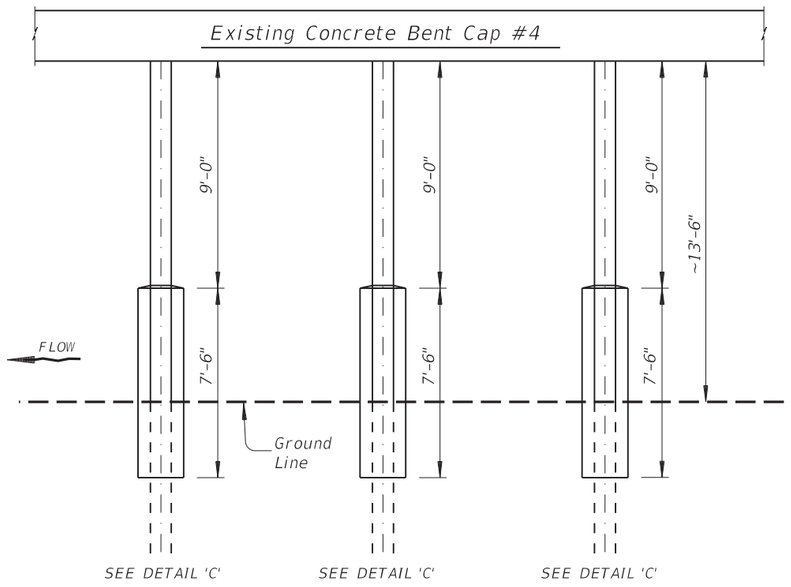


FM 308 @ BROOKEEN CREEK

NBI NO. 09-110-0-0834-03-018



ELEVATION BENT #3
(SHOWING 3 PILE BENT WITH CONCRETE COLUMNS)
(LOOKING SOUTH)



ELEVATION BENT #4
(SHOWING 3 PILE BENT WITH CONCRETE COLUMNS)
(LOOKING SOUTH)

GENERAL NOTES:

All reinforcing steel shall be Grade 60.
Concrete for Steel Pile Encasements shall be Class "C"

Obtain approval for all tools, equipment, materials and techniques proposed for use to perform repairs.

All materials and Labor required for preparing and constructing Steel Pile Encasements, shall be included in the price bid per CY for CL. "C" CONC (PILE ENCASEMENT).

Verify dimesions for pile repair and ground elevations length may be adjusted by the Engineer based on actual channel and ground line elevations

Existing conditions may be under water. Contractor will be responsible for dewatering. Payment for dewatering will be included in the price per bid for item 420 CONCRETE SUBSTRUCTURE. If the contractor can submit a plan and adequately demonstrate the ability to perform the repairs to the Engineer for approval, dewatering may not be neccessary.

Obtain approval for the mix design and the construction prodecures before the beginning of the work.

If underwater placement is approved, concrete mix should be designed for underwater placement and may require the use of anti-washout admixtures.

SHEET 1 OF 3 SHEETS

STATE OF TEXAS
ROSS L. LANGDALE
126994
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8/30/2023

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PILE ENCASEMENT DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: FM308ENC.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
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	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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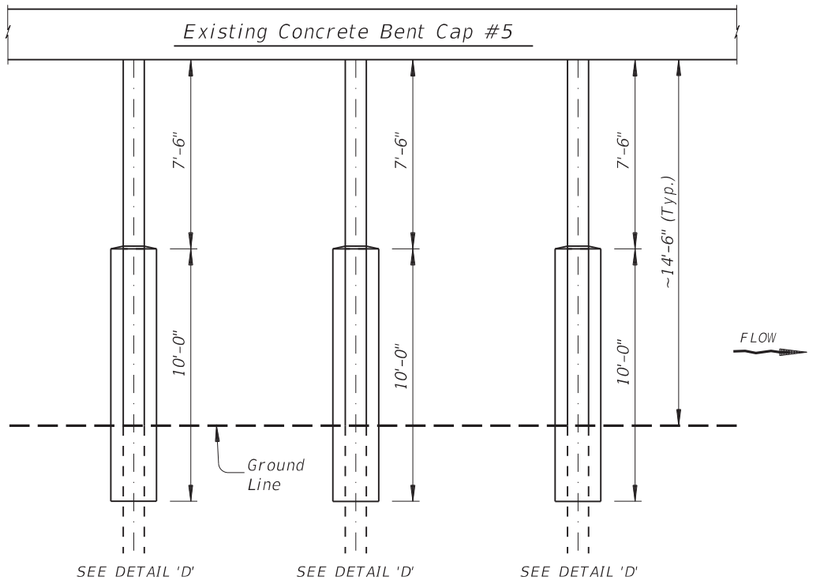
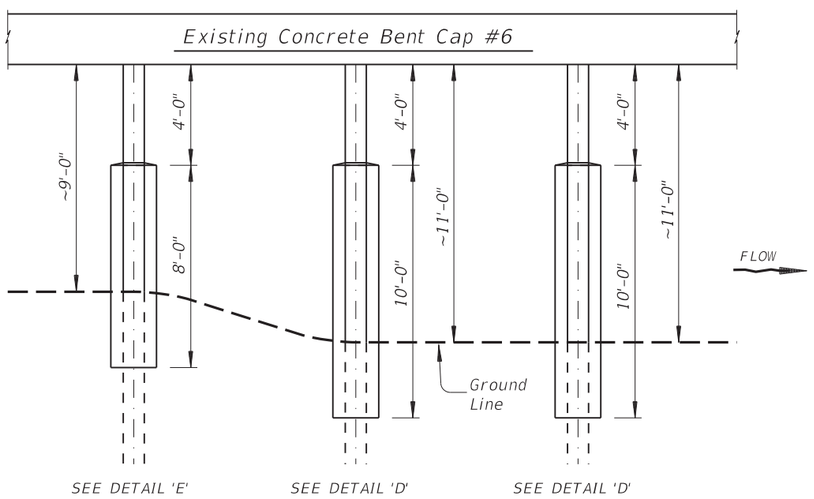
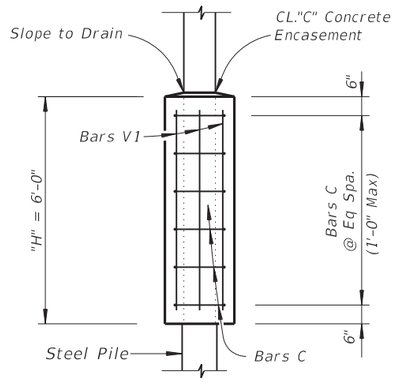


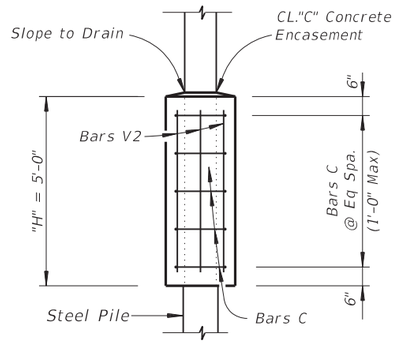
ELEVATION BENT #5
(SHOWING 3 PILE BENT WITH CONCRETE COLUMNS)
(LOOKING NORTH)



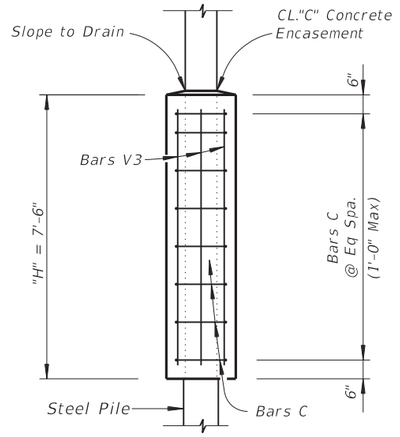
ELEVATION BENT #6
(SHOWING 3 PILE BENT WITH CONCRETE COLUMNS)
Note: Concrete Columns not shown.
(LOOKING NORTH)



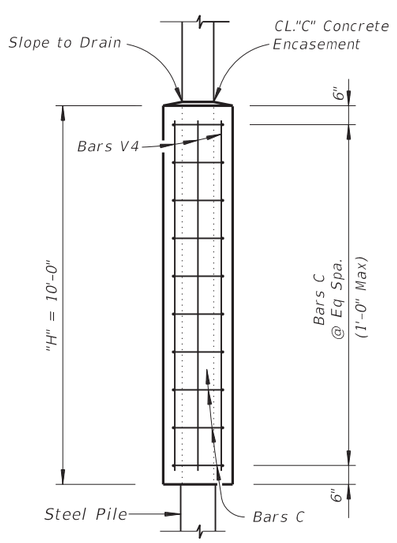
DETAIL 'A' @ BENT #3
CONCRETE ENCASEMENT



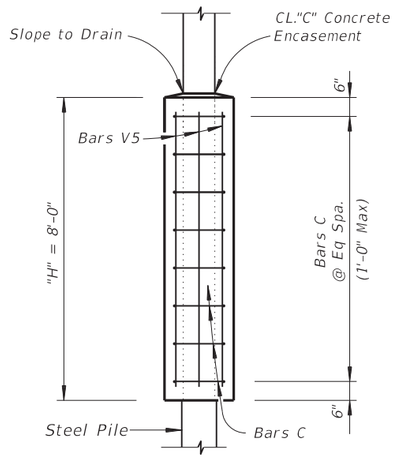
DETAIL 'B' @ BENT #3
CONCRETE ENCASEMENT



DETAIL 'C' @ BENT #4
CONCRETE ENCASEMENT



DETAIL 'D' @ BENT #5
CONCRETE ENCASEMENT



DETAIL 'E' @ BENT #6
CONCRETE ENCASEMENT

STATE OF TEXAS
ROSS L. LANGDALE
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8/30/2023
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SHEET 2 OF 3 SHEETS

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PILE ENCASEMENT DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: FM308ENC.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: APRIL 2023	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	66
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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*ESTIMATED QUANTITIES

(FOR 12 ENCASEMENTS)

Bar	No.	Size	Length	Weight
C	198	#4	4'-0"	529
V1	16	#6	5'-2"	124
V2	8	#6	4'-2"	50
V3	24	#6	6'-8"	240
V4	40	#6	9'-2"	551
V5	8	#6	7'-2"	86
Reinforcing Steel			Lb	1580

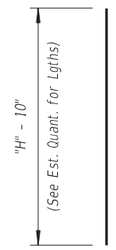
*For Contractors Information Only

ITEM	420-6070
LOCATION	CL C CONC (PILE ENCASEMENT)
	C.Y.
BENT #3 ENCASEMENT	2.2
BENT #4 ENCASEMENT	2.8
BENT #5 ENCASEMENT	3.8
BENT #6 ENCASEMENT	3.5
TOTAL	12.3

NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO ORDERING MATERIALS.

TYPICAL PILE ENCASEMENT REPAIR

(SHOWING RUSTED PILING)
LOCATIONS = INTERIOR BENTS #3 THRU #6)



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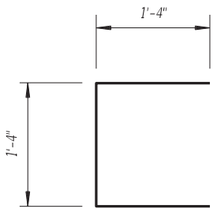

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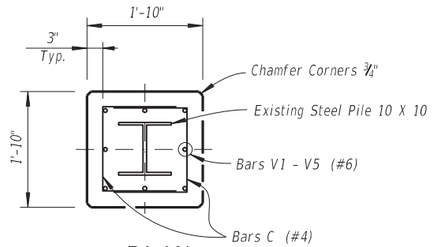

PLAN

CONCRETE ENCASEMENT

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SHEET 3 OF 3 SHEETS

Texas Department of Transportation

PILE ENCASEMENT DETAILS

FM 308 OVER BROOKEEN CREEK

STR.# 018

FILE: FM308ENC.DGN	DN: DOT	CK: DOT	DW: GNH	CK: DOT
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REVISIONS	WACO	6	BPM 643811001	67
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

ACC:

FOR LOCATION REPAIR DETAILS REFER TO:

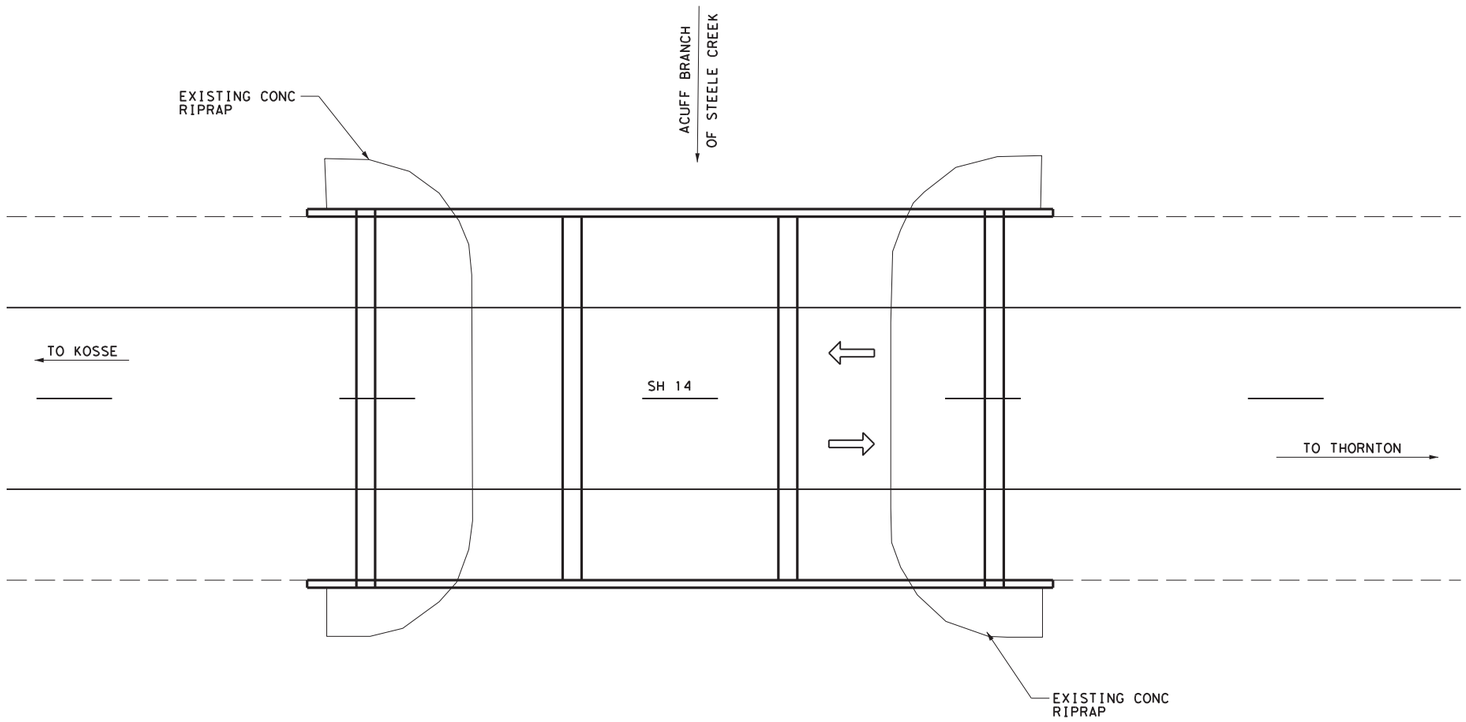
CONCRETE STRUCTURE REPAIR DETAILS (SH 14 OVER ACUFF BRANCH)

LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS (SH 14 OVER ACUFF BRANCH)

MILLING AND OVERLAY DETAILS (SH 14 OVER ACUFF BRANCH)

STRIPING DETAILS (SH 14 OVER ACUFF BRANCH)

AS-BUILT PLAN SET: 0093-06-009



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0354 6088	PLANE ASPH CONC PAV (0" TO 5")	SY	1529
0356 6021	PAV JT UNDERSEAL (24")	LF	192
0401 6001	FLOWABLE BACKFILL	CY	2
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	17.5
0438 6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	192
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	22
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	572
0666 6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	72
0672 6009	REFL PAV MRKR TY II-A-A	LF	7
3076 6069	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	TON	168
3085 6001	UNDERSEAL COURSE	GAL	306

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: SH 14 @ ACUFF BRANCH
NBI#: 09-147-0-0093-06-031
DIMENSIONS: 85.5'x 48' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.39226187/-96.59161406

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

LIMESTONE COUNTY STRUCTURE LAYOUT

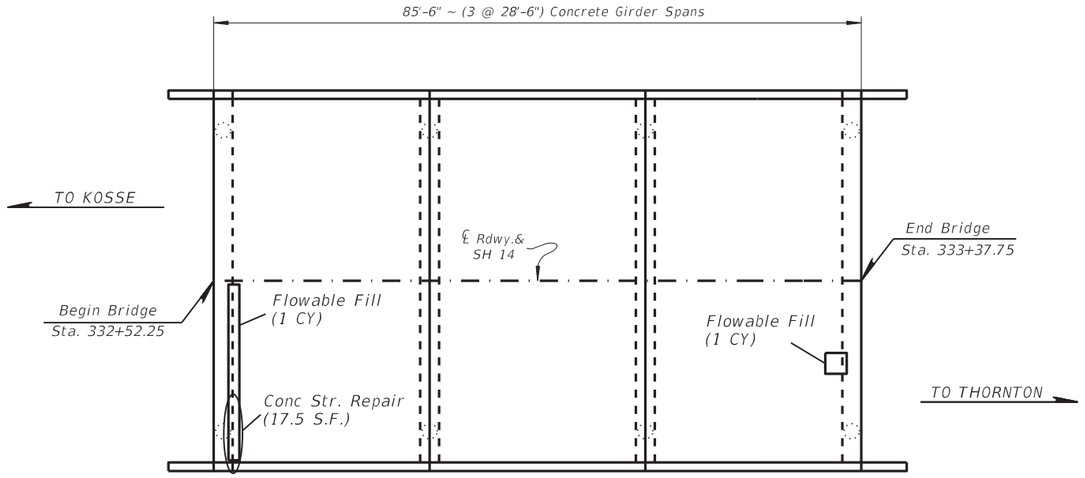
SH 14 @ ACUFF BRANCH

NBI# 09-147-0-0093-06-031

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22,ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL,ETC	68
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

...\0093-06-031.dgn



SH 14 OVER ACUFF BRANCH
85'-6" OVERALL LENGTH
(3 @ 28'-6") CONCRETE T-BEAM SPANS
48'-0" ROADWAY
TYPE T501 RAIL

LAYOUT PLAN
SH 14 OVER ACUFF BRANCH
(NBI # 09-147-0-0093-06-031)

Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.

ESTIMATED QUANTITIES

ITEM	429-6007	401-6001
LOCATION	CONC. STR REPAIR (VERTICAL & OVERHEAD)	FLOWABLE BACKFILL
	S.F.	C.Y.
STR. #031 SH 14 OVER ACUFF BRANCH	17.5	2.0
TOTAL	17.5	2.0

GENERAL NOTES:

Obtain approval for all tools, equipment, materials and techniques proposed for use to repair spalled/Delaminated Interior Bent Caps and bottom of slab locations.

Provide materials as outlined in the CONCRETE REPAIR MANUAL. Provide repair materials suitable for the appropriate horizontal, vertical or overhead application meeting the requirements in DMS-4655, "Concrete Repair Materials".

All materials and labor required for repairing spalled/ delaminated areas shall be included in the price bid per SF for Item: CONC STR REPAIR (VERTICAL & OVERHEAD).

All materials and labor required for filling voids below Abutment Cap will be included in the per price bid per CY for FLOWABLE BACKFILL.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation

CONCRETE STRUCTURE REPAIR DETAILS

SH 14 OVER ACUFF BRANCH

(STR# 031)

FILE: ACUFFCONCREP.dgn	DN: DOT	CK: DOT	DW:	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	69
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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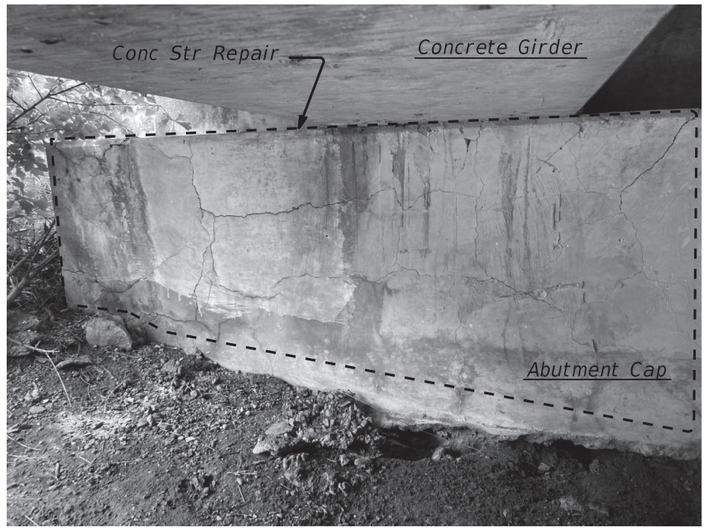
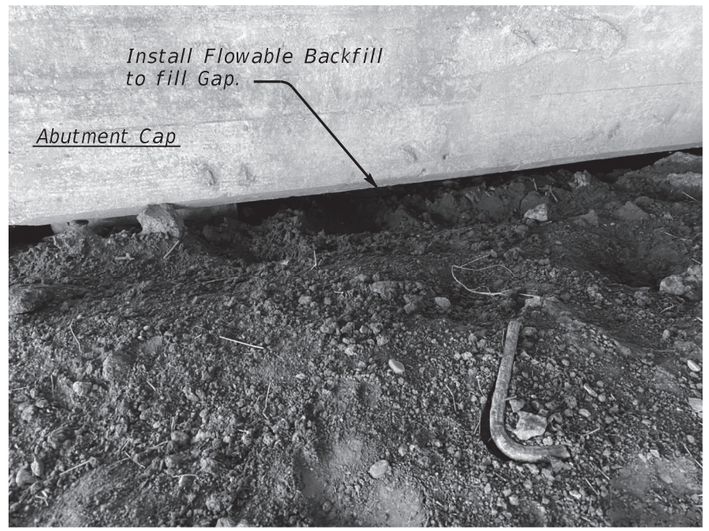
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:



CONCRETE STRUCTURE REPAIR

⚠ SHOWING SPALL ALONG ABUTMENT CAP



REPAIR – VOID UNDER ABUTMENT CAP

⚠ SHOWING LIMITS OF REPAIR ALONG ABUTMENT CAP

⚠ Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.

STATE OF TEXAS
ROSS L. LANGDALE
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PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SHEET 2 OF 2 SHEETS

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CONCRETE STRUCTURE REPAIR DETAILS

SH 14 OVER ACUFF BRANCH

(STR# 031)

FILE: ACUFFCONCREP.dgn	DN: DOT	CK: DOT	DW: ZB	CK: DOT			
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT ●				SHEET
REVISIONS	WACO	6	BPM 643811001				70
	COUNTY		CONTROL	SECT	JOB	HIGHWAY	
	HILL,ETC		6438	11	001	SH 22,ETC	

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8/29/2023
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LEVELS DISPLAYED
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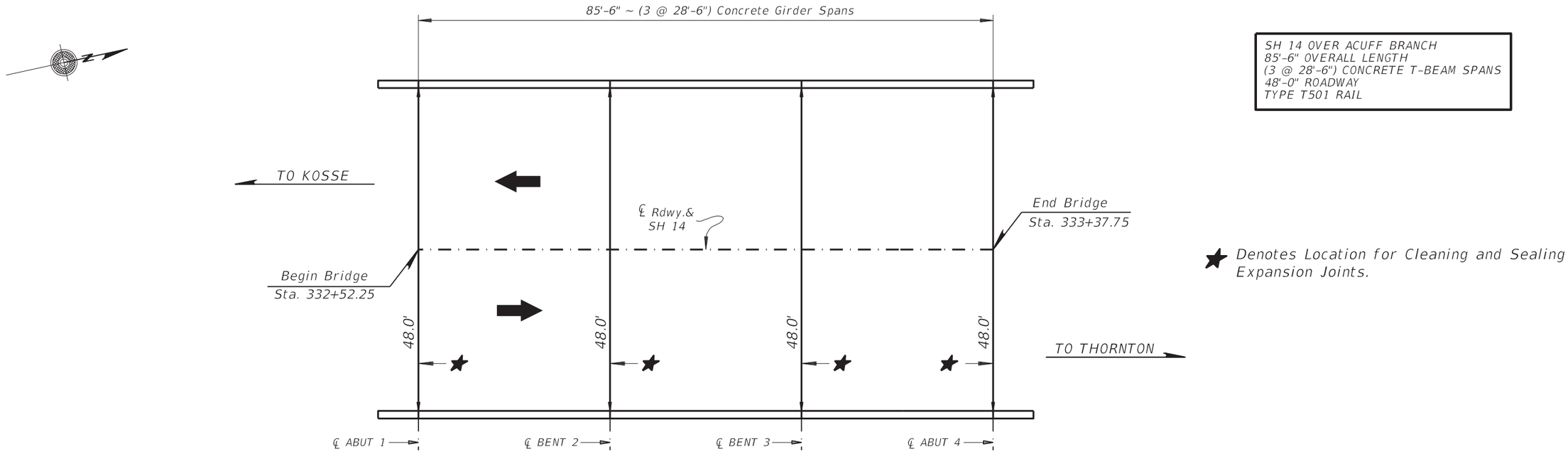
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:



SH 14 OVER ACUFF BRANCH
85'-6" OVERALL LENGTH
(3 @ 28'-6") CONCRETE T-BEAM SPANS
48'-0" ROADWAY
TYPE T501 RAIL

★ Denotes Location for Cleaning and Sealing Expansion Joints.

NOTE: APPROX. 2"-5" OF EXISTING OVERLAY IS TO BE REMOVED DOWN TO THE BRIDGE DECK PROIR TO JOINT REPAIR.
(SEE MILLING & OVERLAY FOR FURTHER DETAILS)

LAYOUT PLAN
SH 14 OVER ACUFF BRANCH
(NBI # 09-147-0-0093-06-031)

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING OF ALL DEBRIS, PROVIDING AND PLACING BACKED ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE L.F. OF "CLEANING AND SEALING OF EXISTING JOINTS (CL 3)". PROVIDING AND APPLYING TACK COAT AND PROVIDING AND PLACING FABRIC JOINT UNDERSEAL OS PAID FOR BY ITEM 356. "FABRIC UNDERSEAL" AND MEASURED BY THE L,F, OF "PAV JT UNDERSEAL".

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE THE REINFORCED FABRIC JOINT UNDERSEAL IN ACCORDANCE WITH DMS-6260 "REINFORCED FABRIC JOINT UNDERSEAL" OR DMS-6220, "FABRIC FOR UNDERSEALS".

PROVIDE THE CLASS 3 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS".

ESTIMATED QUANTITIES

ITEM	356-6021	438-6002
LOCATION	PAV JT UNDERSEAL (24")	CLEANING AND SEALING EXIST JOINTS (CL 3)
	L.F.	L.F.
STR. #031 SH 14 OVER ACUFF BRANCH	192.0	192.0
TOTAL	192.0	192.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

SHEET 1 OF 2 SHEETS

Texas Department of Transportation
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LAYOUT & DETAILS
FOR CLEANING AND SEALING
EXPANSION JOINTS

SH 14 OVER ACUFF BRANCH
(STR.#031)

FILE: 031SH14JTS.DGN	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	71
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED
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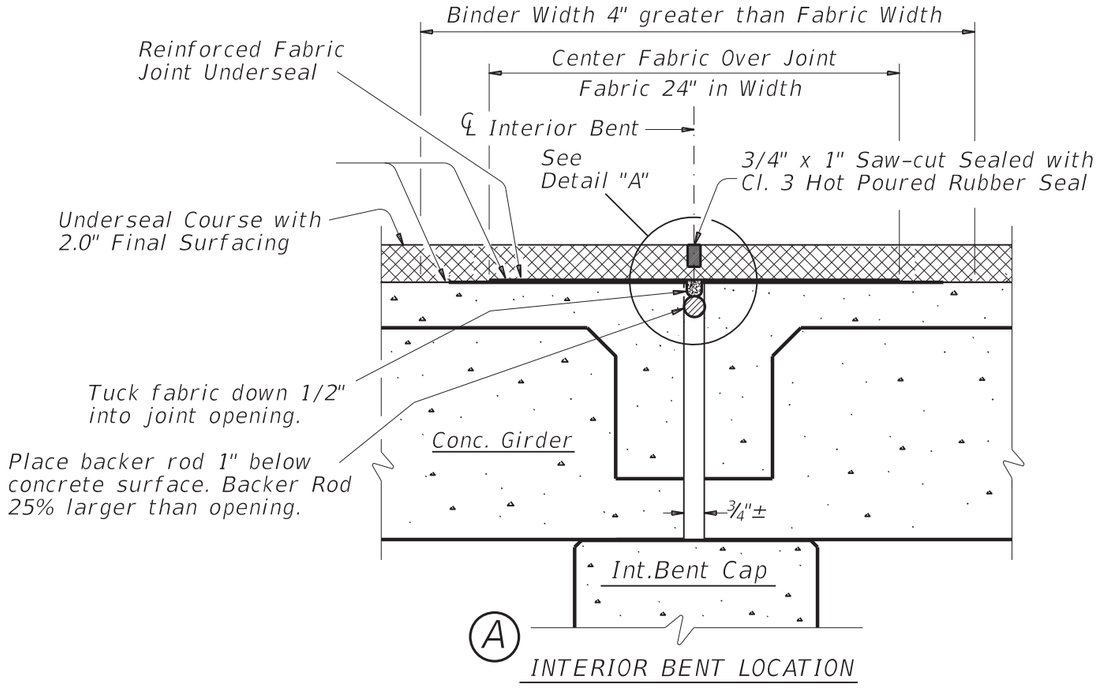
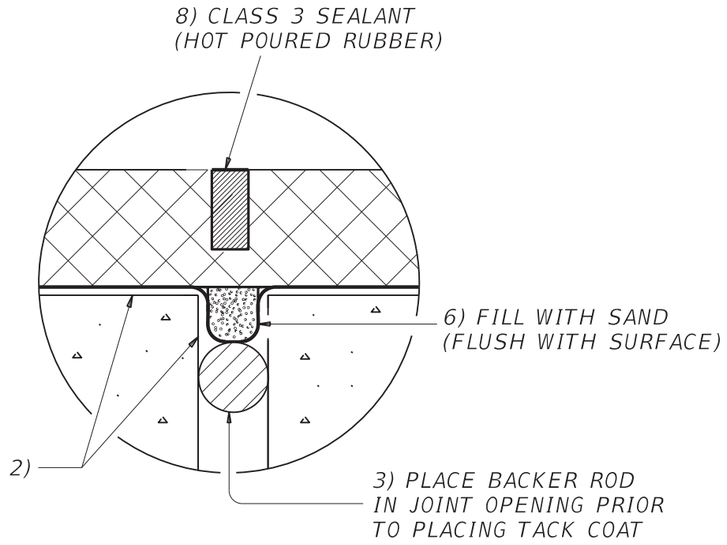
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

3) A tack coat must be applied if the surface has been milled.



INTERIOR BENT LOCATION

FABRIC JOINT SEAL WITH HOT POURED RUBBER



DETAIL "A"

PROCEDURES:

1) PRIOR TO THE PLACEMENT OF THE FABRIC JOINT UNDERSEAL. CLEAN JOINT OPENING OF ALL OLD EXPANSIONS MATERIAL/DEVICES, BITUMINOUS MATERIALS, DIRT, GREASE, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS".

2) REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, AROUND THE JOINT OPENING WITH TYPE II POLYMER CONCRETE IN ACCORDANCE WITH DMS-6140, "POLYMER CONCRETE FOR JOINT SYSTEMS". THIS WORK WILL BE PAID FOR BY ITEM 429 "CNC STR REP (STANDARD)".

3) PLACE TACK COAT OR BINDER AS REQUIRED BY THE FABRIC JOINT UNDERSEAL MANUFACTURER'S INSTALLATION INSTRUCTIONS. PLACE BACKER ROD IN JOINT OPENING PRIOR TO PLACING TACK COAT.

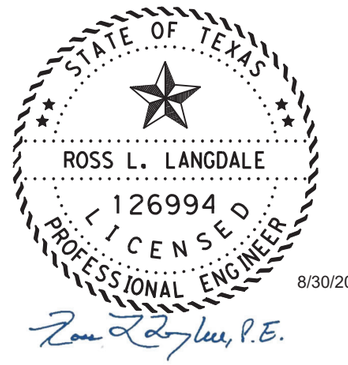
4) PLACE REINFORCED FABRIC JOINT UNDERSEAL CENTERED OVER JOINT OPENING. TUCK FABRIC DOWN APPROXIMATELY 1/2" INTO THE JOINT OPENING. INSTALL UNDERSEAL IN ACCORDANCE WITH MANUFACTURED RECOMMENDATIONS.

5) WHEN USING THE SELF-ADHESIVE TYPE FABRIC UNDERSEAL, PRESSURE ROLL FABRIC JOINT UNDERSEAL TO IMPROVE ADHESION.

6) JUST PRIOR TO PAVING, FILL TUCKED IN PORTION OF UNDERSEAL WITH SAND FLUSH WITH SURFACE. APPLY A TACK COAT TO FABRIC JOINT UNDERSEAL AS REQUIRED BY THE MANUFACTURER'S INSTRUCTIONS. MARK LOCATION OF CENTERLINE OF JOINT ON CURB OR BARRIER AS APPROVED.

7) AFTER THE ASPHALTIC CONCRETE PAVEMENT OPERATIONS ARE COMPLETE, SAW CUT 1" INTO THE ASPHALT AT CENTERLINE OF JOINT. MAKE MULTIPLE SAW CUTS TO CREATE A 3/4" JOINT OPENING OR MATCH THE EXISTING JOINT OPENING. WHICHEVER IS GREATER. DO NOT DAMAGE THE UNDERSEAL.

8) SEAL THE JOINT OPENING WITH A CLASS 3, "HOT POURED RUBBER". SEAL FLUSH WITH THE TOP OF THE ASPHALTIC CONCRETE PAVEMENT.



8/30/2023

Ross L Langdale, P.E.

SHEET 2 OF 2 SHEETS

Texas Department of Transportation

LAYOUT & DETAILS
FOR CLEANING AND SEALING
EXPANSION JOINTS

SH 14 OVER ACUFF BRANCH

(STR.#031)

FILE: 031SH14JTS.DGN	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	72
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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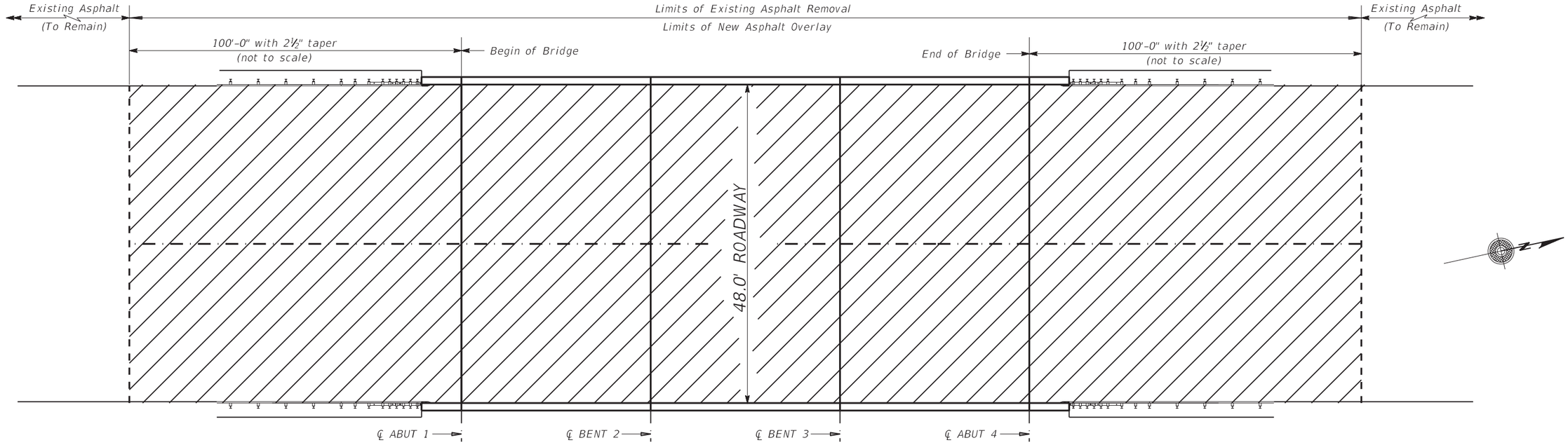
95 05 15 25 35 45 56 65 75 85 96 06 16 26 36 63



NOTE: REMOVE APPROX. 2"-5" OF EXISTING OVERLAY DOWN TO BRIDGE DECK

ROADWAY PLAN
SH 14 OVER ACUFF BRANCH

(NBI # 09-147-0-0093-06-031)
(SHOWING LIMITS OF MILLING/OVERLAY)

SH 14 OVER ACUFF BRANCH
85'-6" OVERALL LENGTH
(3 @ 28'-6") CONCRETE T-BEAM SPANS
48'-0" ROADWAY
TYPE T501 RAIL

GENERAL NOTES:

1. Mill Existing Asphalt completely off the Bridge Deck.
2. Repair any damaged exposed Deck Surface or Bridge Joints in accordance with Items 429 and 438.
3. Prepare Expansion Joints in accordance with Joint Repair Details.
4. Construct Underseal Course and Final Surfacing.
5. Clean and Seal Bridge Joints in accordance with Joint Repair Details.

ESTIMATED QUANTITIES

ITEM	354-6088	3078-6069	3085-6001
LOCATION	PLANE ASPH CONC. PAV (0' to 5")	D-GR HMA TY-C-SAC-B PG64-22 (EXEMPT)	UNDERSEAL COURSE
	S.Y.	TON	GAL.
STR. #031 SH 14 OVER ACUFF BRANCH	1529.0	168.0	306.0
TOTAL	1529.0	168.0	306.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023

SHEET 1 OF 1 SHEETS

Texas Department of Transportation

MILLING
AND
OVERLAY DETAILS
SH 14 OVER ACUFF BRANCH
(STR.#031)

FILE: 031SH14JTS.DGN	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT •	SHEET
REVISIONS	WACO	6	BPM 643811001	73
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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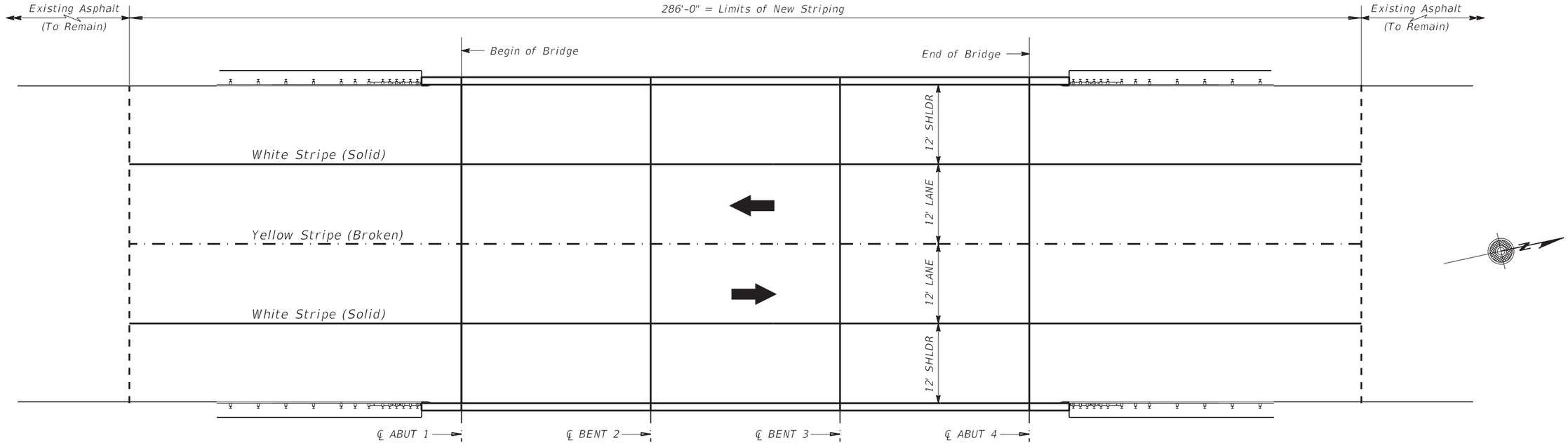

LAYOUT PLAN

SH 14 OVER ACUFF BRANCH

(NBI # 09-147-0-0093-06-031)

SH 14 OVER ACUFF BRANCH
85'-6" OVERALL LENGTH
(3 @ 28'-6") CONCRETE T-BEAM SPANS
48'-0" ROADWAY
TYPE T501 RAIL

ESTIMATED QUANTITIES

ITEM	662-6111	666-6303	666-6312	672-6009
LOCATION	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	RE PM W/RET REQ TY 1 (W) 4" (SLD) (100MIL)	RE PM W/RET REQ TY 1 (Y) 4" (BRK) (100MIL)	REFL PAV MRKR TY II-A-A
	EA	LF	LF	LF
STR. #031 SH 14 OVER ACUFF BRANCH	22.0	572.0	72.0	7.0
TOTAL	22.0	572.0	72.0	7.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SHEET 1 OF 1 SHEETS

Texas Department of Transportation

STRIPING DETAILS

SH 14 OVER ACUFF BRANCH

(STR.#031)

FILE: 031SH14JTS.DGN	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	74
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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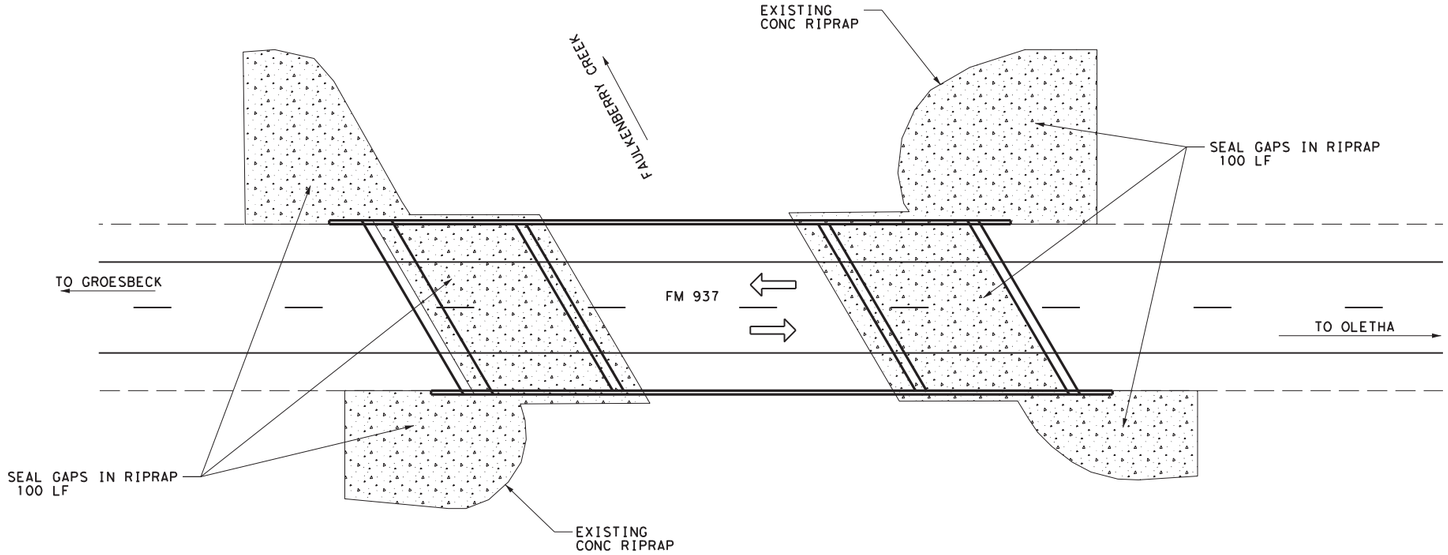
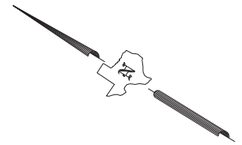
AS-BUILT PLAN SET: 1191-04-013



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL



GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0780 6010	CNC CRACK REPAIR(DISCRETE)(SURF SEAL)	LF	200

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: FM 937 @ FAULKENBERRY CREEK
NBI#: 09-147-0-1191-04-012
DIMENSIONS: 160'x 44' BRIDGE
SKEW: 30° SKEW
GPS LAT/LON: 31.49187665/-96.51623532

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

LIMESTONE COUNTY
STRUCTURE LAYOUT
FM 937 @ FAULKENBERRY CREEK
NBI# 09-147-0-1191-04-012

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	75
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

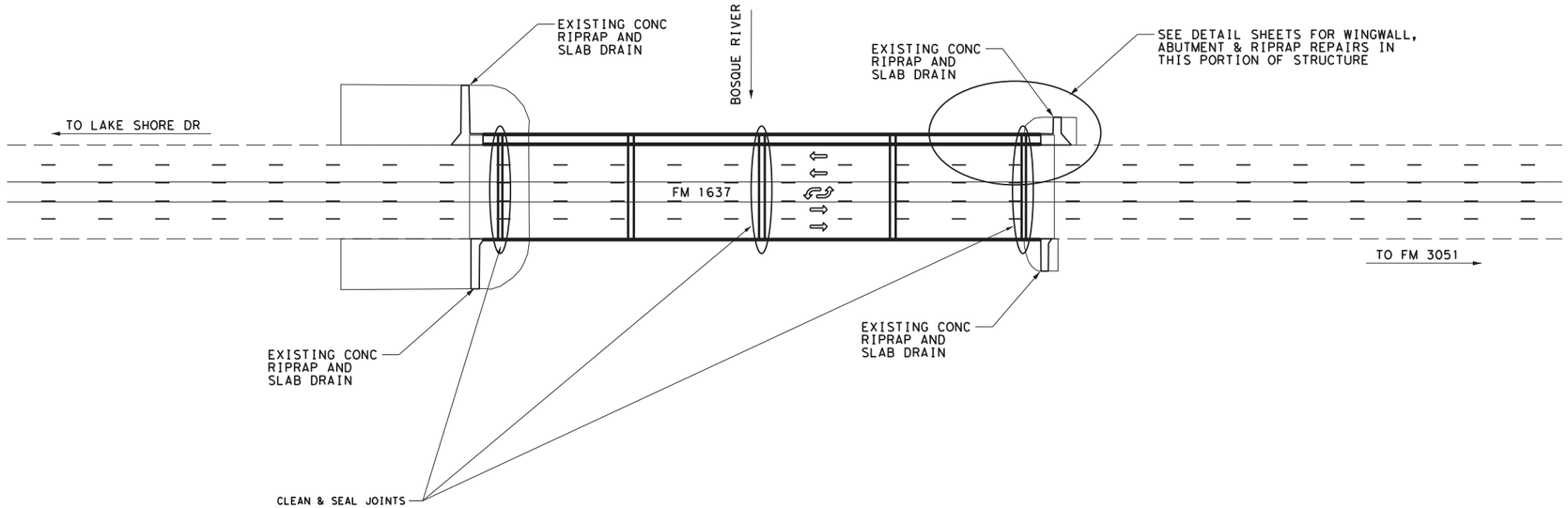
...\1191-04-012.dgn

FOR LOCATION REPAIR DETAILS REFER TO:

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

RIPRAP REPAIR DETAILS

LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS

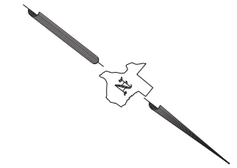


NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: FM 1637 @ BOSQUE RIVER
NBI#: 09-161-0-0833-03-049
DIMENSIONS: 367'x 65' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.60134792/-97.19400629

LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL



GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0104 6009	REMOVING CONC (RIPRAP)	SY	52
0104 6021	REMOVING CONC (CURB)	CY	9
0158 6002	SPEC EXCAV WORK (BACKHOE)	HR	20
0401 6001	FLOWABLE BACKFILL	CY	5
0420 6074	CL C CONC (MISC)	CY	15
0432 6002	RIPRAP (CONC)(5 IN)	CY	10
0432 6033	RIPRAP (STONE PROTECTION)(18 IN)	CY	30
0438 6004	CLEANING AND SEALING EXIST JOINTS(CL7)	LF	220
0529 6002	CONC CURB (TY II)	CY	26

CONTRACTOR'S INFORMATION ONLY

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

McLENNAN COUNTY STRUCTURE LAYOUT

FM 1637 @ BOSQUE RIVER

NBI# 09-161-0-0833-03-049

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	76
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

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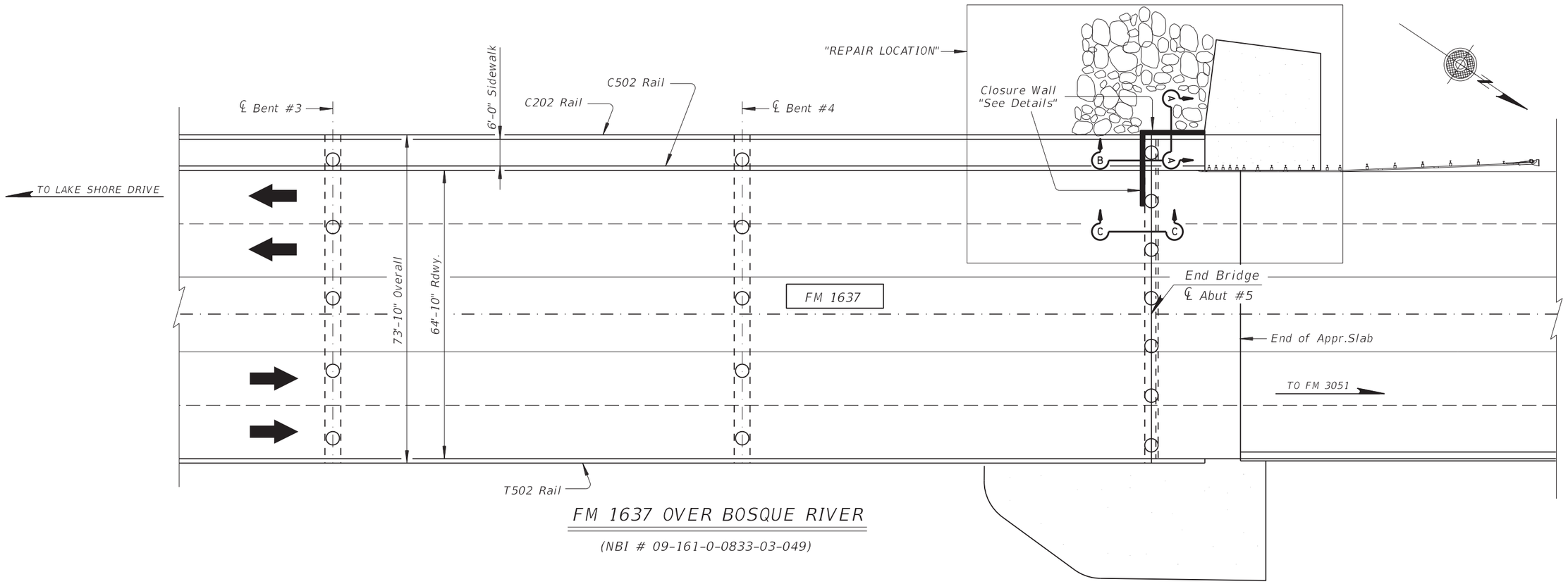

FM 1637 OVER BOSQUE RIVER

(NBI # 09-161-0-0833-03-049)

See Sheets 2 thru 5 for Typical Sections and Details

ESTIMATED QUANTITIES

ITEM	401-6001	420-6074	③
LOCATION	FLOWABLE BACKFILL	CL C CONC (MISC)	REMOVAL OF RIPRAP (STONE)
	C.Y.	C.Y.	S.Y.
CLOSURE WALL (WINGWALL)	—	4.0	—
CLOSURE WALL (ABUTMENT)	—	4.0	15.0
EROSION AREA	—	② 7.0	
SLOPE EROSION (ABUTMENT)	① 3.0		
TOTAL	3.0	15.0	15.0

① For Erosion Repair along Slope at Abutment. See Sheet 5 for Details.

② Quantity includes Mass Placement to fill void under Abutment Cap.

③ For Contractors Information Only. See RIPRAP REPAIR DETAILS.

GENERAL NOTES:

All Reinforcing for Closure Walls shall be Grade 60.

Obtain approval for all tools, equipment, materials and techniques proposed for use to construct Closure Wall.

All Materials and Labor required for constructing Closure Wall, shall be included in the price bid per CY for Item: 420, CL C CONC (MISC).

STATE OF TEXAS
ROSS L. LANGDALE
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PROFESSIONAL ENGINEER
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SHEET 1 OF 5 SHEETS

Texas Department of Transportation

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	77
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

...\0833-03-049_D1.dgn

8/29/2023
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LEVELS DISPLAYED ACC:
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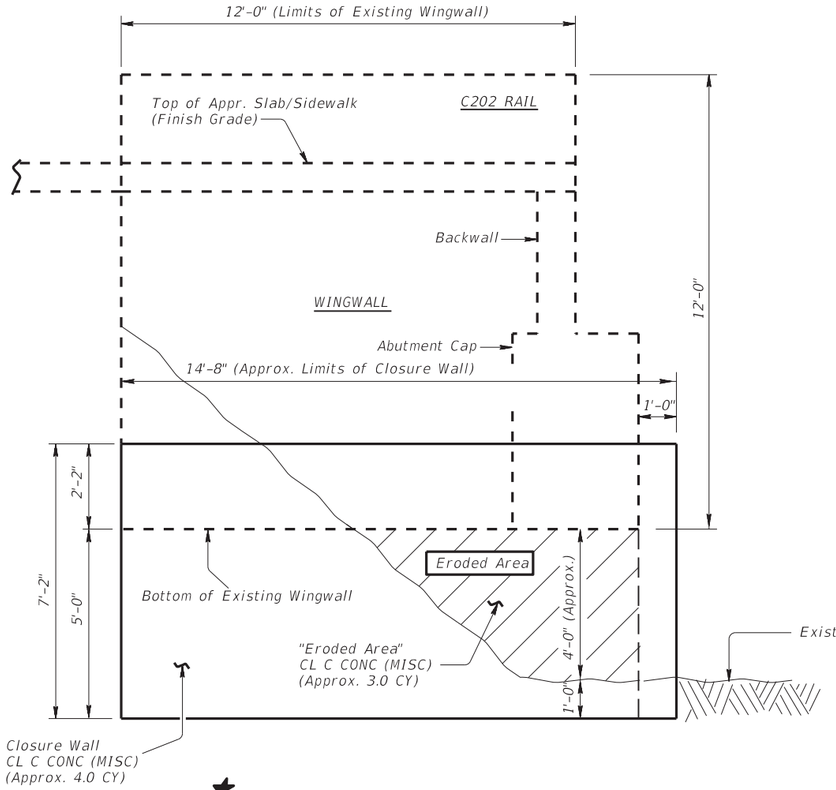
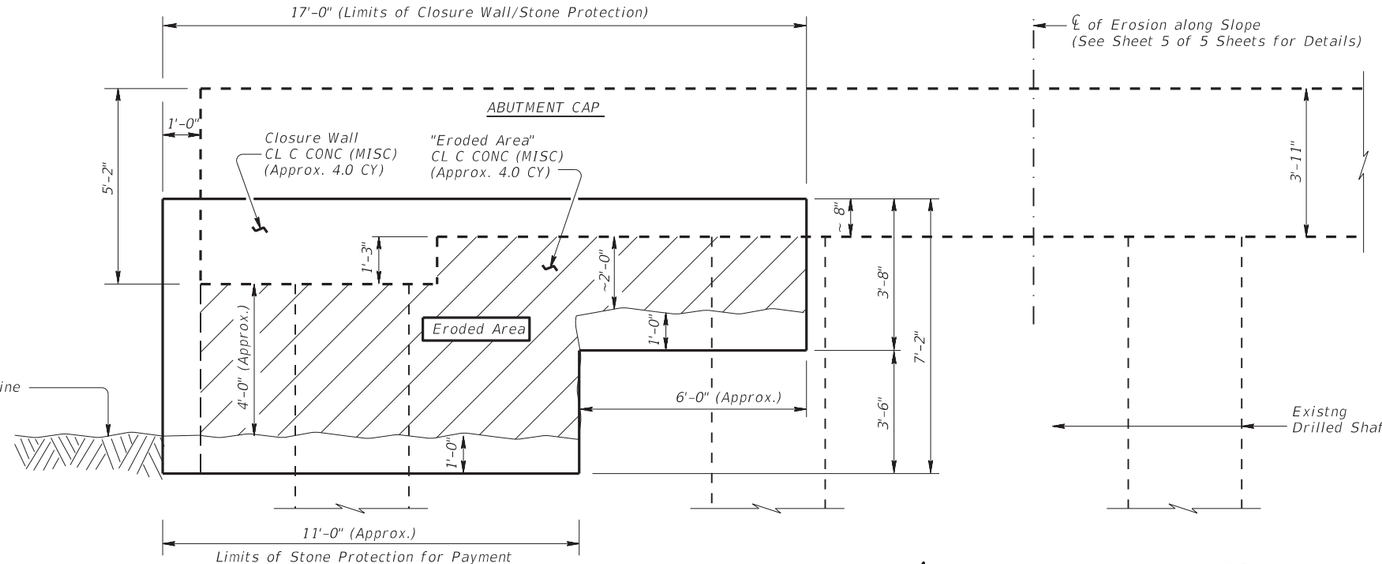
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



★ CLOSURE WALL ELEVATION

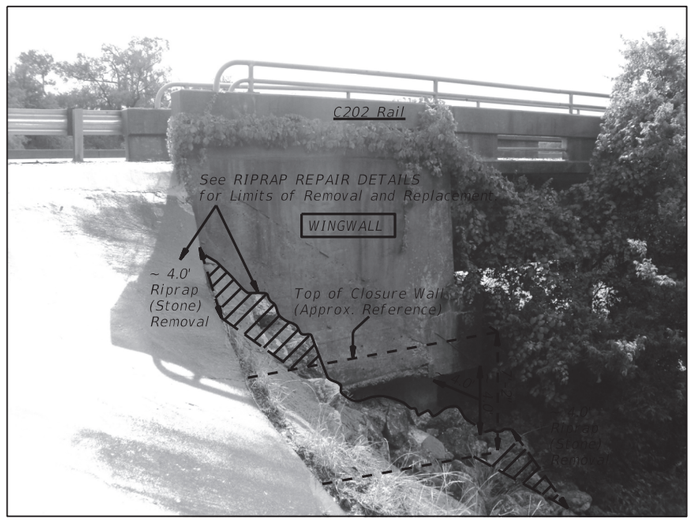
(SHOWING LIMITS OF CLOSURE WALL AT WINGWALL)
(LOOKING EAST)

★ The limits of repair shown are approximate. Contractor to verify the limits shown, prior to ordering materials.



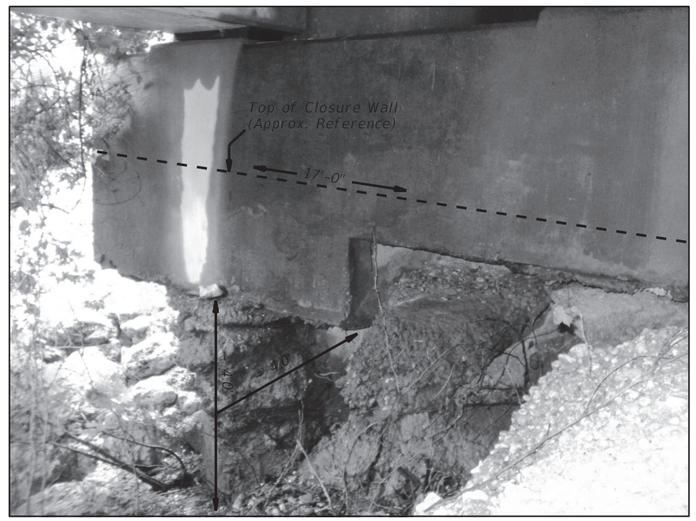
★ CLOSURE WALL ELEVATION

(SHOWING LIMITS OF CLOSURE WALL AT CORNER OF ABUTMENT #5)
(LOOKING NORTHWEST)



★ EROSION REPAIR AT WINGWALL

(SHOWING LIMITS OF REPAIR)
(LOOKING EAST)



★ EROSION REPAIR AT ABUTMENT #5

(SHOWING LIMITS OF REPAIR)
(LOOKING NORTHWEST)

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SHEET 2 OF 5 SHEETS

Texas Department of Transportation

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	78
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

...\0833-03-049_D2.dgn

LEVELS DISPLAYED
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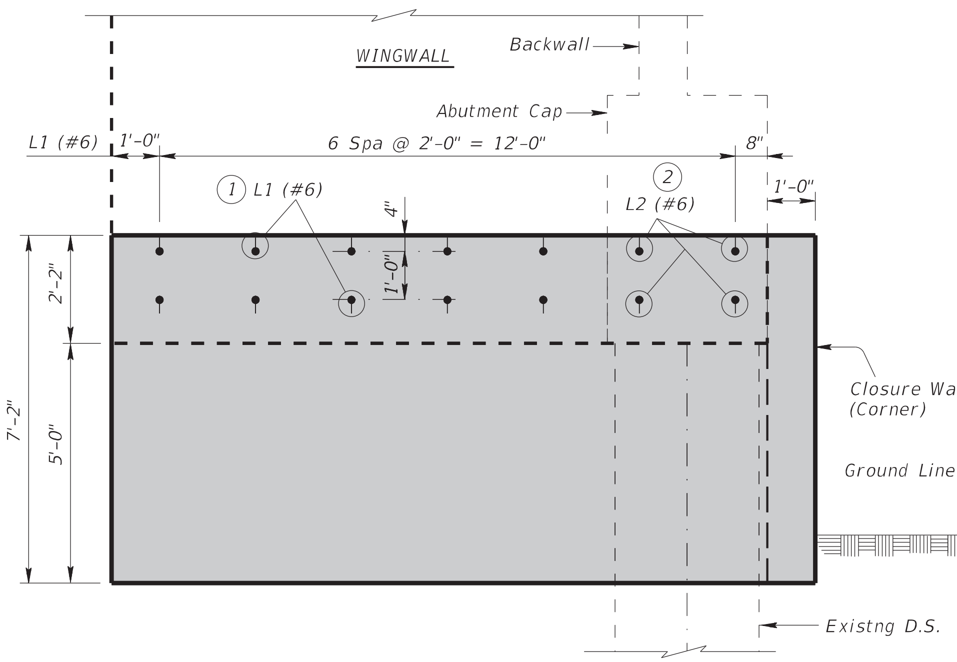
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:

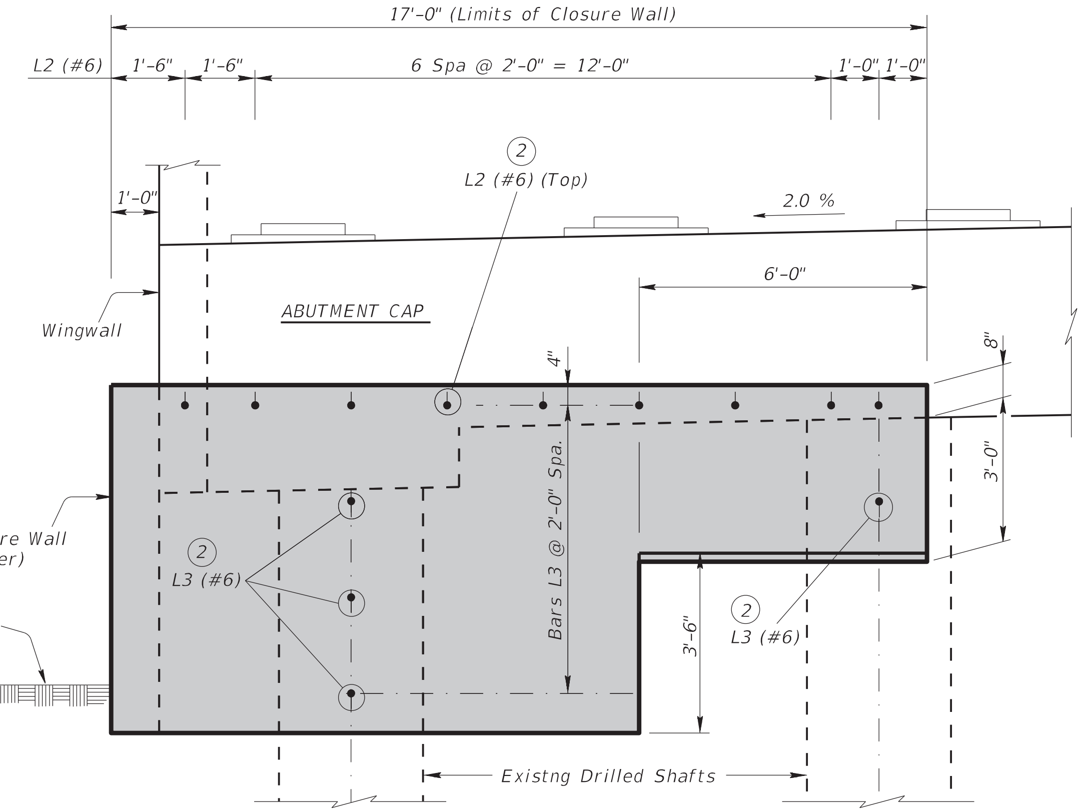
(1) NOTE:
Drill & Grout Bars L1 (8" Min depth) into Existing Wingwall using Epoxy Adhesive. Conforming to the requirements of (DMS-6100).

(2) NOTE:
Drill & Grout Bars L2 & L3 (1'-0" Min depth) into Existing Drilled Shafts & Abutment Cap using Epoxy Adhesive. Conforming to the requirements of (DMS-6100).



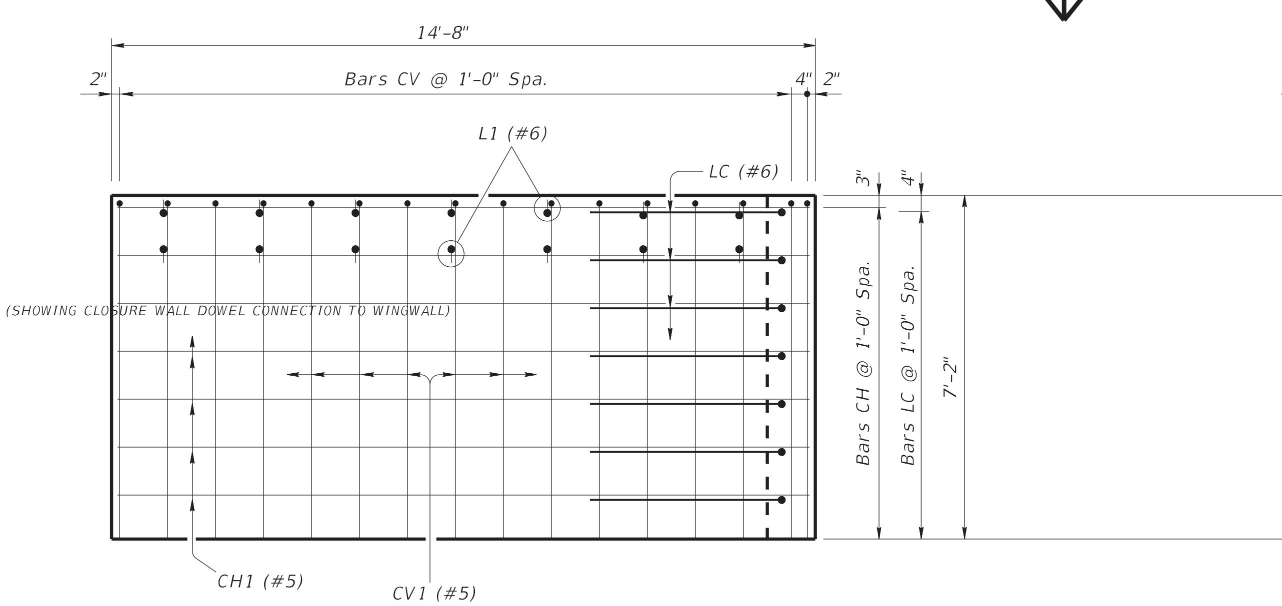
CLOSURE WALL ELEVATION

(LOOKING EAST)



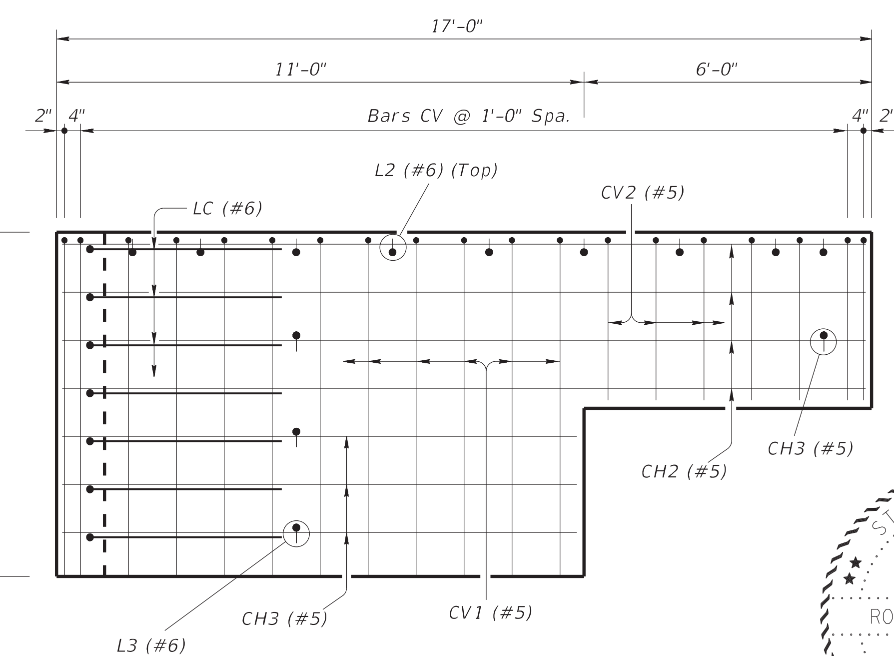
CLOSURE WALL ELEVATION

(SHOWING CLOSURE WALL DOWEL CONNECTION TO ABUTMENT #5)
(LOOKING NORTH)



CLOSURE WALL ELEVATION

(SHOWING REINFORCING AT WINGWALL)
(LOOKING EAST)



CLOSURE WALL ELEVATION

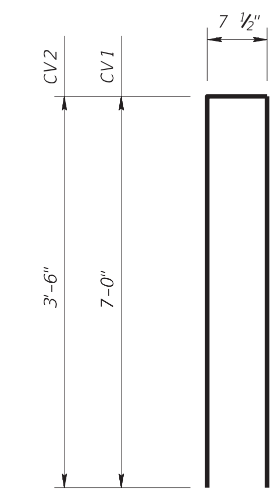
(SHOWING REINFORCING AT ABUTMENT)
(LOOKING NORTH)

*ESTIMATED QUANTITIES

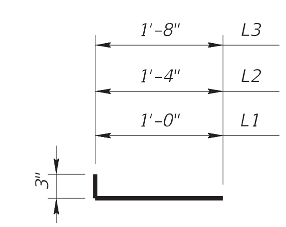
(CLOSURE WALL AT WINGWALL/ABUTMENT)

Bar	No.	Size	Length	Weight
CH1	14	#6	14'-4"	301
CH2	8	#6	16'-8"	200
CH3	6	#6	10'-8"	96
CV1	28	#5	14'-8"	428
CV2	7	#5	7'-8"	56
LC	7	#6	4'-0"	42
L1	10	#6	1'-3"	19
L2	13	#6	1'-7"	31
L3	4	#6	1'-11"	12
Reinforcing Steel		Lb		1185

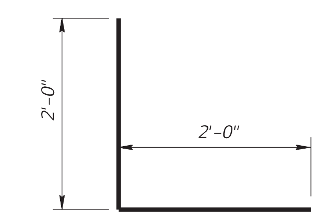
* For Contractors Information Only



BARS CV (#5)

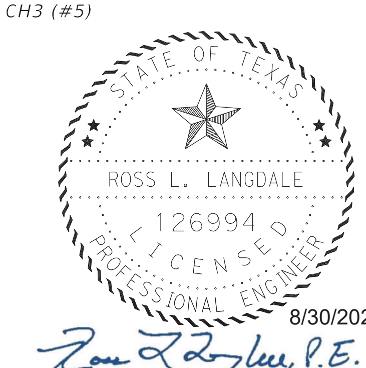


BARS L (#6)



BARS LC (#6)

SHEET 3 OF 5 SHEETS



8/30/2023

Texas Department of Transportation

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT	SHEET
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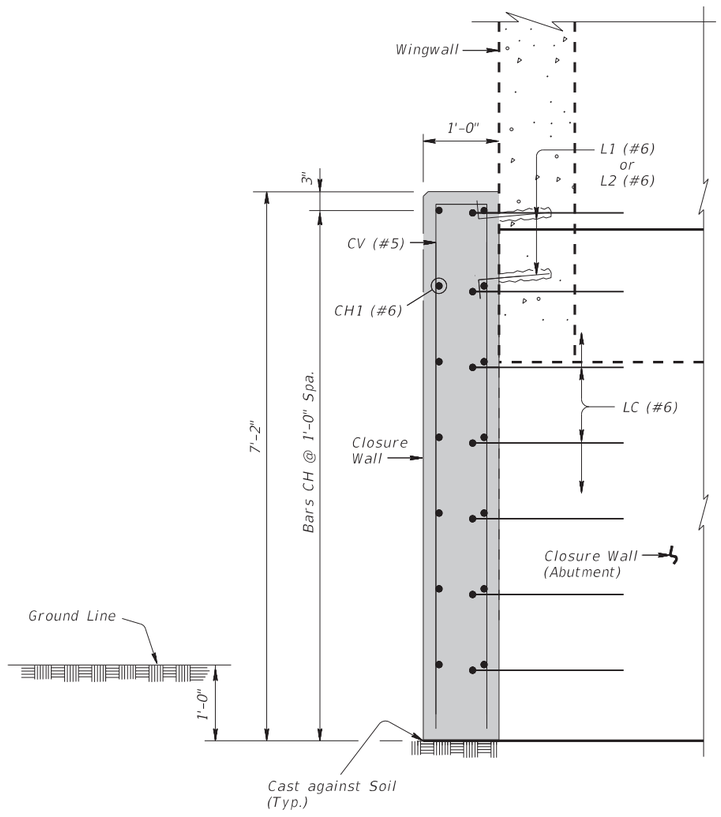
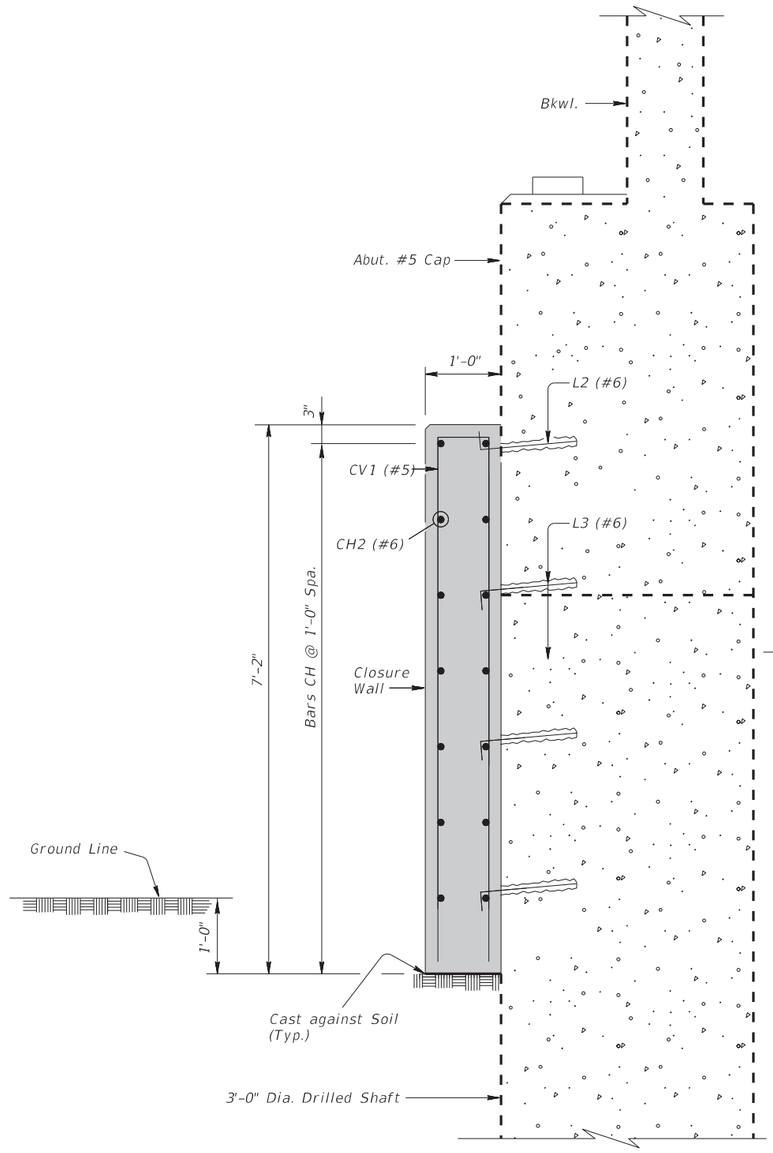
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC



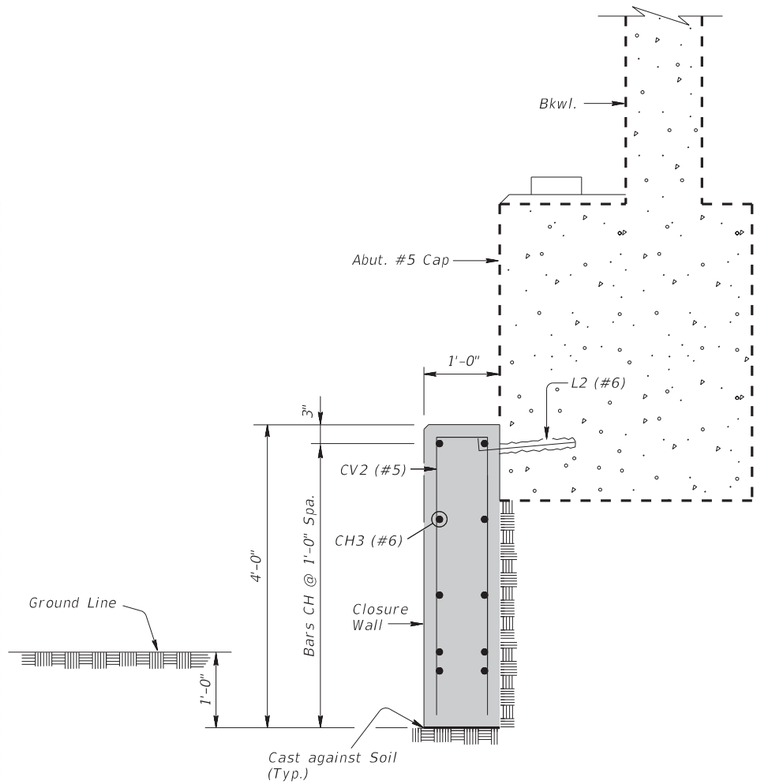
SECTION A-A

(SHOWING CLOSURE WALL CORNER CONNECTION)
(LOOKING NORTH)



SECTION B-B

(SHOWING CLOSURE WALL CONNECTION TO ABUTMENT CAP/DRILLED SHAFTS)
(LOOKING WEST)



SECTION C-C

(SHOWING CLOSURE WALL CONNECTION TO ABUTMENT CAP)
(LOOKING WEST)

STATE OF TEXAS
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8/30/2023

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SHEET 4 OF 5 SHEETS

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT	
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REVISIONS	WACO	6	BPM 643811001		80
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

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8/29/2023
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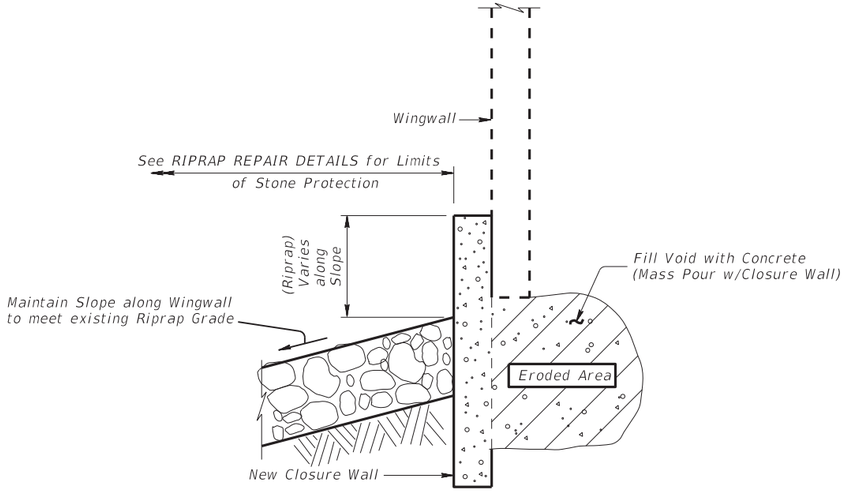
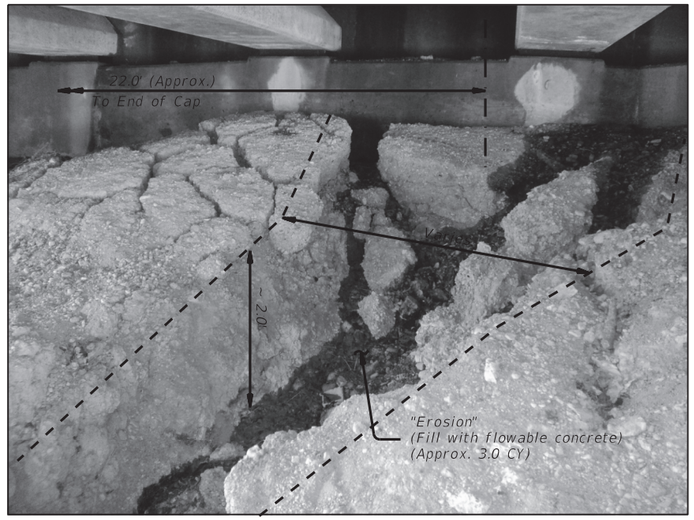


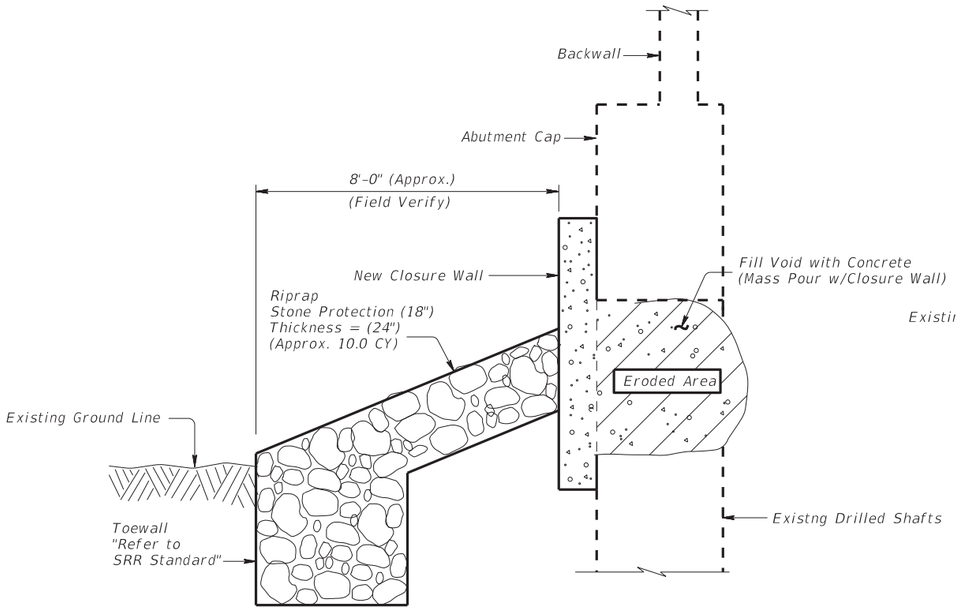
SECTION A-A

(SHOWING LIMITS OF STONE PROTECTION AT NEW CLOSURE WALL ALONG WINGWALL)
(LOOKING NORTH)



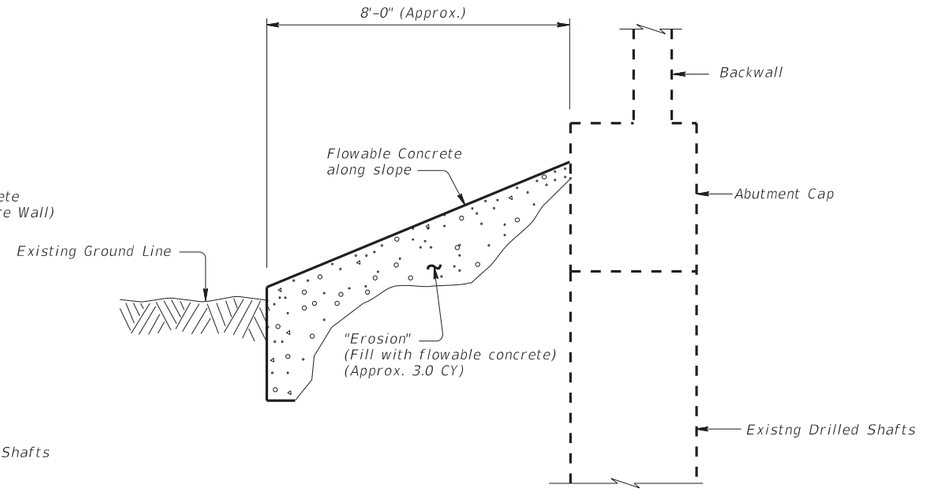
EROSION REPAIR AT ABUTMENT #5

(SHOWING LIMITS OF REPAIR)
(LOOKING NORTHWEST)



SECTION B-B

(SHOWING LIMITS OF STONE PROTECTION AT NEW CLOSURE WALL)
(LOOKING WEST)



SECTION C-C

(SHOWING LIMITS OF EROSION REPAIR ALONG SLOPE
(LOOKING WEST)

STATE OF TEXAS
ROSS L. LANGDALE
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8/30/2023
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SHEET 5 OF 5 SHEETS

LAYOUT AND DETAILS FOR BRIDGE WINGWALL AND ABUTMENT REPAIR

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	81
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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LEVELS DISPLAYED
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ACC:

8/29/2023
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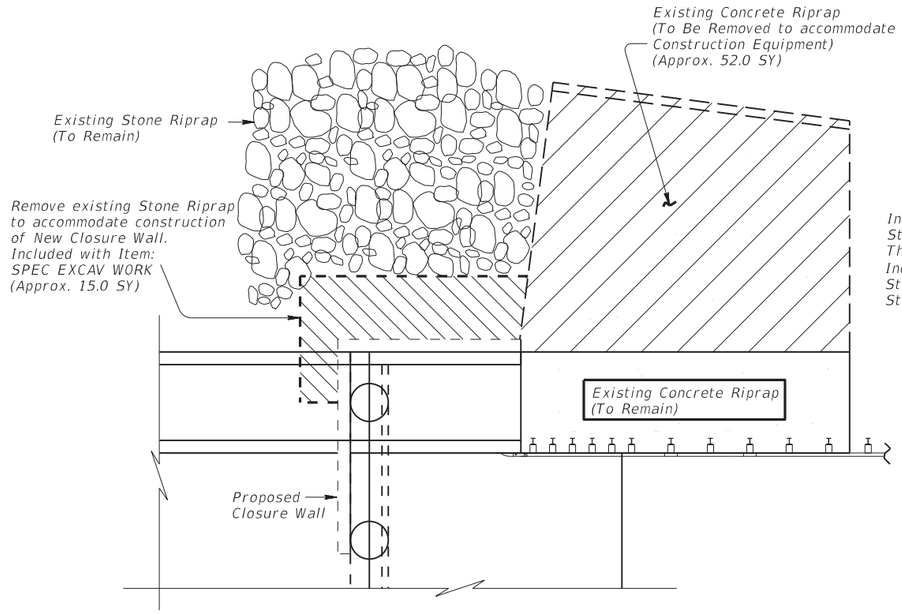
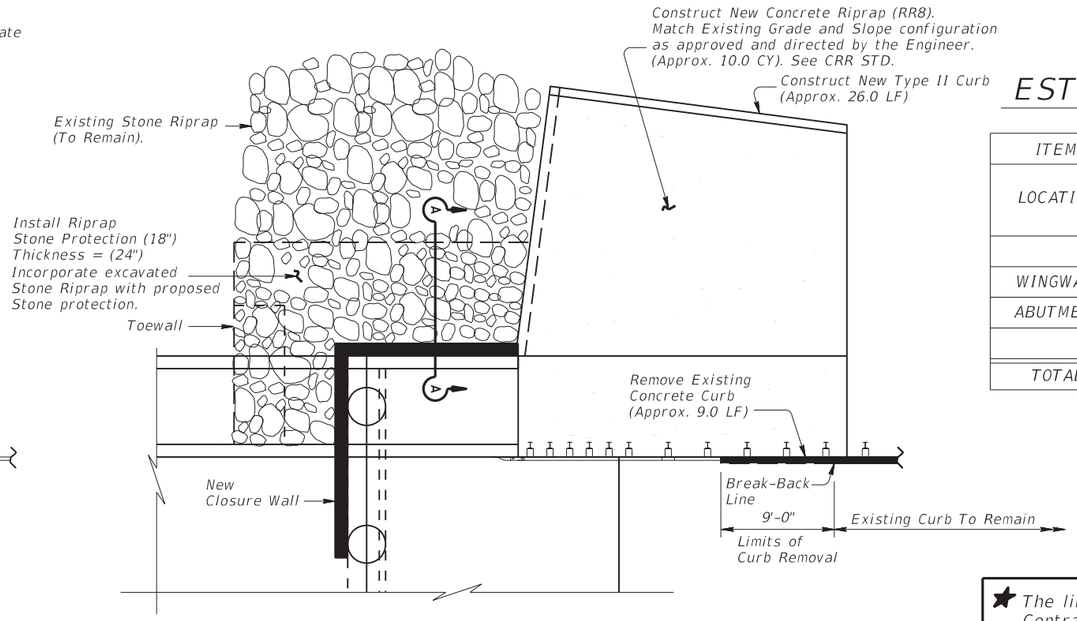


PLAN
(SHOWING LIMITS OF STONE RIPRAP REMOVAL)



PLAN
(SHOWING LIMITS OF PROPOSED STONE PROTECTION)

ESTIMATED QUANTITIES

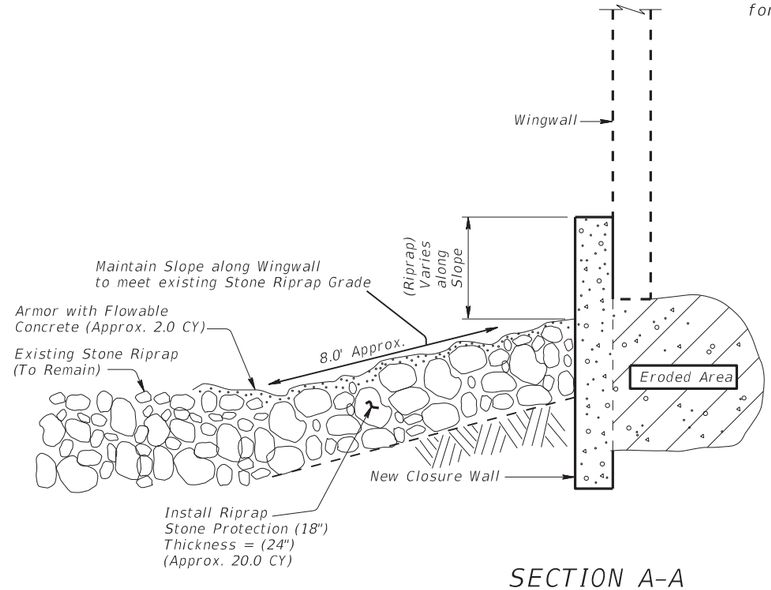
ITEM	401-6001	★ 432-6033
LOCATION	FLOWABLE BACKFILL	RIPRAP (STONE PROTECTION) (18 IN)
	C.Y.	C.Y.
WINGWALL	2.0	20.0
ABUTMENT	—	10.0
TOTAL	2.0	30.0

★ The limits of repair shown are approximate. Contractor to verify the limits shown, prior to ordering materials.

GENERAL NOTES:

All Materials and Labor required for placement of Riprap Stone Protection, including back-filling and Grading, shall be included in the price bid per CY for Item: 432, RIPRAP STONE PROTECTION (18 IN).

RIPRAP REPAIR AT ABUTMENT #5 WINGWALL
(SHOWING LIMITS OF STONE PROTECTION)
(LOOKING EAST)



SECTION A-A
(SHOWING LIMITS OF STONE PROTECTION ALONG WINGWALL)
(LOOKING NORTH)

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PROFESSIONAL ENGINEER
8/30/2023

SHEET 1 OF 2 SHEETS

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RIPRAP REPAIR DETAILS

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	82
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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LEVELS DISPLAYED
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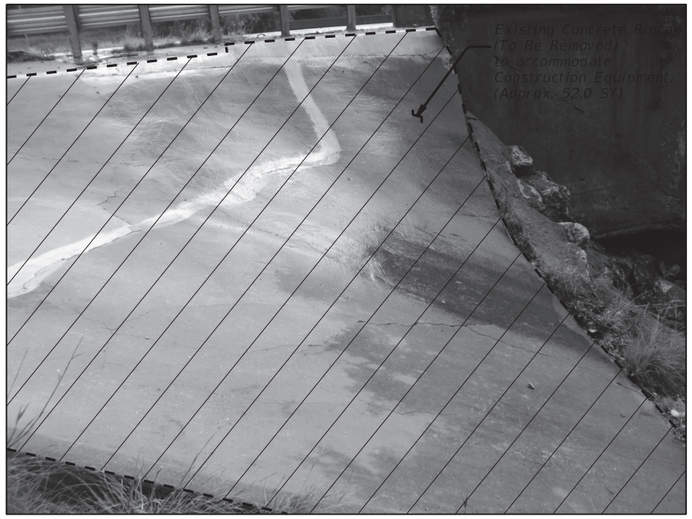
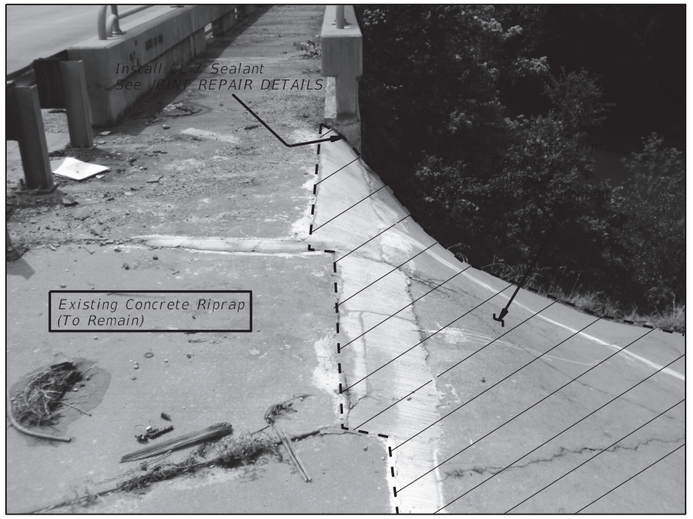
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
ACC:



★ EXISTING CONCRETE RIPRAP REMOVAL

(SHOWING LIMITS OF REMOVAL)
(LOOKING EAST)



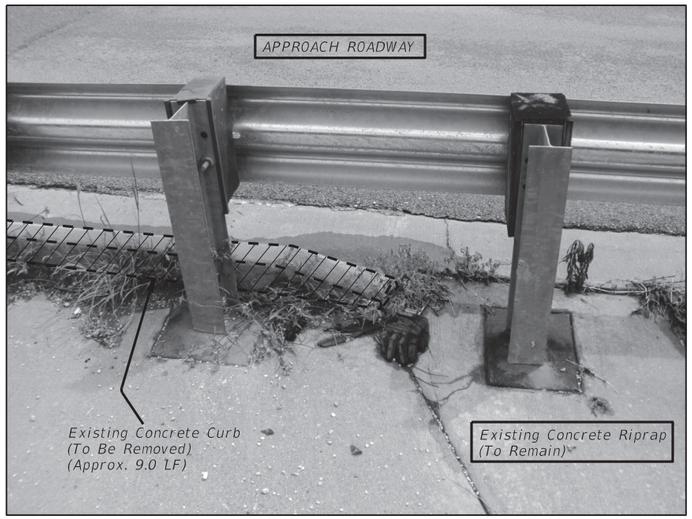
EXISTING CONCRETE RIPRAP REMOVAL

(SHOWING LIMITS OF REMOVAL)
(LOOKING SOUTH)

ESTIMATED QUANTITIES

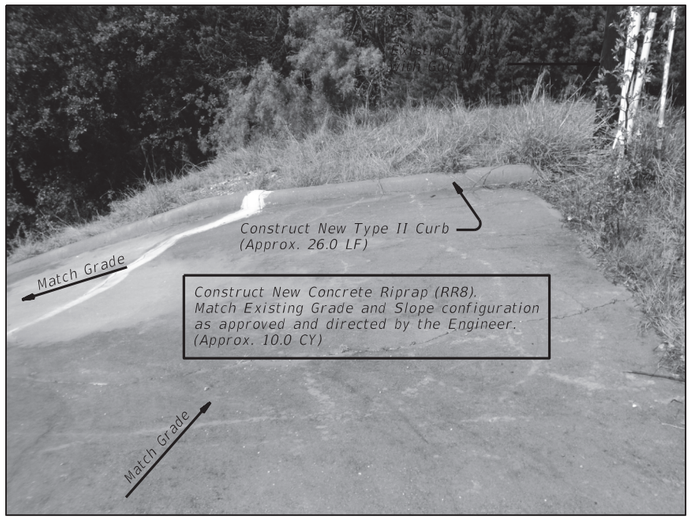
ITEM	104-6009	104-6021	158-6002	432-6002	529-6002
LOCATION	REMOVING CONC (RIPRAP)	REMOVING CONC (CURB)	SPEC EXCAV WORK (BACKHOE)	RIPRAP (CONC) (5 IN)	CONC CURB (TY II)
	S.Y.	L.F.	HR	C.Y.	L.F.
NW CORNER	52.0	9.0	20	10.0	26.0
TOTAL	52.0	9.0	20	10.0	26.0

★ The limits of repair shown are approximate. Contractor to verify the limits shown, prior to ordering materials.



EXISTING CONCRETE CURB REMOVAL

(SHOWING LIMITS OF REMOVAL)
(LOOKING EAST)



PROPOSED TYPE II CONCRETE CURB

(SHOWING LIMITS OF PROPOSED TYPE II CURB AND RIPRAP SLOPE CONFIGURATION)
(LOOKING WEST)

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PROFESSIONAL ENGINEER

8/30/2023

Ross L Langdale, P.E.

SHEET 2 OF 2 SHEETS

RIPRAP REPAIR DETAILS

FM 1637 OVER BOSQUE RIVER

(STR. #049)

FILE: WINGREP.dgn	DN: DOT	CK: DOT	DW: GNH	CK: DOT
ORIG DATE: MAY 2022	DIST	FED REG	MAINTENANCE PROJECT ●	SHEET
REVISIONS	WACO	6	BPM 643811001	83
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

...\0833-03-049_D7.dgn

8/29/2023
T:\WACMAINT_RMC_Contracts\Bridge Preventive Maint\BPM_2024\BPM643811001\CADD\BASE\SHEETS\McLENNAN\0833-03-049_FM-1637@BOSQUE_RIVER\0833-03-049_D7.dgn

LEVELS DISPLAYED ACC:
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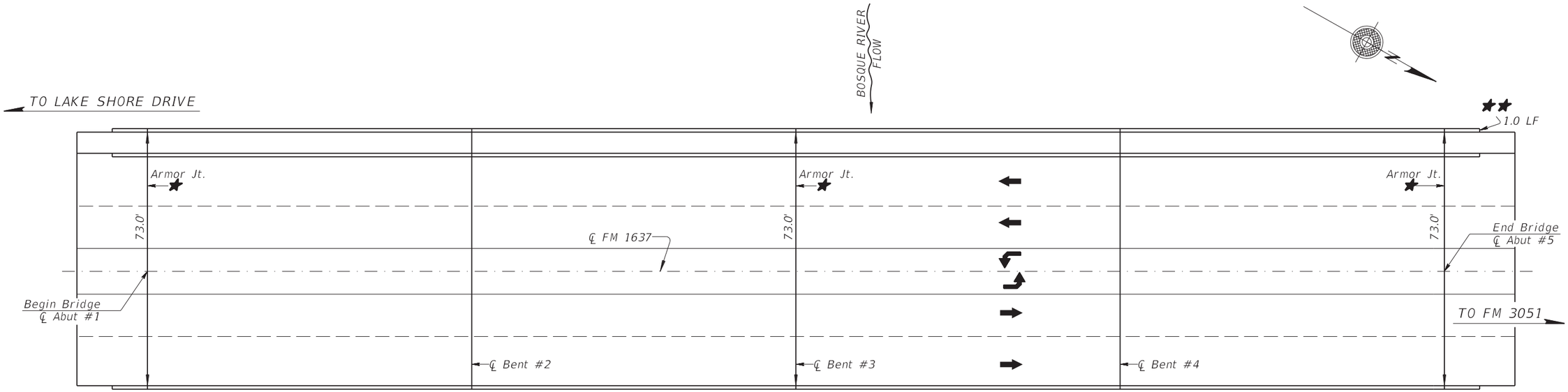
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



★ Denotes location for Cleaning and Sealing Expansion Joints. (Includes Sidewalks)

★★ Denotes location for Cleaning and Sealing Joint between End of Wingwall and proposed Concrete Riprap. See RIPRAP REPAIR DETAILS.

LAYOUT PLAN
FM 1637 OVER BOSQUE RIVER
(N.B.I.#09-161-0-0833-03-049)

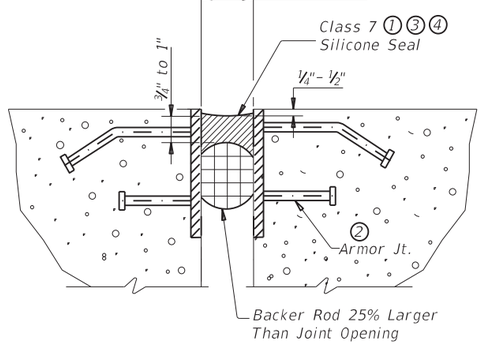
NOTES:

① The joints shall be cleaned in accordance with Item 438 and prior to beginning operations, the Contractor shall submit a statement from the Sealant Manufacturer showing the recommended equipment and Installation procedures to be used.

② Condition of existing expansion joint or rail shall be determined prior to placing sealant material. The entire length of existing joint shall be checked and any portion that is determined unsound by the Engineer shall be removed as directed by the Engineer. Any existing seal shall be removed and disposed of.

③ Surfaces where sealant material is to be placed shall be clean and dry in accordance with the manufacturer's specifications. Clean joint opening of all old expansion materials/devices, dirt, and all other deleterious materials in accordance with Item 438, "Cleaning and Sealing Joints." Clean joint out full depth of the joint. Obtain approval of cleaned joint prior to proceeding with joint sealing operation. Seal the joint opening with a Class 7 Silicone.

④ Seal when required as Directed by the Engineer. Extend sealant up into rail or curb 6 inches on low side or sides of deck. Prepare surfaces where sealant is to be placed in accordance with manufacturers specifications. If the self-leveling sealant cannot be extended up into the rail, use a Class 4 Sealant in the curb or rail portion only.



SECTION THRU SEALED EXPANSION JOINT
NOT TO SCALE

ESTIMATED QUANTITIES

ITEM	438-6004
LOCATION	CLEANING AND SEALING EXISTING JOINTS (CL 7)
	L.F.
STR. #049 FM 1637 OVER BOSQUE RIVER	220.00
TOTAL	220.00

GENERAL NOTES:

All work, including cleaning exist joint opening of all debris, and sealing joint, is paid for by Item 438, "Cleaning and Sealing Existing Joints."

Obtain approval for all tools, equipment, materials and techniques proposed for use to prepare the joint.

Provide the joint sealant in accordance with DMS-6310, "Joint Sealants and Fillers."

The Contractor shall field verify dimensions, prior to ordering materials.

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8/30/2023
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LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS
(FM 1637 OVER BOSQUE RIVER)

(STR #049)

FILE: FM1637JTREP.DGN	DN: DOT	CK: DOT	DW: JB	CK: DOT
ORIG DATE: JUNE 2022	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	84
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HILL, ETC	6438	11 001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED ACC:
1 2 3 4 5 6 7 8 9 10 11 12 13 41 51 61
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

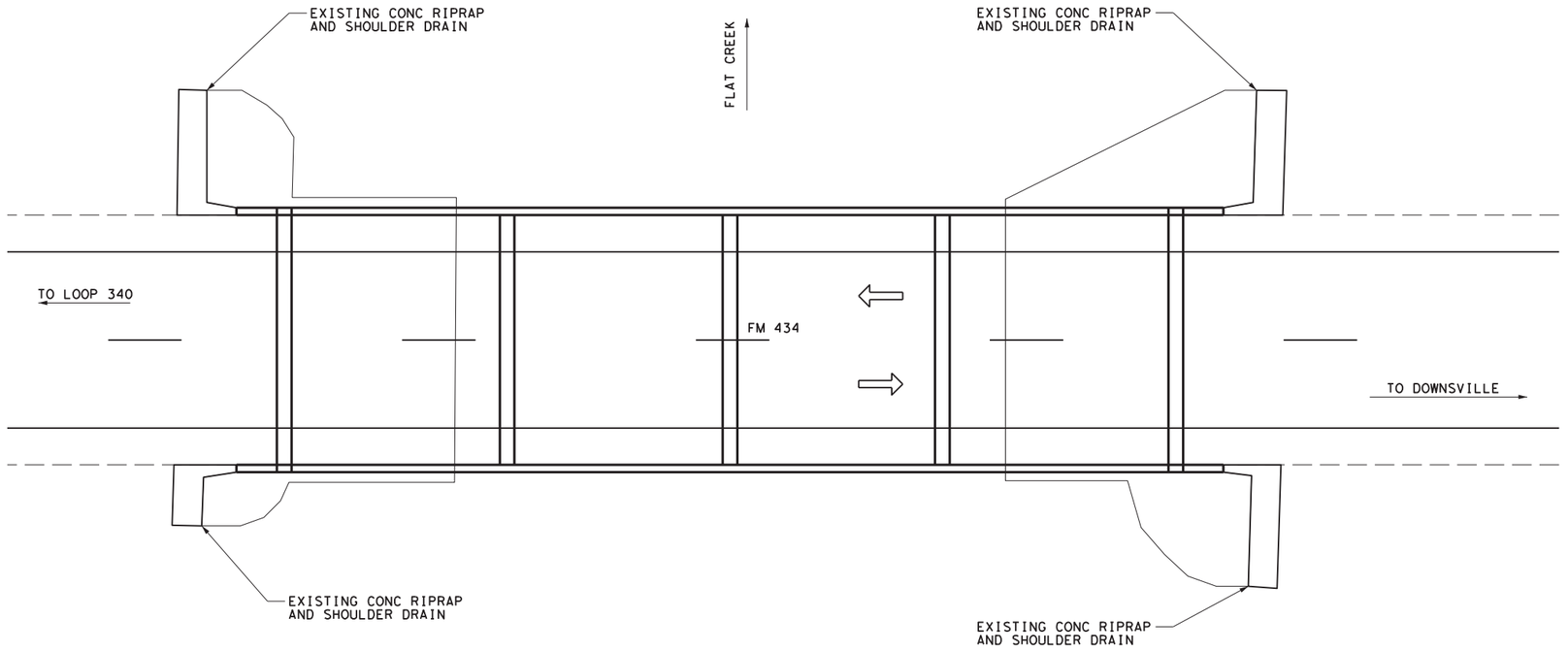
FOR LOCATION REPAIR DETAILS REFER TO:

CONCRETE STRUCTURE REPAIR DETAILS (FM 434 OVER FLAT CREEK)

COLUMN ENCASEMENT DETAILS (FM 434 FLAT CREEK)

EROSION REPAIR DETAILS (FM 434 FLAT CREEK)

AS-BUILT PLAN SET: 0833-04-019



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT
NTS
DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0401 6001	FLOWABLE BACKFILL	CY	6.5
0420 6074	CL C CONC (MISC)	CY	1.6
0432 6033	RIPRAP (STONE PROTECTION) (18 IN)	CY	45

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: FM 434 @ FLAT CREEK
NBI#: 09-161-0-0833-04-046
DIMENSIONS: 121.33'x 34' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.49247264/-97.0654601

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. 8/30/23
Signature of Registrant & Date

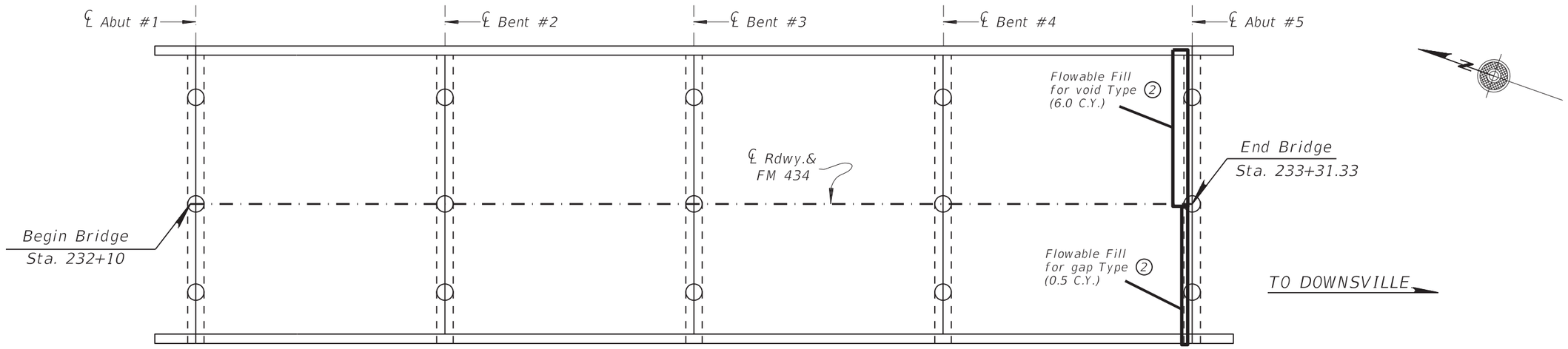
Texas Department of Transportation

McLENNAN COUNTY STRUCTURE LAYOUT
FM 434 @ FLAT CREEK
NBI# 09-161-0-0833-04-046

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.		HIGHWAY No.
DL	6	BPM 643811001		SH 22, ETC
CHECK	STATE	DISTRICT	COUNTY	SHEET No.
CS	TEXAS	WACO	HILL, ETC	85
GRAPHICS	CONTROL	SECTION	JOB	
DL	6438	11	001	
CHECK				
CS				

...\0833-04-046.dgn



FM 434 OVER FLAT CREEK
121'-4" OVERALL LENGTH
(4 @ 30'-4") CONCRETE PAN GIRDER
34'-0" ROADWAY
T201 RAIL

LAYOUT PLAN

FM 434 OVER FLAT ROCK CREEK

(NBI # 09-161-0-0833-04-046)

REPAIR - TYPE 2

⚠ SHOWING VOID AT ABUTMENT CAP

ITEM	401-6001
LOCATION	FLOWABLE BACKFILL
	C.Y.
REPAIR LOCATION TYPE 2	6.5
TOTAL	6.5

GENERAL NOTES:

All materials and labor required for filling voids below Abutment Cap will be included in the price bid per CY for FLOWABLE BACKFILL.

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PROFESSIONAL ENGINEER

8/30/2023

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SHEET 1 OF 1 SHEETS

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CONCRETE STRUCTURE REPAIR DETAILS

FM 434 OVER FLAT CREEK

(STR.#046)

FILE: 046FM434ConRep.dgn	DN: DOT	CK: DOT	DW: ZB	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	86
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC	6438	11	001	SH 22,ETC

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8/29/2023
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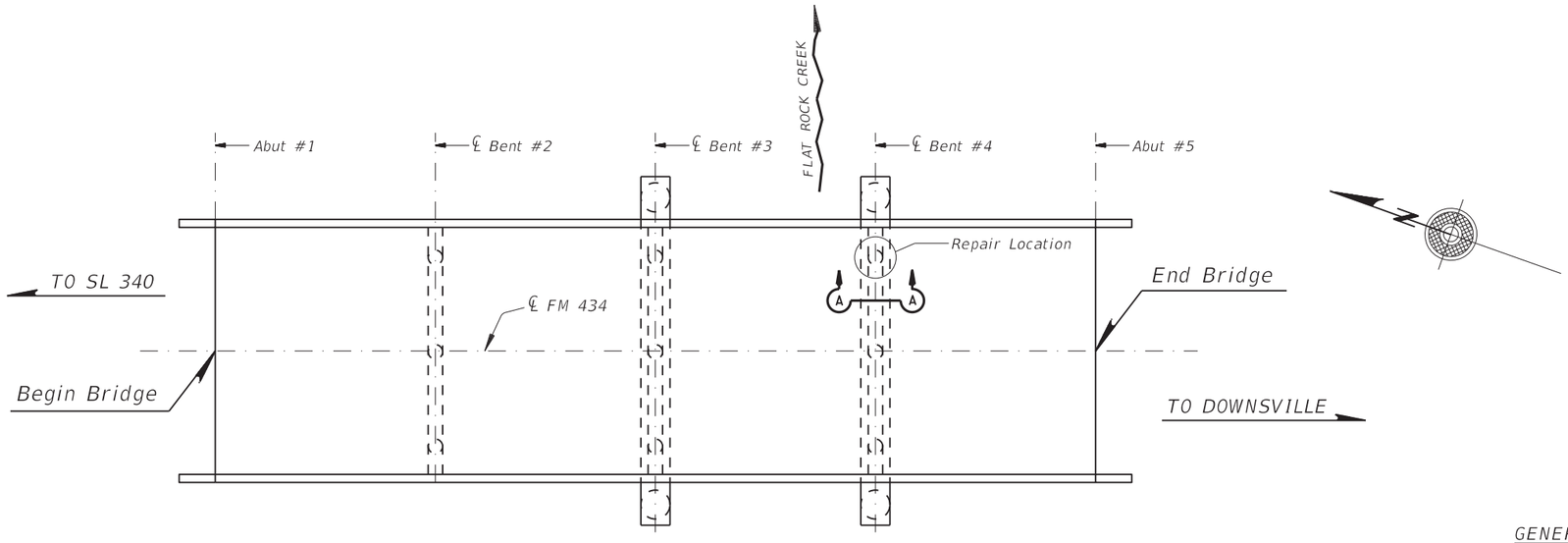
ACC:



FM 434 @ FLAT ROCK CREEK

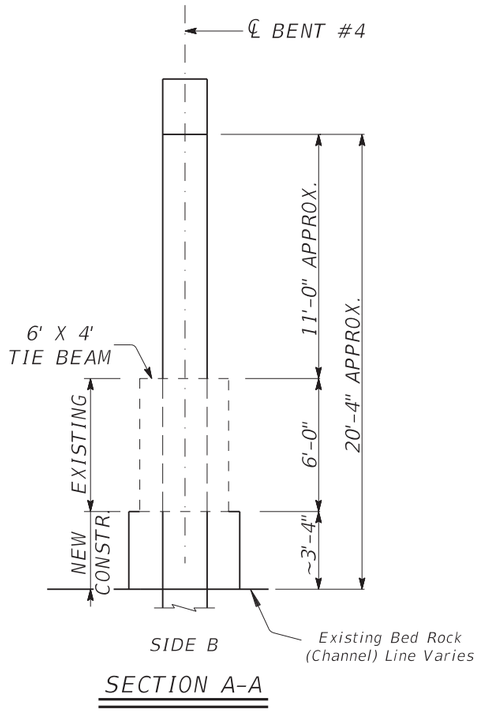
(NBI # 09-161-0-0833-04-046)

GENERAL NOTES:

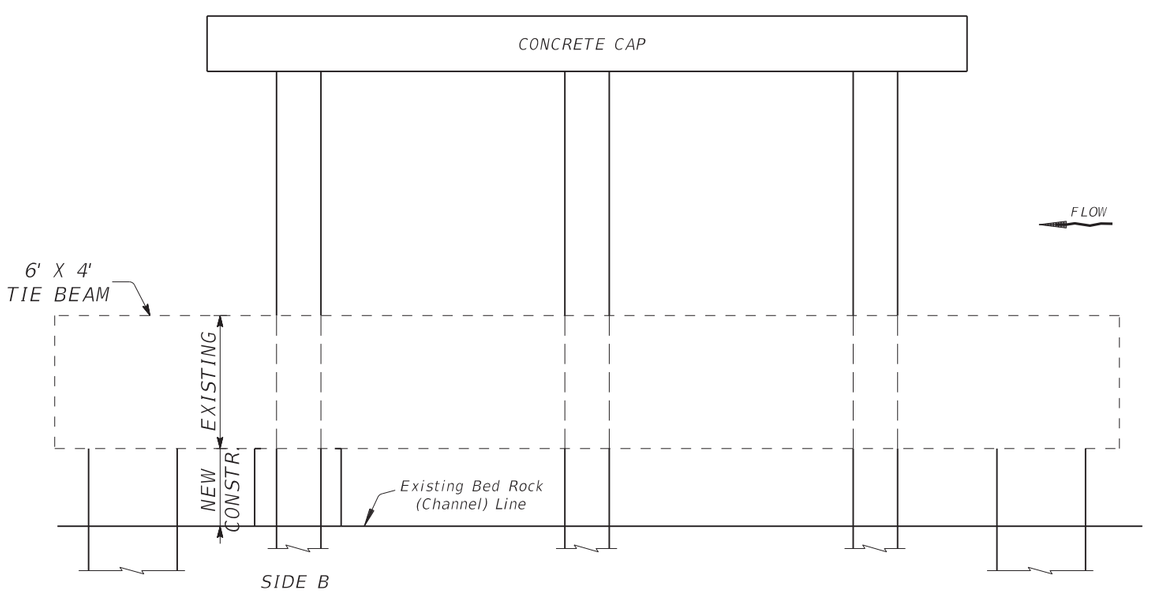
All reinforcing steel shall be Grade 60.

Concrete for Column Encasement shall be Class "C".

All materials and labor reeequired for preparing and constructing column encasements shall be included in the price bid per CY CL. "C" MISC.



SECTION A-A



ELEVATION

Bent #4 - Look South
(See Sheet 2 of 2 for Construction Details)

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SHEET 1 OF 2 SHEETS

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COLUMN ENCASEMENT DETAILS

FM 434
(FLAT ROCK CREEK)

(STR.#046)

FILE: FM434ENC.dgn	DN: DOT	CK: DOT	DW: JJ	CK: DOT	
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT		SHEET
REVISIONS	WACO	6	BPM 643811001		87
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

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8/29/2023
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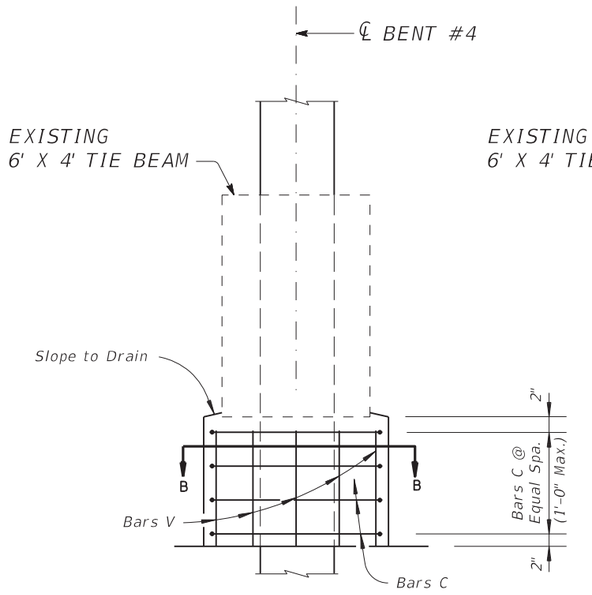
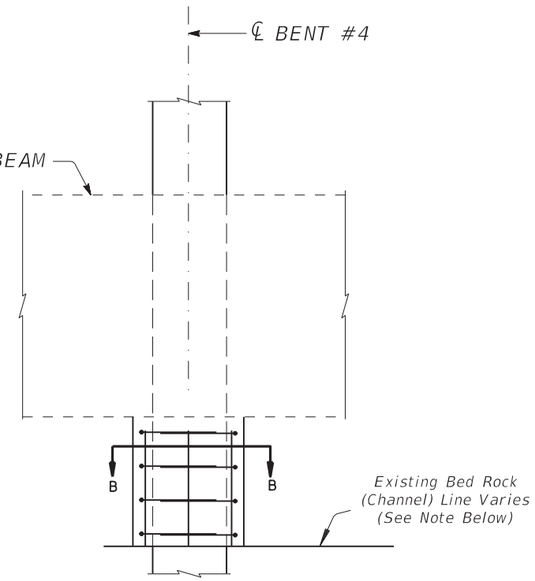
LEVELS DISPLAYED ACC:



DETAIL @ SIDE A

CONCRETE ENCASEMENT

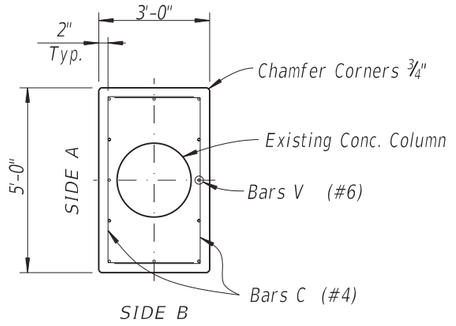


DETAIL @ SIDE B

CONCRETE ENCASEMENT

NOTE:

Bed Rock shall be clean from dirt, debris and any loose rock before Construction.



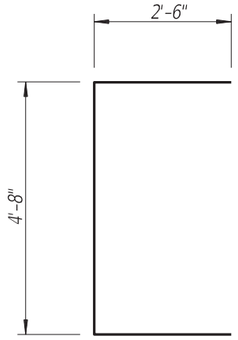
SECTION B-B

CONCRETE ENCASEMENT

NOTE:
CONTRACTOR TO FIELD VERIFY DIMENSIONS PRIOR TO ORDERING MATERIALS.

BARS V

Note: Field cut as needed.
Bed rock varies.



BARS C

ITEM	420-6074
LOCATION	CL C CONC (MISC)
	C.Y.
BENT 4 ENCASE	1.6
TOTAL	1.6

*ESTIMATED QUANTITIES

(FOR ALL NEW ENCASEMENT)

Bar	No.	Size	Length	Weight
C	8	#4	9'-8"	52
V	12	#6	3'-2"	57
Reinforcing Steel			Lb	109

* For Contractors Information Only

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PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

SHEET 2 OF 2 SHEETS

Texas Department of Transportation

COLUMN ENCASEMENT DETAILS

FM 434
(FLAT ROCK CREEK)

(STR.#046)

FILE: FM434ENC.dgn	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT #	SHEET
REVISIONS	WACO	6	BPM 643811001	88
	COUNTY	CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC	6438	11	001	SH 22, ETC

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8/29/2023
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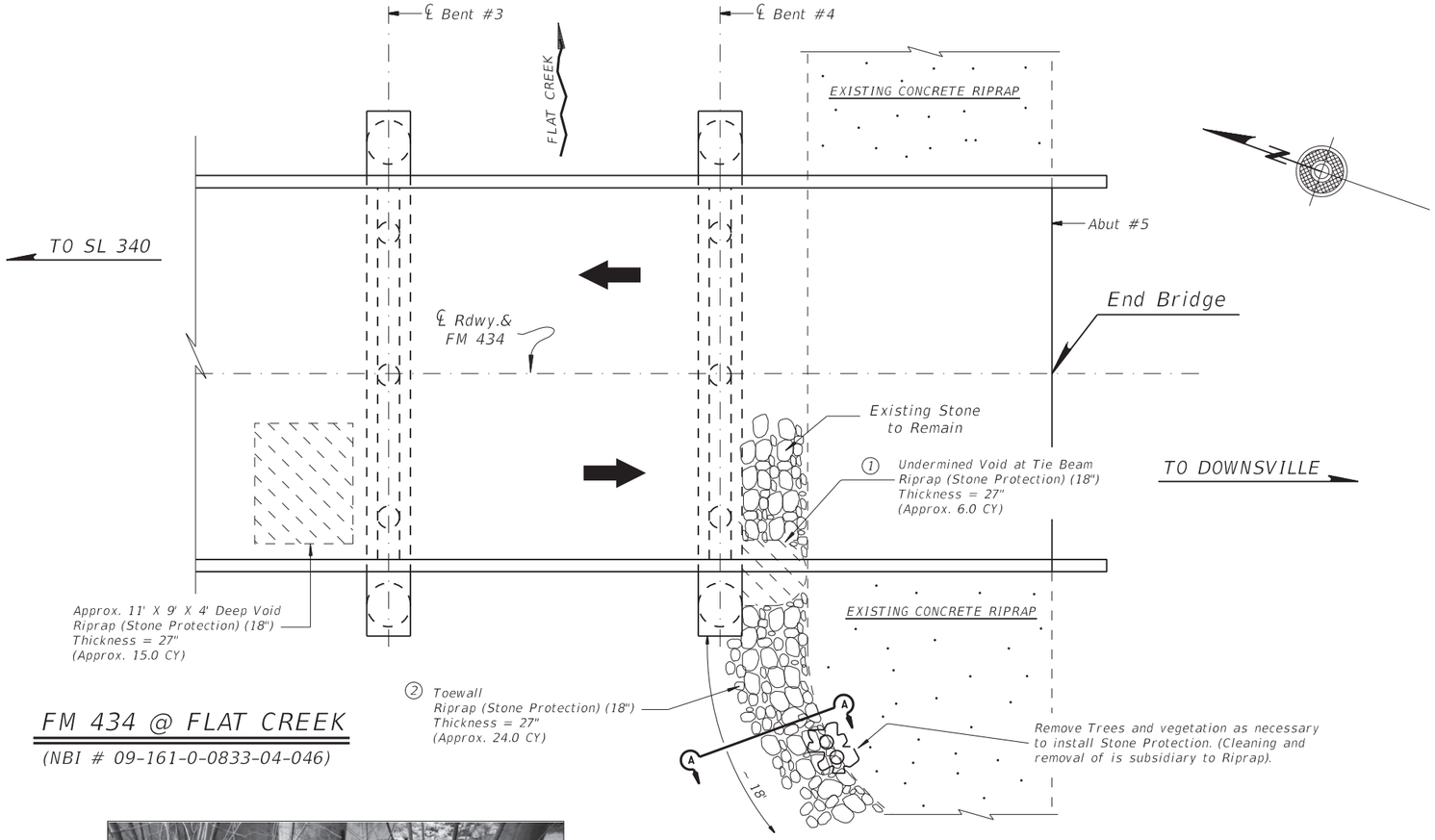


FM 434 @ FLAT CREEK

(NBI # 09-161-0-0833-04-046)

Fill Void with Riprap
18" Stone Protection
Approx. 4' X 6' X 6' Deep

① REPAIR AT EXISTING TIE BEAM

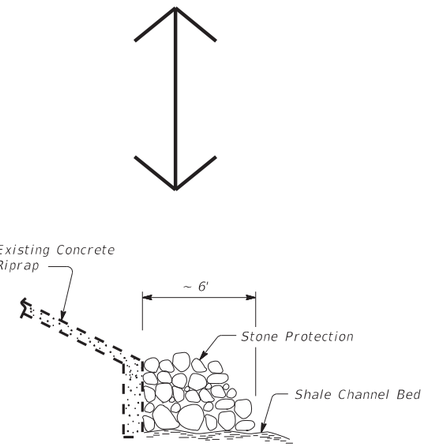
SHOWING LIMITS OF REPAIR AREA BENT #4 SOUTH SIDE
DETAIL 1

ESTIMATED QUANTITIES

ITEM	DESCRIPTION	UNIT	QTY
0432-6033	RIPRAP (STONE PROTECTION) (18 IN)	C.Y.	45.0

② REPAIR AT EXISTING RIPRAP TOEWALL

SHOWING LIMITS OF REPAIR AREA UPSTREAM SOUTH BANKS



SECTION A-A

(SHOWING LIMITS OF STONE PROTECTION AT EXISTING RIPRAP TOEWALL)

GENERAL NOTES:

1. THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF RIPRAP STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF THESE ITEMS AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
2. IF NO ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED AS NEEDED TO PLACE RIPRAP. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
3. ALL EXCAVATION, GRADING, BACKFILLING AND FINISHING OF SOIL WILL BE SUBSIDIARY TO THE VARIOUS BID ITEMS.

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8/30/2023
Ross Langdale, P.E.

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EROSION REPAIR DETAILS

FM 434
(FLAT CREEK)

(STR.#046)

FILE: FM434Rep.dgn	DN: DOT	CK: DOT	DW: JJ	CK: DOT	
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT		SHEET
REVISIONS	WACO	6	BPM 643811001		89
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

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8/29/2023
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LEVELS DISPLAYED ACC:
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17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

FOR LOCATION REPAIR DETAILS REFER TO:

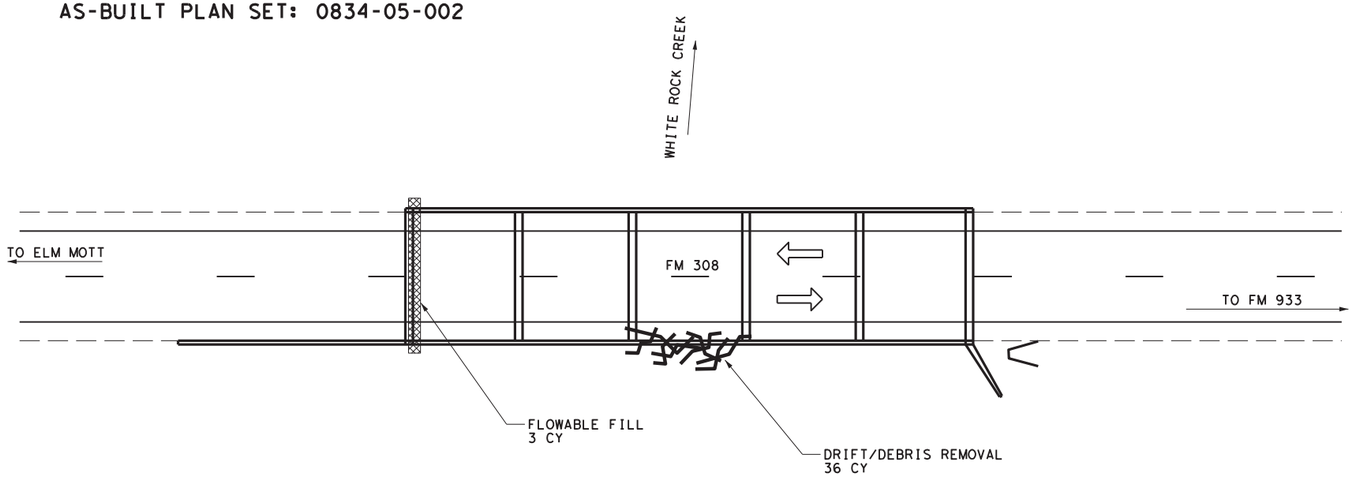
CONCRETE STRUCTURE REPAIR DETAILS (FM 308 OVER WHITE ROCK CREEK)

MILLING AND OVERLAY DETAILS (FM 308 OVER WHITE ROCK CREEK)

LAYOUT AND DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS (FM 308 OVER WHITE ROCK CREEK)

STRIPING DETAILS (FM 308 OVER WHITE ROCK CREEK)

AS-BUILT PLAN SET: 0834-05-002



LEGEND:

- EMBANKMENT
- EXCAVATION
- CONCRETE RIP RAP
- STONE RIP RAP
- FLOWABLE BACKFILL

GENERAL VICINITY LAYOUT

NTS

DRAWING NOT TO SCALE

GENERAL NOTES:

1. WHEN DIRECTED SURPLUS MATERIAL ESTIMATED AT INDIVIDUAL LOCATIONS MAY BE USED AT OTHER CONTRACT SITES.
2. IF STONE PROTECTION IS REQUIRED, THE DETAILS SHOWN ARE PROVIDED AS AN APPROXIMATE GUIDE FOR INSTALLATION OF STONE PROTECTION. THE CONTRACTOR WILL DETERMINE THE LIMITS OF STONE PROTECTION REQUIRED AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED PRIOR TO MATERIAL PURCHASE AND DELIVERY.
3. IF NO PAY ITEM FOR DEBRIS REMOVAL IS NOTED; DEBRIS WILL BE REMOVED FROM BRIDGE STRUCTURE ELEMENTS. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
4. THE CONTRACTOR WILL LIMIT CHANNEL DISTURBING ACTIVITIES TO THE VICINITY OF STRUCTURE AND TxDOT ROW. CONSTRUCTION WILL HAVE EROSION CONTROL BMP IN PLACE DURING ANY SOIL DISTURBING ACTIVITY.
5. IF NO PAY ITEM FOR BRUSH REMOVAL IS NOTED; BRUSH CLEARING FOR EXCAVATION AND EMBANKMENT WILL NOT BE PAID DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
6. THE CONTRACTOR MUST EXHAUST ALL TYPE-D EMBANKMENT AVAILABLE AT SITE PRIOR TO DELIVERY OF TYPE-B.
7. IF JOINT SEAL IS REQUIRED FOR RIP RAP, THE QUANTITY SHOWN IS FOR ESTIMATION ONLY. THE CONTRACTOR WILL DETERMINE THE LIMITS OF SEALANT AS DICTATED BY FIELD CONDITIONS AND AS DIRECTED. JOINTS TOO LARGE FOR SEALANT MAY BE SEALED BY FLOWABLE BACKFILL AS DIRECTED. REFER TO DMS-6100 FOR MATERIAL SPECIFICATIONS.
8. LOCATIONS WHERE FENCING MUST BE ALTERED; AT ALL TIMES CONTRACTOR WILL MAINTAIN ADEQUATE BARRIER TO KEEP LIVESTOCK FROM ENTERING ROW. WHEN POSSIBLE REPLACE FENCING TO MATCH ORIGINAL. THIS WILL NOT BE PAID FOR DIRECTLY, BUT CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.

ITEM-CODE	DESCRIPTION	UNITS	TOTAL
0354 6088	PLANE ASPH CONC PAV (0" TO 5")	SY	940
0356 6021	PAV JT UNDERSEAL (24")	LF	638
0401 6001	FLOWABLE BACKFILL	CY	3
0429 6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	73
0438 6002	CLEANING AND SEALING EXIST JOINTS(CL3)	LF	188
0662 6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	13
0666 6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	540
0666 6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	540
0672 6009	REFL PAV MRKR TY II-A-A	LF	7
3076 6069	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	TON	130
3085 6001	UNDERSEAL COURSE	GAL	180
7000 6001	REML & DISPL DRIFTWOOD & DEBRIS	CY	36

CONTRACTOR'S INFORMATION ONLY

NOTE:
THIS SKETCH IS TO BE USED AS AN APPROXIMATE GUIDE FOR MAINTENANCE WORK TO BE PERFORMED IN THE VICINITY OF THIS EXISTING STRUCTURE.

LOCATION: FM 308 @ WHITE ROCK CREEK
NBI#: 09-161-0-0834-05-027
DIMENSIONS: 150'x 34' BRIDGE
SKEW: NORMAL
GPS LAT/LON: 31.65913403/-97.12305152

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by CHARLES W. SMITH P.E. 110312, on

Charles W. Smith, P.E. PE 8/30/23
Signature of Registrant & Date

Texas Department of Transportation

McLENNAN COUNTY STRUCTURE LAYOUT

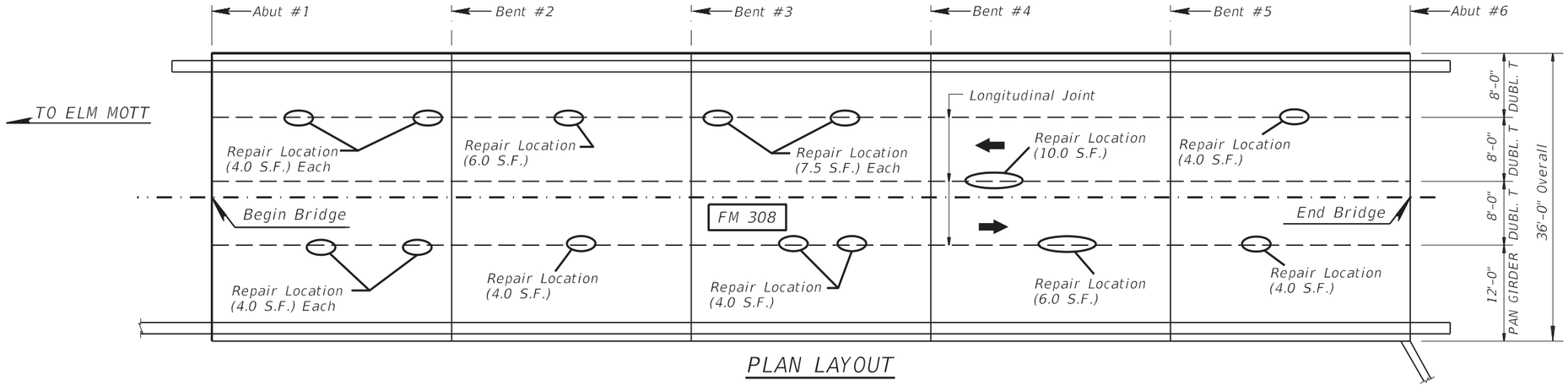
FM 308 @ WHITE ROCK CREEK

NBI# 09-161-0-0834-05-027

SCALE: NTS

DESIGN	FED RD DIV No.	PROJECT No.	HIGHWAY No.
DL	6	BPM 643811001	SH 22, ETC
CHECK	STATE	DISTRICT / COUNTY	SHEET No.
CS	TEXAS	WACO / HILL, ETC	90
GRAPHICS	CONTROL	SECTION / JOB	
DL	6438	11 / 001	
CHECK			
CS			

...\0834-05-027.dgn



PLAN LAYOUT

FM 308 OVER WHITE ROCK CREEK

(NBI # 09-161-0-0834-05-027)

FM 308 OVER WHITE ROCK CREEK
150'-0" OVERALL LENGTH
(5 @ 30'-0") CONCRETE PAN GIRDER
AND T-BEAM SPAN
31'-4" ROADWAY, TYPE T201 RAIL

CONCRETE REPAIR @ LONGITUDINAL JOINTS

⚠ SHOWING LIMITS OF SPALLS W/DELAMINATION
NOTE: SPALLS/DELAMINATIONS VARY PER LOCATION

ITEM	429-6007
LOCATION	CONC. STR REPAIR (VERTICAL & OVERHEAD)
	S.F.
REPAIR LOCATIONS	73.0
TOTAL	73.0

⚠ Note: Details are shown as a guide. Contractor to verify all Misc. Spall/Delamination locations prior to ordering Materials.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L Langdale, P.E.

CONCRETE STRUCTURE REPAIR DETAILS

FM 308 OVER WHITE ROCK CREEK

(STR. #027)

FILE: FM308JtRep.DGN	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	91
	COUNTY		CONTROL SECT JOB	HIGHWAY
	HILL,ETC		6438 11 001	SH 22,ETC

...\0834-05-027_D1.dgn

8/29/2023
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LEVELS DISPLAYED ACC:
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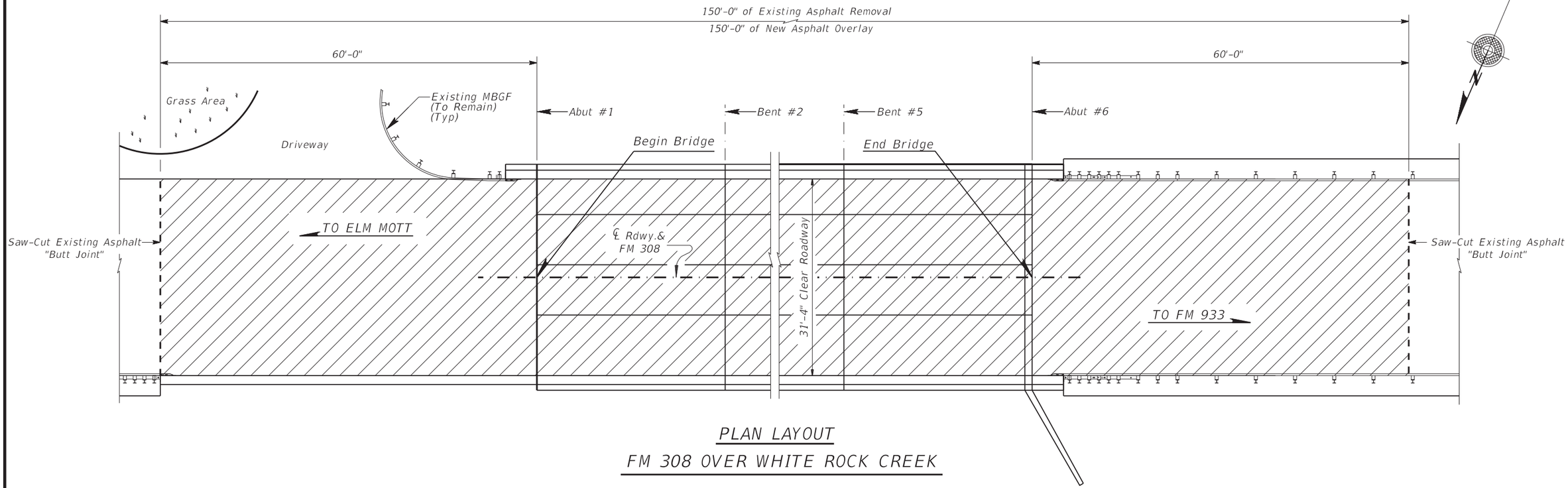

PLAN LAYOUT

FM 308 OVER WHITE ROCK CREEK

(NBI # 09-161-0-0834-05-027)

GENERAL NOTES:

1. Mill Existing Asphalt completely OFF Bridge Deck.
2. Repair any damaged exposed Deck Surface or Bridge Joints in accordance with Items 429 and 438.
3. Prepare Expansion Joints in accordance with Joint Repair Details.
4. Construct Underseal Course and Final Surfacing.
5. Clean and Seal Bridge Joints in accordance with Joint Repair Details.

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER
8/30/2023
Ross L. Langdale, P.E.

ESTIMATED QUANTITIES

LOCATION	354-6088	3076-6069	3085-6001
	PLANE ASPH CONC PAV (0" TO 5")	D-GR HMA TY-C SAC-B PG64-22 (EXEMPT)	UNDERSEAL COURSE
	SY	TON	GAL
FM 308 @ WHITE ROCK CREEK	940	130	180

MILLING AND OVERLAY DETAILS

FM 308 OVER WHITE ROCK CREEK

(STR. #027)

FILE: FM308JtRep.DGN	DN: DOT	CK: DOT	DW: JJ	CK: DOT		
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT			SHEET
REVISIONS	WACO	6	BPM 643811001			92
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL, ETC		6438	11	001	SH 22, ETC

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8/29/2023
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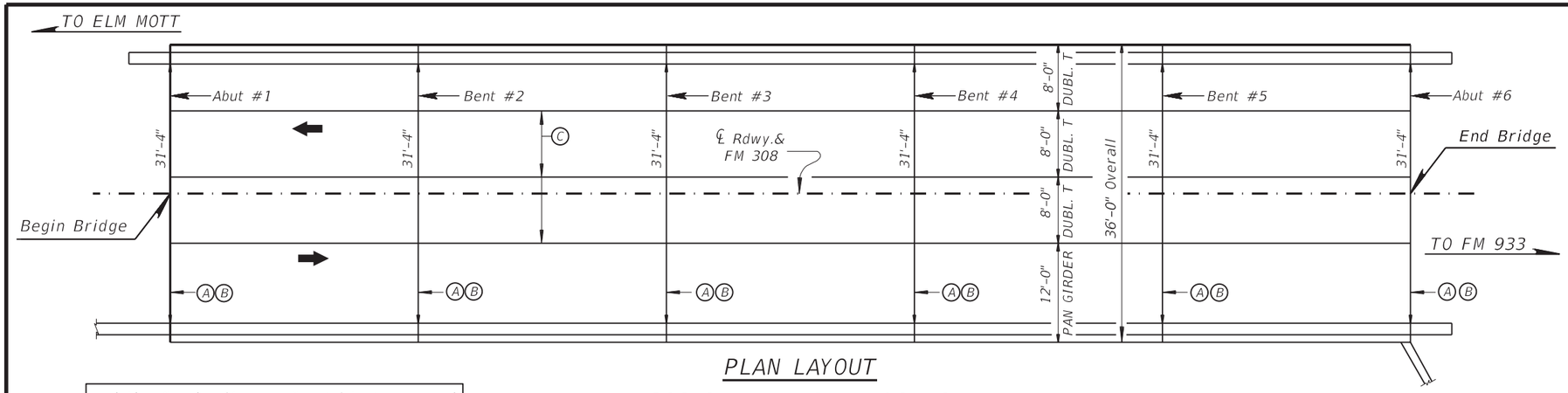


Existing Overlay (Approx. 2" – 5") to be removed of existing Bridge Deck and Appr. Slab.

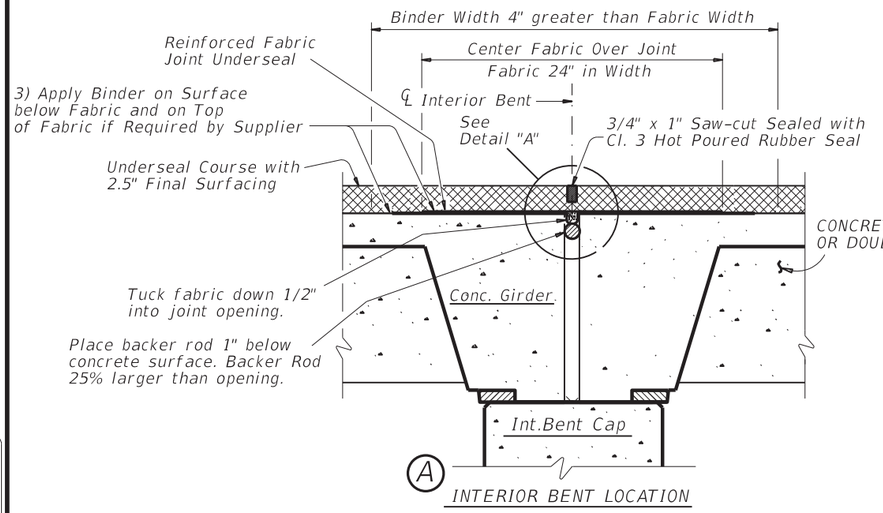
PLAN LAYOUT

FM 308 OVER WHITE ROCK CREEK

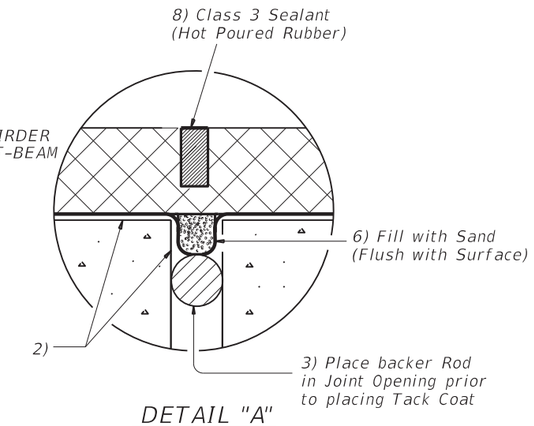
(NBI # 09-161-0-0834-05-027)

FM 308 OVER WHITE ROCK CREEK
150'-0" OVERALL LENGTH
(5 @ 30'-0") CONCRETE PAN GIRDER
AND T-BEAM SPAN
31'-4" ROADWAY, TYPE T201 RAIL

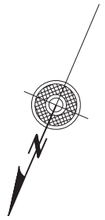
3) A tack coat must be applied if the surface has been milled.



FABRIC JOINT SEAL WITH HOT POURED RUBBER



DETAIL "A"



Ⓐ Ⓑ DENOTES LOCATION FOR CLEANING AND SEALING EXISTING EXPANSION JOINTS. SEE "FABRIC JOINT SEAL WITH HOT POURED RUBBER" DETAIL A, SHEET 1 OF 2 SHEETS OR DETAIL B, SHEET 2 OF 2 SHEETS.

Ⓒ DENOTES LOCATION FOR SEALING LONGITUDINAL CONSTRUCTION JOINTS. SEE "SECTION THRU FABRIC UNDERSEAL AT CONSTRUCTON JOINT" DETAIL C, SHEET 2 OF 2 SHEETS.

PROCEDURES:

1) PRIOR TO THE PLACEMENT OF THE FABRIC JOINT UNDERSEAL, CLEAN JOINT OPENING OF ALL OLD EXPANSION MATERIALS/DEVICES, BITUMINOUS MATERIALS, DIRT, GREASE, AND ALL OTHER DELETERIOUS MATERIALS IN ACCORDANCE WITH ITEM 438, "CLEANING AND SEALING JOINTS."

2) REPAIR ANY SIGNIFICANT SPALLED OR CRACKED AREAS, AS DETERMINED BY THE ENGINEER, AROUND THE JOINT OPENING WITH TYPE II POLYMER CONCRETE IN ACCORDANCE WITH DMS-6140, "POLYMER CONCRETE FOR JOINT SYSTEMS". THIS WORK WILL BE PAID FOR BY ITEM 429 "CNC STR REP (STANDARD)".

3) PLACE TACK COAT OR BINDER AS REQUIRED BY THE FABRIC JOINT UNDERSEAL MANUFACTURER'S INSTALLATION INSTRUCTIONS. PLACE BACKER ROD IN JOINT OPENING PRIOR TO PLACING TACK COAT.

4) PLACE REINFORCED FABRIC JOINT UNDERSEAL CENTERED OVER JOINT OPENING. TUCK FABRIC DOWN APPROXIMATELY ½" INTO THE JOINT OPENING. INSTALL UNDERSEAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

5) WHEN USING THE SELF-ADHESIVE TYPE FABRIC UNDERSEAL, PRESSURE ROLL FABRIC JOINT UNDERSEAL TO IMPROVE ADHESION.

6) JUST PRIOR TO PAVING, FILL TUCKED IN PORTION OF UNDERSEAL WITH SAND FLUSH WITH SURFACE. APPLY A TACK COAT TO FABRIC JOINT UNDERSEAL AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. MARK LOCATION OF CENTERLINE OF JOINT ON CURB OR BARRIER AS APPROVED.

7) AFTER THE ASPHALTIC CONCRETE PAVEMENT OPERATIONS ARE COMPLETE, SAW CUT 1" INTO THE ASPHALT AT CENTERLINE OF JOINT. MAKE MULTIPLE SAW CUTS TO CREATE A ¾" JOINT OPENING OR MATCH THE EXISTING JOINT OPENING, WHICHEVER IS GREATER. DO NOT DAMAGE THE UNDERSEAL.

8) SEAL THE JOINT OPENING WITH A CLASS 3, "HOT POURED RUBBER." SEAL FLUSH WITH THE TOP OF THE ASPHALTIC CONCRETE PAVEMENT.

8/30/2023

Ross Langdale, P.E.

GENERAL NOTES:

CLEANING EXISTING JOINT OPENING OF ALL DEBRIS, PROVIDING AND PLACING BACKER ROD, SAW-CUTTING JOINT OPENING, AND SEALING JOINT IS PAID FOR BY ITEM 438, "CLEANING AND SEALING JOINTS" AND MEASURED BY THE L.F. OF "CLEANING AND SEALING OF EXISTING JOINTS (CL 3)." PROVIDING AND APPLYING TACK COAT AND PROVIDING AND PLACING FABRIC JOINT UNDERSEAL IS PAID FOR BY ITEM 356, "FABRIC UNDERSEAL" AND MEASURED BY THE L.F. OF "PAV JT UNDERSEAL."

OBTAIN APPROVAL FOR ALL TOOLS, EQUIPMENT, MATERIALS AND TECHNIQUES PROPOSED FOR USE TO PREPARE THE JOINT.

PROVIDE THE REINFORCED FABRIC JOINT UNDERSEAL IN ACCORDANCE WITH DMS-6260, "REINFORCED FABRIC JOINT UNDERSEAL" OR DMS-6220, "FABRIC FOR UNDERSEALS."

PROVIDE THE CLASS 3 JOINT SEALANT IN ACCORDANCE WITH DMS-6310, "JOINT SEALANTS AND FILLERS."

Ⓐ OR Ⓑ ESTIMATED QUANTITIES

ITEM	356-6021	438-6002
LOCATION	PAV JT UNDERSEAL (24")	CLEANING AND SEALING EXIST JOINTS (CL 3)
	L.F.	L.F.
STR. #027 FM 308 OVER WHITE ROCK CREEK	188.00	188.00
TOTAL	188.00	188.00

SHEET 1 OF 2 SHEETS

Texas Department of Transportation
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LAYOUT & DETAILS
FOR CLEANING AND SEALING
EXPANSION JOINTS
FM 308 OVER WHITE ROCK CREEK

(STR. #027)

FILE: FM308JtRep.DGN	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	93
	COUNTY	CONTROL	SECT JOB	HIGHWAY
	HILL, ETC	6438	11 001	SH 22, ETC

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8/29/2023
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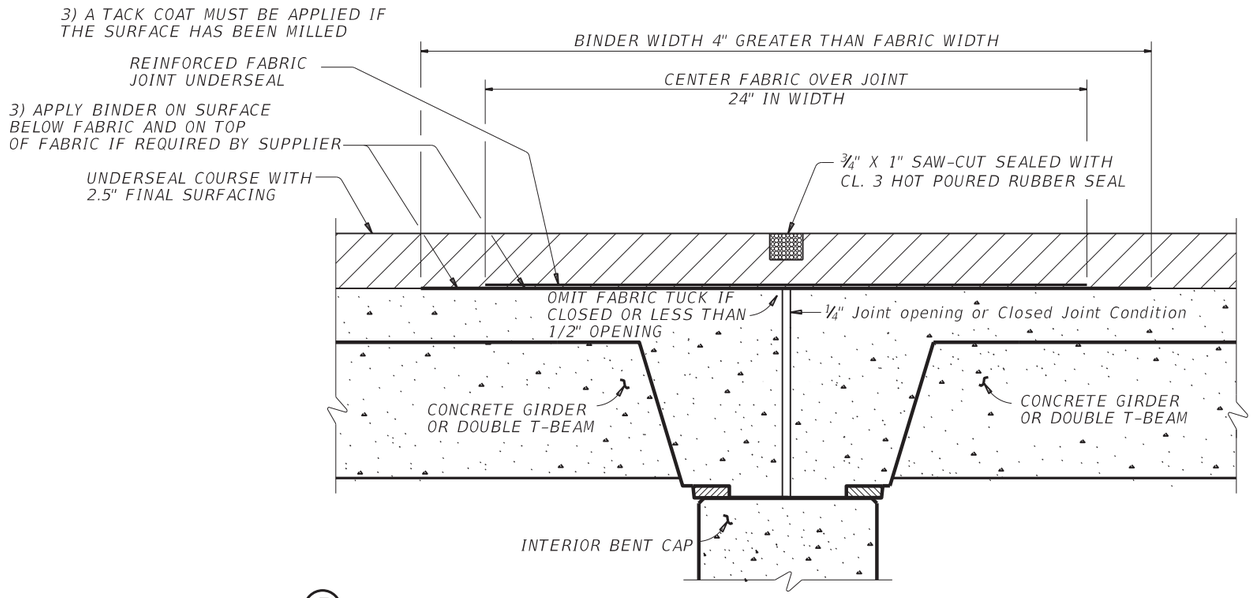
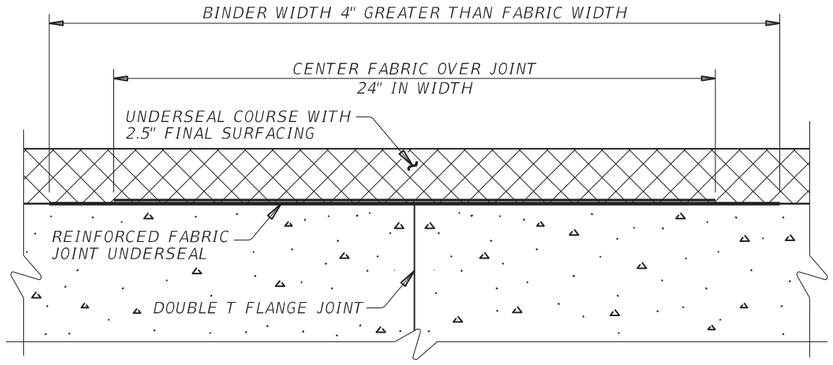


Ⓑ SECTION THRU FABRIC UNDERSEAL AT CLOSED OR LESS THAN 1/2" JOINT



Ⓒ SECTION THRU FABRIC UNDERSEAL AT CONSTRUCTION JOINT

(AT LONGITUDINAL CONSTRUCTION JOINTS)

Ⓒ ESTIMATED QUANTITIES

ITEM	356-6021
LOCATION	PAV JT UNDERSEAL (24")
	L.F.
STR. #027 FM 308 OVER WHITE ROCK CREEK	450.0
TOTAL	450.0

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross Langdale, P.E.

SHEET 2 OF 2 SHEETS

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LAYOUT & DETAILS FOR CLEANING AND SEALING EXPANSION JOINTS

FM 308 OVER WHITE ROCK CREEK

(STR. #027)

FILE: FM308JtRep.DGN	DN: DOT	CK: DOT	DW: JJ	CK: DOT
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT	SHEET
REVISIONS	WACO	6	BPM 643811001	94
	COUNTY	CONTROL	SECT JOB	HIGHWAY
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8/29/2023
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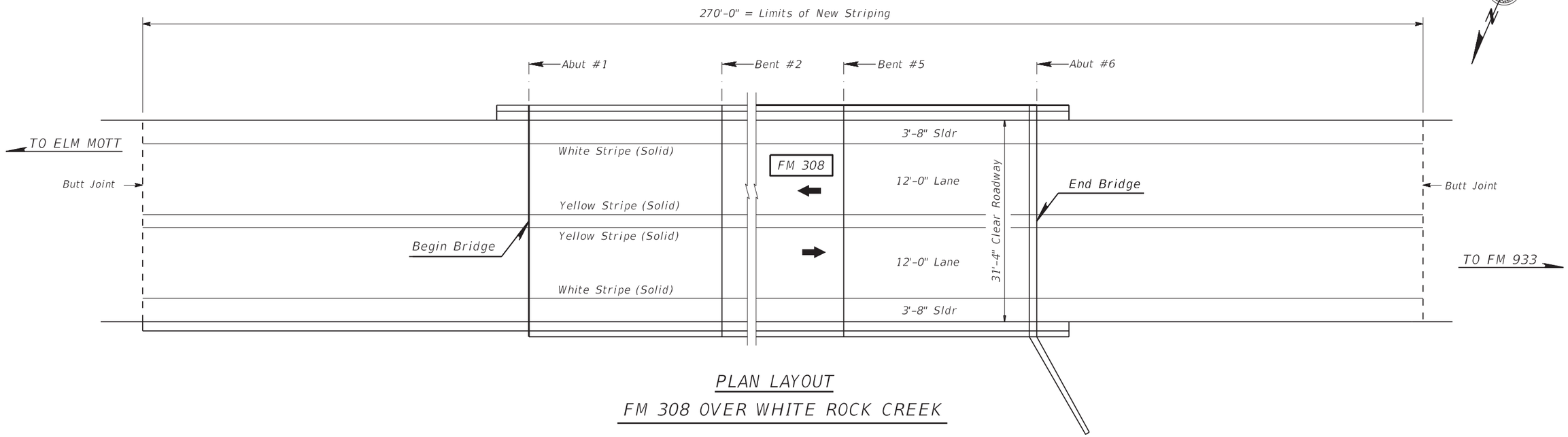

PLAN LAYOUT
FM 308 OVER WHITE ROCK CREEK

(NBI # 09-161-0-0834-05-027)

ESTIMATED QUANTITIES

LOCATION	662-6111 WK ZN PAV MRK SHT TERM (TAB) TY Y-2	666-6303 RE PM W/RET REQ TY I (W) 4" (SLD) (100MIL)	666-6315 RE PM W/RET REQ TY I (Y) 4" (SLD) (100MIL)	672-6009 REFL PAV MRKR TY II-A-A
	EA	LF	LF	EA
FM 308 @ WHITE ROCK CREEK	13	540	540	7

STATE OF TEXAS
ROSS L. LANGDALE
126994
LICENSED
PROFESSIONAL ENGINEER

8/30/2023

Ross L. Langdale, P.E.

STRIPING DETAILS
FM 308 OVER WHITE ROCK CREEK

(STR. #027)

FILE: FM308JtRep.DGN	DN: DOT	CK: DOT	DW: JJ	CK: DOT		
ORIG DATE: MAY 2023	DIST	FED REG	MAINTENANCE PROJECT			SHEET
REVISIONS	WACO	6	BPM 643811001			95
	COUNTY		CONTROL	SECT	JOB	HIGHWAY
	HILL,ETC		6438	11	001	SH 22,ETC

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8/29/2023
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DATE: 8/29/2023 7:51:45 AM
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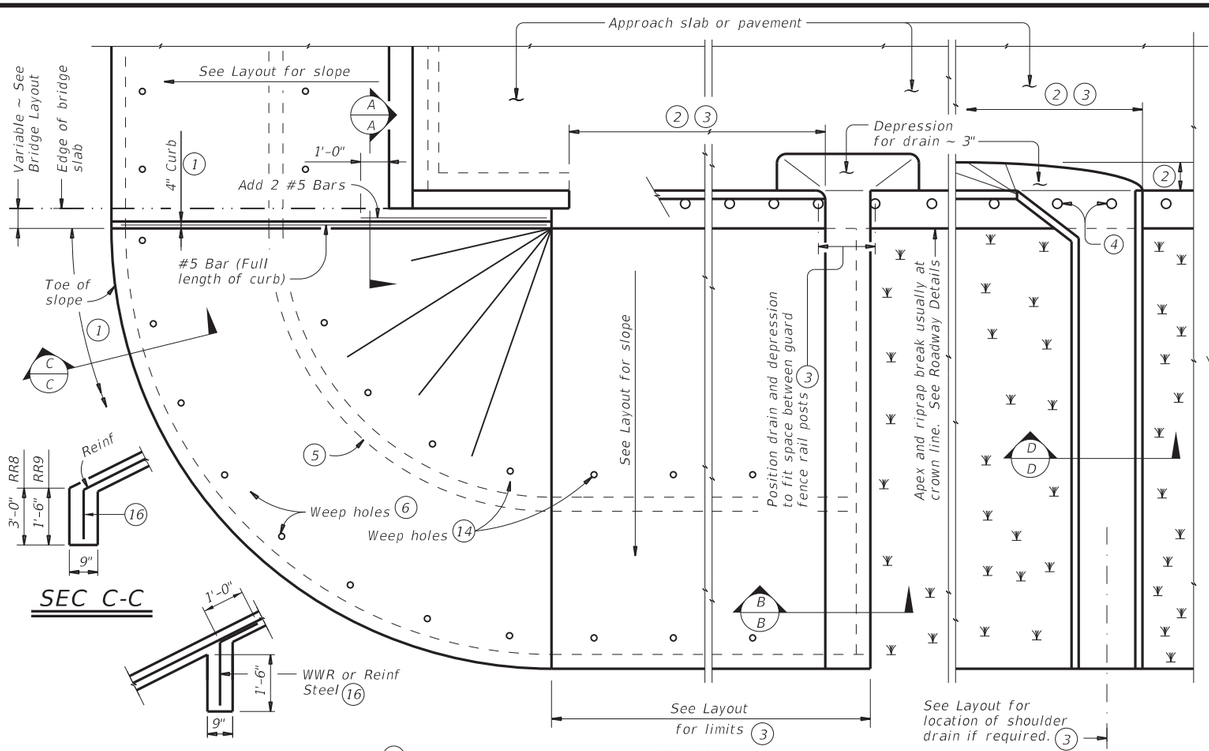
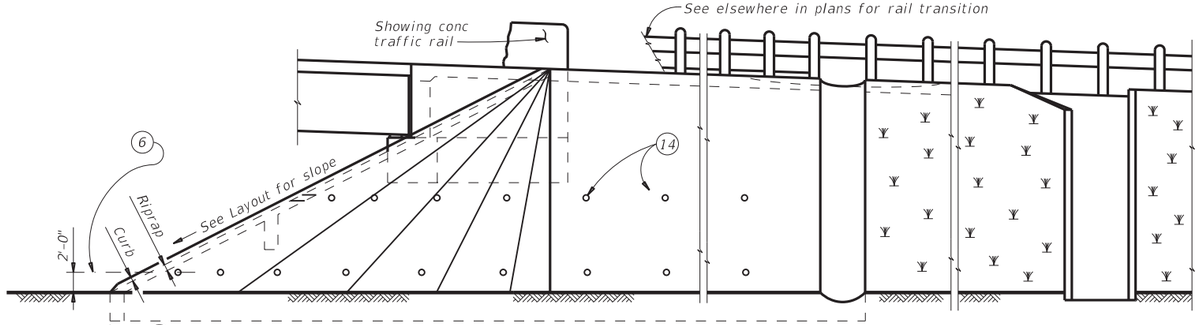
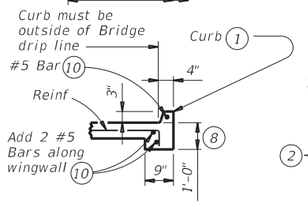


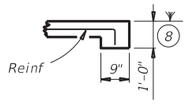
INTERMEDIATE TOEWALL (5)



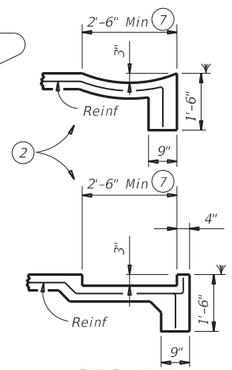
ELEVATION



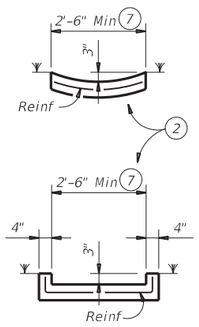
SEC A-A



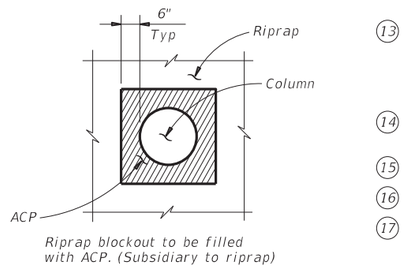
SEC B-B
(No drain)



SEC B-B
(Shoulder drain integral with riprap)

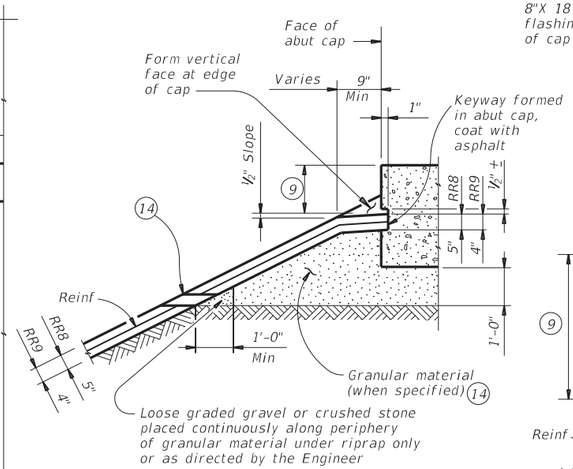


SEC D-D
(Shoulder drain)

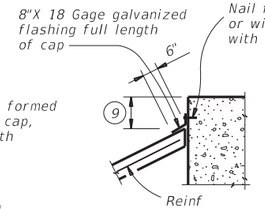


Riprap blockout to be filled with ACP. (Subsidiary to riprap)

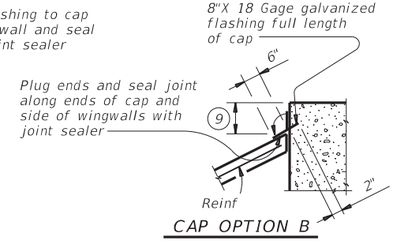
RIPRAP DETAIL AT COLUMNS
(As directed by the Engineer)



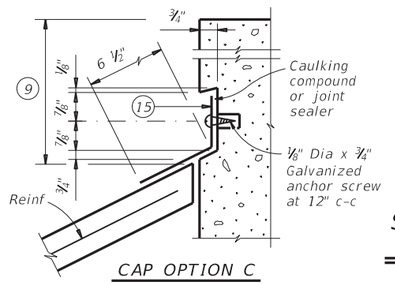
SHOWING KEYWAY OPTION



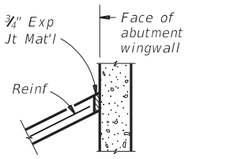
CAP OPTION A



CAP OPTION B

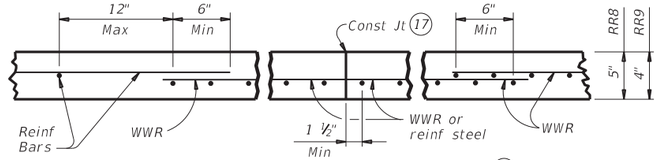


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

(1) When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.

(2) Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.

(3) Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.

(4) See details elsewhere in plans for installation of guard fence posts through concrete riprap.

(5) Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.

(6) Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.

(7) Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.

(8) Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.

(9) Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

(10) #5 bars shown are required even when synthetic fiber reinforcing option is selected.

(11) Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.

(12) Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.

(13) Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.

(14) If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.

(15) 8" x 18 Gage Galv Sheet Metal

(16) Provide WWR or #3 bars, with 1'-0" extension into slope.

(17) WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:
Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.
Provide Grade 60 reinforcing steel.
Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.
Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.
Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.
Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.
Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".
See Layout for limits of riprap.
RR8 is to be used on stream crossings.
RR9 is to be used on other embankments.

Texas Department of Transportation
Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

CRR

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©TxDOT April 2019 REVISIONS	CONT	SECT	JOB	HIGHWAY
	6438	11	001	SH 22,ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL,ETC		96

DATE: 8/29/2023 7:51:47 AM
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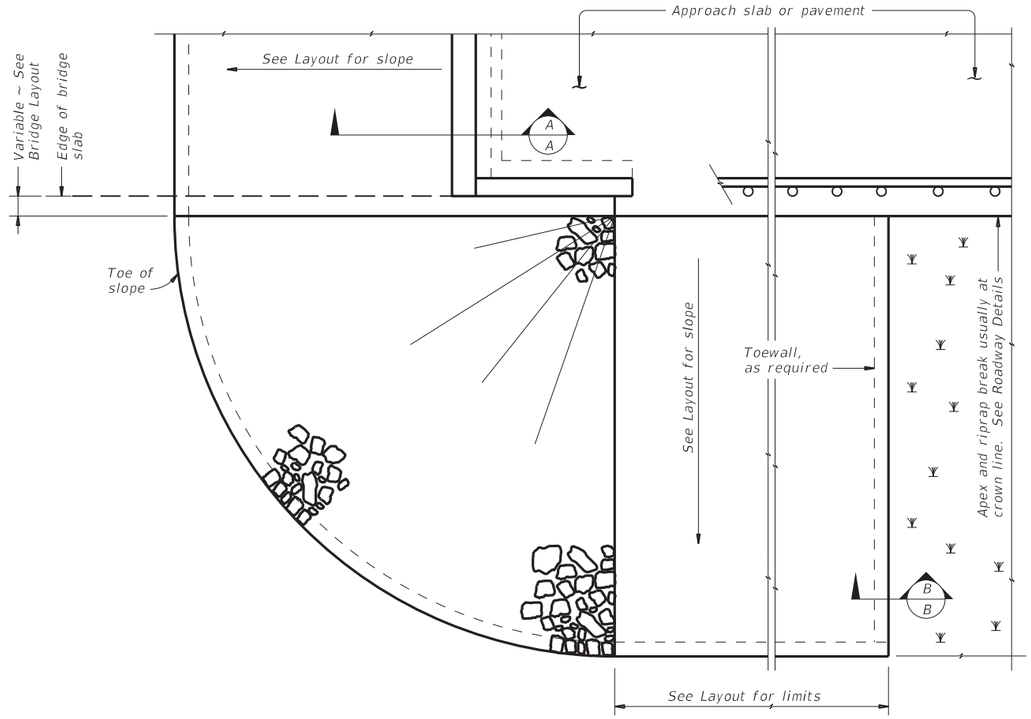
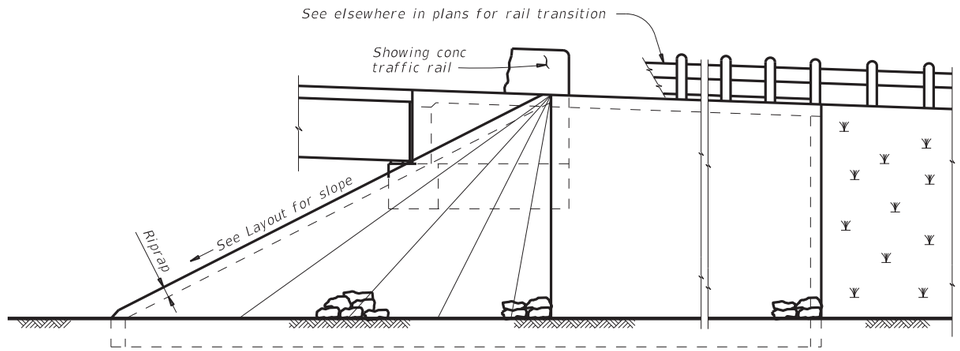
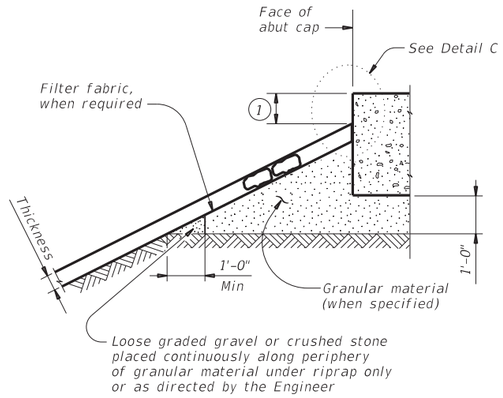


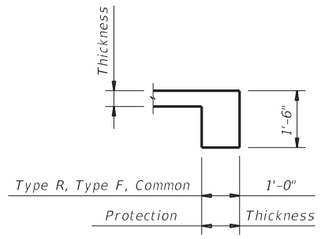
PLAN



ELEVATION

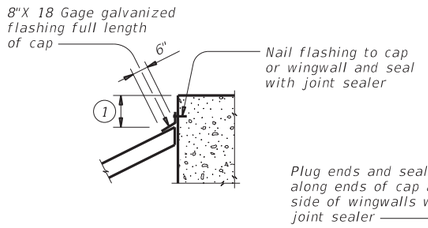


SECTION A-A AT CAP



SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".



CAP OPTION A

CAP OPTION B

DETAIL C

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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REVISIONS	6438	11	001	SH 22, ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL, ETC		97

DATE: 8/29/2023 7:51:47 AM
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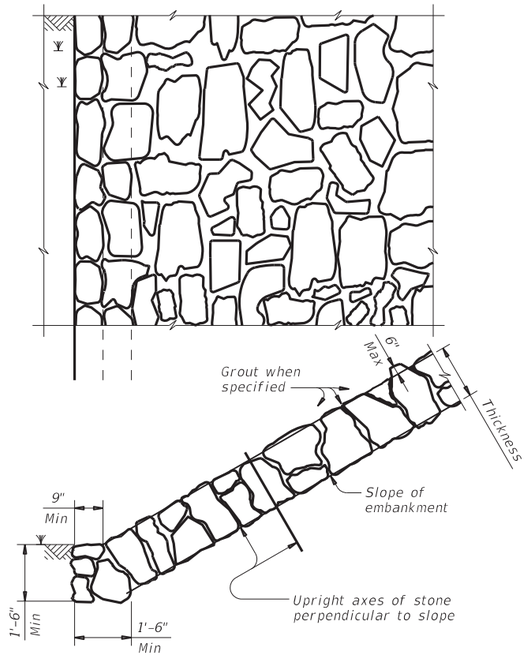


FIGURE 1 ~ TYPE R STONE RIPRAP
dry or grouted

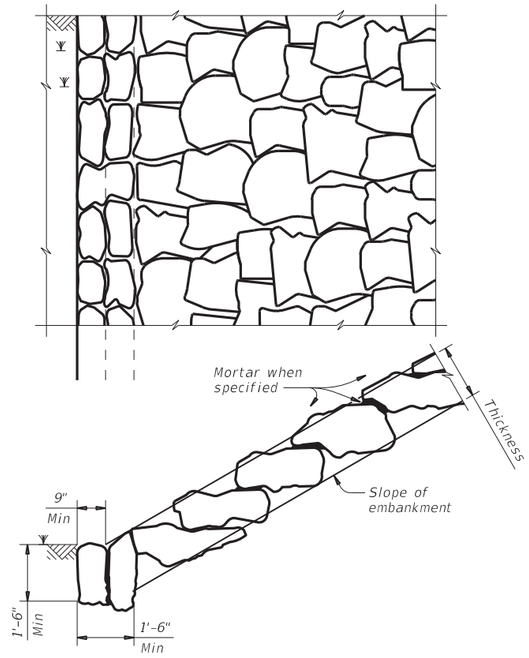


FIGURE 2 ~ TYPE F STONE RIPRAP
dry or mortared

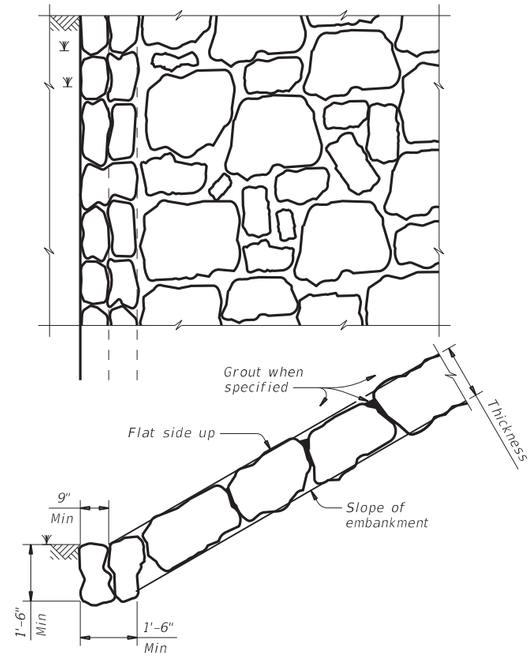


FIGURE 3 ~ TYPE F STONE RIPRAP
grouted

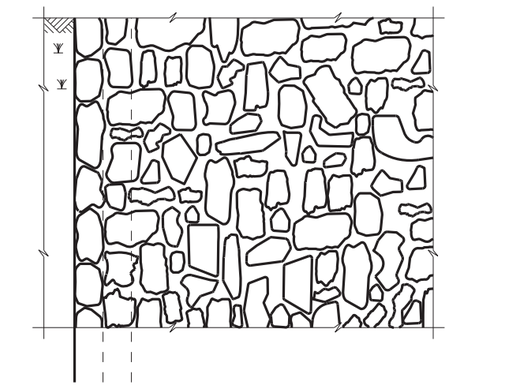


FIGURE 4 ~ COMMON STONE RIPRAP
dry or grouted

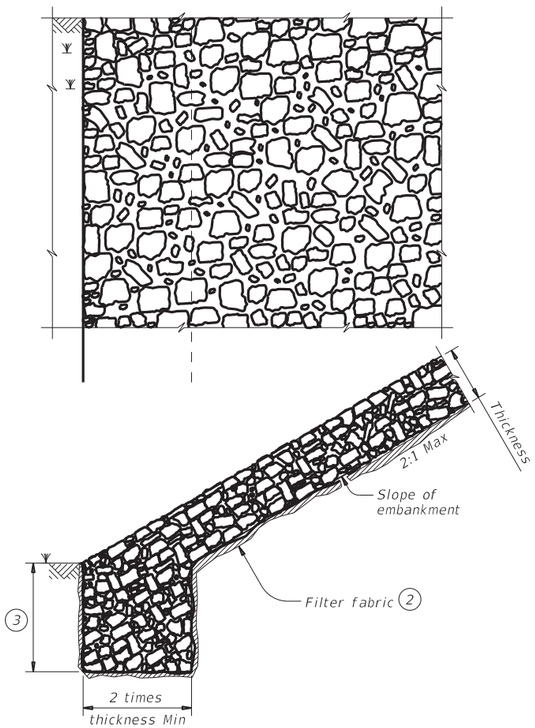


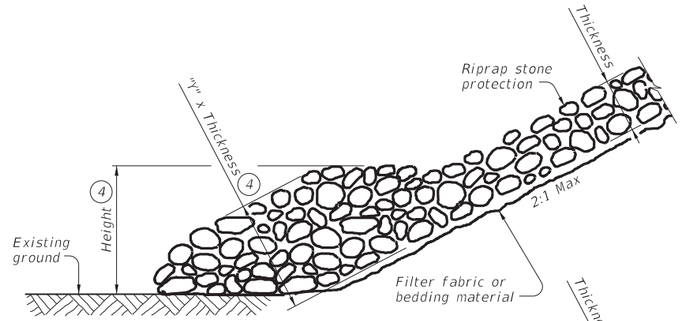
FIGURE 5 ~ PROTECTION STONE RIPRAP (5)

(2) Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

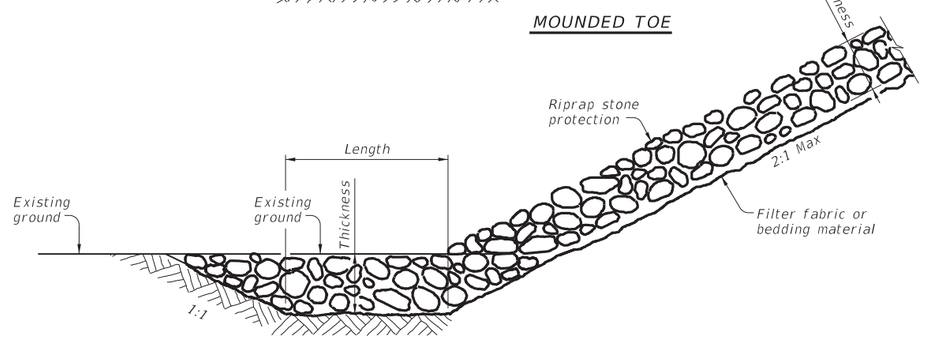
(3) Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

(4) "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

(5) List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS (5)

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS	6438	11	001	SH 22, ETC
	DIST	COUNTY		SHEET NO.
	WACO	HILL, ETC		98

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.

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):
BPM 6438 - 11 - 001

1.2 PROJECT LIMITS:
VARIOUS LOCATION IN THE WACO DISTRICT; SEE PROJECT LAYOUTS FOR MAPS AND LOCATIONS

1.3 PROJECT COORDINATES:
SEE PROJECT LAYOUTS FOR COORDINATE DATA

1.4 TOTAL PROJECT AREA (Acres): 5.671

1.5 TOTAL AREA TO BE DISTURBED (Acres): 0.333

1.6 NATURE OF CONSTRUCTION ACTIVITY:
MAINTENANCE OF EXISTING BRIDGE STRUCTURES

1.7 MAJOR SOIL TYPES:

Soil Type	Description

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.)

☐ Mobilization
☒ Install sediment and erosion controls
☐ Blade existing topsoil into windrows, prep ROW, clear and grub
☐ Remove existing pavement
☐ Grading operations, excavation, and embankment
☐ Excavate and prepare subgrade for proposed pavement widening
☐ Remove existing culverts, safety end treatments (SETs)
☐ Remove existing metal beam guard fence (MBGF), bridge rail
☐ Install proposed pavement per plans
☐ Install culverts, culvert extensions, SETs
☐ 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

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

1.12 ROLES AND RESPONSIBILITIES: TxDOT

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

1.13 ROLES AND RESPONSIBILITIES: CONTRACTOR

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

STATE OF TEXAS
CHARLES W. SMITH
110312
LICENSED PROFESSIONAL ENGINEER

Charles W. Smith, PE 8/30/23

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

July 2023 Sheet 1 of 2
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 643811001		99
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	HILL,ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6438	11	001	SH 22,ETC

DATE: 8/29/2023
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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

- ☐ X 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
- X ☐ 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

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
- ☐ Loaded haul trucks to be covered with tarpaulin
- ☐ Stabilized construction exit
- ☐ Daily street sweeping
- ☐ 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

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 DEWATERING:

2.9 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 .

2.10 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
CHARLES W. SMITH
110312
LICENSED
PROFESSIONAL ENGINEER

Charles W. Smith, PE

8/30/23

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

July 2023 Sheet 2 of 2

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6	BPM 643811001		100
STATE	STATE DIST.	COUNTY	
TEXAS	WACO	HILL, ETC	
CONT.	SECT.	JOB	HIGHWAY NO.
6438	11	001	SH 22, ETC

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I. STORMWATER POLLUTION PREVENTION-CLEAN WATER ACT SECTION 402

TPDES TXR 150000: Stormwater Discharge Permit or Construction General Permit required for projects with 1 or more acres disturbed soil. Projects with any disturbed soil must protect for erosion and sedimentation in accordance with Item 506.

List MS4 Operator(s) that may receive discharges from this project. They may need to be notified prior to construction activities.

1.

2.

☐ No Action Required ☒ Required Action

Action No.

1. Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
2. Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
3. Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
4. When Contractor project specific locations (PSL's) increase disturbed soil area to 5 acres or more, submit NOI to TCEQ and the Engineer.

II. WORK IN OR NEAR STREAMS, WATERBODIES AND WETLANDS CLEAN WATER ACT SECTIONS 401 AND 404

USACE Permit required for filling, dredging, excavating or other work in any water bodies, rivers, creeks, streams, wetlands or wet areas.

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 (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☒ Other Nationwide Permit Required: NWP# NWP 3a

Required Actions: List waters of the US permit applies to, location in project and check Best Management Practices planned to control erosion, sedimentation and post-project TSS.

1. All work locations on this contract are waters of the US and work would be conducted under NWP3a
2.
3.
4.
5.
6.
7.
8.

The elevation of the ordinary high water marks of any areas requiring work to be performed in the waters of the US requiring the use of a nationwide permit can be found on the Bridge Layouts.

Best Management Practices:

Erosion	Sedimentation	Post-Construction TSS
☒ Temporary Vegetation	☒ Silt Fence	☐ Vegetative Filter Strips
☐ Blankets/Matting	☐ Rock Berm	☐ Retention/Irrigation Systems
☐ Mulch	☐ Triangular Filter Dike	☐ Extended Detention Basin
☐ Sodding	☐ Sand Bag Berm	☐ Constructed Wetlands
☐ Interceptor Swale	☐ Straw Bale Dike	☐ Wet Basin
☐ Diversion Dike	☐ Brush Berms	☐ Erosion Control Compost
☐ Erosion Control Compost	☐ Erosion Control Compost	☐ Mulch Filter Berm and Socks
☐ Mulch Filter Berm and Socks	☐ Mulch Filter Berm and Socks	☐ Compost Filter Berm and Socks
☐ Compost Filter Berm and Socks	☐ Compost Filter Berm and Socks	☒ Vegetation Lined Ditches
	☐ Stone Outlet Sediment Traps	☐ Sand Filter Systems
	☐ Sediment Basins	☐ Grassy Swales

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications 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.

☐ No Action Required ☒ Required Action

Action No.

1. SEE STATEMENT ABOVE
2.

IV. VEGETATION RESOURCES

Preserve native vegetation to the extent practical.
Contractor must adhere to Construction Specification Requirements Specs 162, 164, 192, 193, 506, 730, 751, 752 in order to comply with requirements for invasive species, beneficial landscaping, and tree/brush removal commitments.

☐ No Action Required ☒ Required Action

Action No.

1. SEE STATEMENT ABOVE
2. See Item 8 of General Notes in regards to tree trimming and removal
3.
4.

V. BIOLOGICAL RESOURCES

☐ No Action Required ☒ Required Action

Action No.

1. Comply with Migratory Bird Treaty Act (MBTA)
2. At SH 95 at Little River, Bell County; no work in the Little River, stay out of the river. If work has to take place in the River, contact District Environmental (254) 867-2737
3. SEE STATEMENT BELOW
4.
5.

If any of the listed species are observed, cease work in the immediate area, do not disturb species or habitat and contact the Engineer immediately. The work may not remove active nests from bridges and other structures during nesting season of the birds associated with the nests. If caves or sinkholes are discovered, cease work in the immediate area, and contact the Engineer immediately.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

General (applies to all projects):

Comply with the Hazard Communication Act (the Act) 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 Act.

Maintain an adequate supply of on-site spill response materials, as indicated in the MSDS. In the event of a spill, take actions to mitigate the spill as indicated in the MSDS, in accordance with safe work practices, and contact the 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 (not identified as normal)
* Trash piles, drums, canister, barrels, etc.
* Undesirable smells or odors
* Evidence of leaching or seepage of substances

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 is required.
If "Yes", then TxDOT is responsible for completing asbestos assessment/inspection.

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

☐ Yes ☒ No

If "Yes", then TxDOT must retain a 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 demolition.

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

In either case, the Contractor is responsible for providing the date(s) for abatement activities and/or demolition with careful coordination between the Engineer and asbestos consultant in order to minimize construction delays and subsequent claims.

Any other evidence indicating possible hazardous materials or contamination discovered on site. Hazardous Materials or Contamination Issues Specific to this Project:

☐ No Action Required ☒ Required Action

Action No.

1. Lead Based Paint: The removal, containment, and disposal process of hazardous materails would comply with applicable federal,state and local laws.

VII. OTHER ENVIRONMENTAL ISSUES

(includes regional issues such as Edwards Aquifer District, etc.)

☒ No Action Required ☐ Required Action

Action No.

1.
2.
3.

Texas Department of Transportation — Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

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©TxDOT: February 2015	CONT	SECT	JOB		HIGHWAY		
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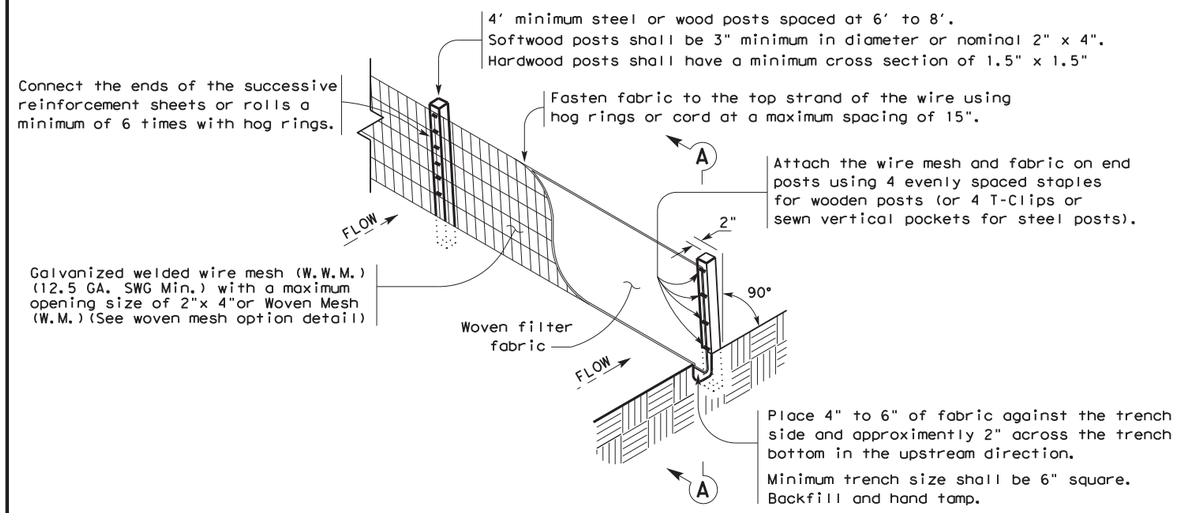
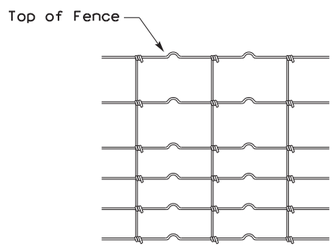
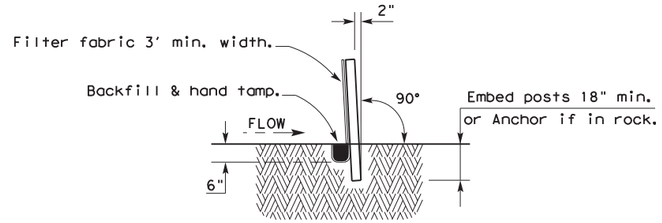
12-12-2011 (DS)	DIST	COUNTY			SHEET No.		
05-07-14 ADDED NOTE SECTION IV.	WACO	HILL, ETC			101		
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.							



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.

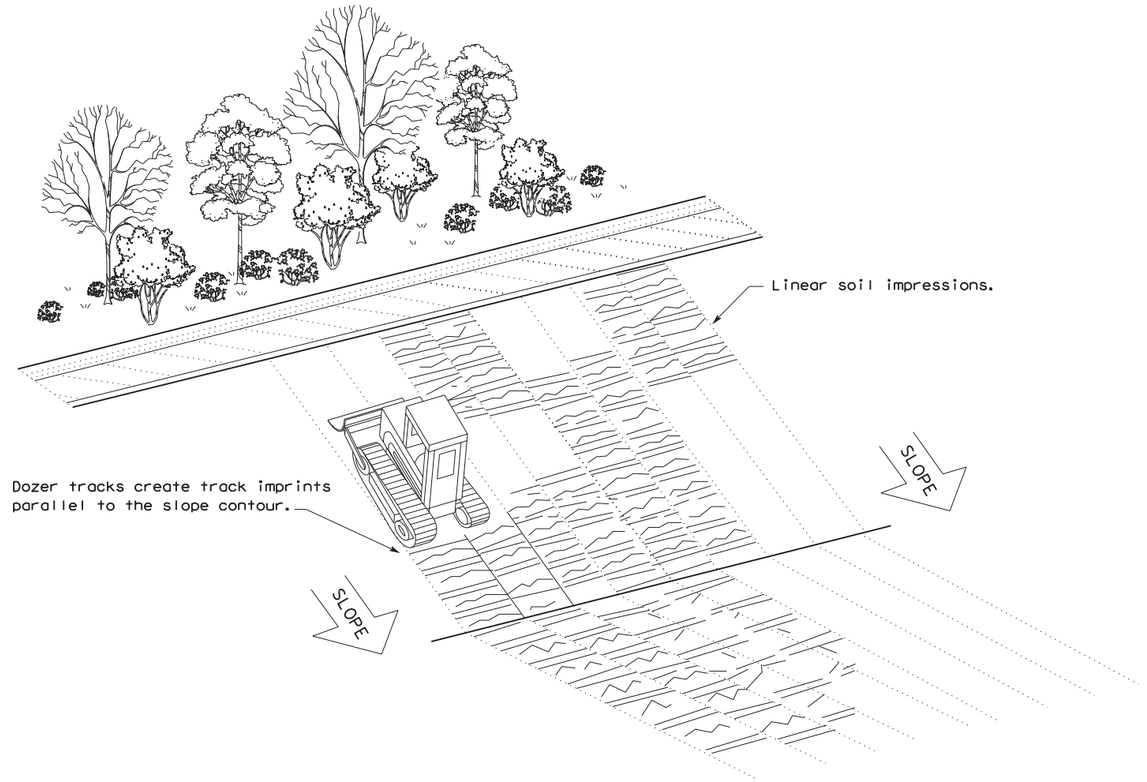
LEGEND

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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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

1. Prior to TxDOT allowing the Contractor to start construction, the Contractor will provide the required storm water and 404 permit documentation and support activities, including but not limited to the following:

   - Provide a list of all chemicals, construction and waste products that will be generated, stored or brought upon TxDOT ROW. The list includes expected construction debris, sanitary wastes, construction chemicals and petroleum products used or generated by the Contractor and sub-contractors. Along with the list, the Contractor will supply a spill prevention plan and clean up procedures that will include each of these chemical products or generated waste.

   - Provide in the construction schedule the necessary line items that will comply with the schedule and planning requirements of the storm water permit.

   - Post the TxDOT storm water permit and any Contractor permits, per permit requirements.

   - Provide copies of storm water permits for Contractor PSL(s). As new PSL(s) may be obtained for the project, provide copies of new or amended permits to TxDOT. The Contractor will not disturb soil without the proper permits.

   - Provide scale drawings of off ROW PSL's within one mile of the project, for field offices, borrow sources, plant sites or other uses.

   - Provide permit information on any Contractor batch plants or concrete crushing plants to be located at a Contractor PSL(s) within one mile of the project limits or boundaries. Copies of the air and water permits are to be provided to TxDOT before materials will be used on the project. No asphalt or concrete batch plants or concrete crushing plants will be located on TxDOT ROW.

   - Provide a letter indicating a Contractor Responsible Person for environmental compliance (CRP) for the project, and maintain a CRP throughout the project duration.

   - Provide all environmental documentation including certification of compliance and EMS training documents/certificates prior to starting work. The Contractor is to provide daily BMP inspection reports that document all field BMPs needing repair or replacement. The Contractor is to clearly document specific BMPs needing repair and location each work day. The Contractor is encouraged to be proactive in fixing BMPs without TxDOT direction.

   - Provide documentation required for Waters of the US, Note #3 and submittals for Item 496 bridge removal. Bridge removal methods submitted will follow all Waters of the US note requirements. The Contractor is not to start construction within the Ordinary High Water Marks of any stream until receiving approval for stream channel construction methods from TxDOT.

   - Provide a written procedure for managing all chemicals and construction items placed in vertical containment structures. Also, provide methods to be used for the treatment, disposal, collection or release of storm water.

   - Provide an estimated date by letter, for the submittal of marked up bridge drawings, indicating cut locations for any structural steel requiring cutting or torching of steel, coated with lead containing paints.

2. Place and maintain trash cans and portable sanitary facilities at locations where there is active construction. Worker generated trash and construction debris will be kept from being transported by storm water and will be collected daily from the ground and routinely hauled from the work area.

3. Contractor will provide TxDOT copies of all correspondence with MS4s, TCEQ, EPA, DSHS and Corps of Engineers regarding activities on this project.

4. Contractor to conduct storm water inspections and develop SWPPP documents to support Contractor permits obtained for the project including PSL(s).

5. Contractor will maintain written documentation of locations of all portable sanitary facilities. The Contractor is required to document the location and disposition of all spills and cleanups from portable sanitary facilities.

6. Contractor will not store chemicals on TxDOT ROW, unless chemicals are stored following all environmental and safety regulations. Fuels for construction equipment will not be stored on TxDOT ROW.

7. The Contractor will store fuels and bulk chemicals on Contractor PSL(s) using a secondary containment method, such as double lined tanks and/or free standing containment reservoirs made of plastic or steel designed to hold bulk chemicals or drums.

8. The Contractor will not remove sediment controls without the prior approval of TxDOT, except for a sediment control that may back up water and cause safety or traffic problems.

SCALE = NTS SHEET 1 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

9. Any sediment controls removed by the Contractor must be re-installed before the next rainfall event or by the end of day, as approved in advance.

10. Vegetative buffer strips may be used in place of temporary sediment controls such as silt fences and rock filter dams. The amount of disturbed soil area will be limited to 1/3 of an acre or less for a minimum of 50 feet of grassed ditch and 2/3 of an acre of disturbed soil for a minimum of 100 feet of grassed ditch.

11. Construction equipment found to be leaking oil, fuel or coolant will be immediately stopped, the leaking fluid collected and the equipment fixed. Equipment continuing to leak will be removed from the project at no cost to TxDOT. Leaking fluids from equipment will be collected and removed from the project or PSL.

12. Earth berms or mounds typically used to stockpile topsoil and used in place of boundary silt fence will be seeded upon being constructed. Long term use of earth berms or mounds will not be continued without establishing grass on the control.

13. The Contractor will inform TxDOT of new areas where soil will be disturbed to facilitate planning for new sediment controls. Areas of vegetated soil will not be disturbed by the Contractor, unless adequate sediment controls can be installed before the next rainfall event. The Contractor will assist TxDOT in keeping an accurate set of working SWPPP drawings that show the locations of all temporary sediment and erosion controls.

14. The Contractor will maintain an adequate amount of temporary sediment controls on hand at the field office or project staging area for critical SWPPP maintenance, including silt fence (minimum of 200 feet) and rock / fabric for rock filter dams (minimum for 100 feet of Type III dams).

    The requirement for BMP rock quantities on hand is waived for small projects for on and off system bridge installations. The Contractor having a BMP Subcontractor does not eliminate the requirement for the Contractor to have the required silt fence and rock on hand, typically stored at the Contractor PSL.

15. Failure of a sub-contractor to complete storm water work on time will require the Contractor to start storm water sediment control work immediately and complete the work with high priority, or be subject to stop work on the entire project.

16. Earth materials on roads as a result of soil tracking will not be allowed to be transported off ROW in storm water. Soil or rock material found on roadways deposited from Contractor equipment will be removed daily.

17. Unless approved, completed concrete curb inlets will not be blocked by sediment controls. The contractor will frequently sweep the completed or partially completed roadway to keep sediment out of drainage pipes.

18. The Contractor will be responsible for proper dust control and will route construction traffic in a manner that minimizes dust generation.

19. Water for dust control will contain no pollutants, but may be non-potable from upland stock ponds. No quantity of water to be used for construction purposes may be taken from a 404 stream, prior to the proper authorizations or permits being obtained by the Contractor.

20. Contractor is to direct workers and sub-contractors to use portable sanitary facilities provided by the Contractor and not to trespass off ROW.

21. Contractor will provide written verification to TxDOT that earth borrow pits and disposal sources meet environmental and regulatory requirements, prior to use. Excavations will meet all OSHA requirements and the current safety guidelines established for TxDOT Quarries and Pits.

22. Boundary silt fences that are terminated down slope, with one end being at the lowest elevation, will be installed with an L - hook to contain sediment. Boundary silt fences that are installed on flat ground will have L-hooks on both ends.

23. Rock filter dams across ditches will be constructed where the rock filter dam ends are embedded within the ditch side slopes and ditch bottom. The top center elevation of the rock filter dam will be at least 6 inches lower than the elevations on the rock filter dam ends.

24. Silt fence will be constructed in a U or V pattern across ditch lines and up the ditch side slope to keep storm water from flowing around the ends of the silt fence. Small silt fences that do not adequately span the ditch and allows storm water around the end(s) will not be used. Where there is adequate space, large U pattern silt fences are preferred to facilitate sediment collection and sediment removal with equipment.

25. Sediment controls (RFDs or silt fences) will be located along road ditches as marked on the SWPPP drawings. Modifications to the sediment control spacing will be adjusted during the project based on sediment control effectiveness. The installation and maintenance of sediment controls at or near outfalls, where storm water leaves TxDOT ROW, takes persistent over ditch line sediment controls.

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

26. Storm water draining sheet flow over disturbed soil sloped towards the ROW property line, will be intercepted by a boundary silt fence typically installed with L-shaped ends.

27. For ditch grading and shoulder up work, the Contractor is limited during good weather to remove up to one mile (limited to five acres of disturbed soil) of ditch line sediment controls; on one side of the roadway. Outfall controls cannot be removed during this activity. Ditch line controls must be replaced upon completion of work and before the next rain event.

28. Sediment controls damaged by the Contractor, as defined by permit, must be fixed or replaced immediately upon discovery.

29. Notches in silt fences are not typically allowed. Specific silt fences that back up water onto lanes of traffic may be notched if approved.

30. For silt fence maintenance, the Contractor will leave approximately 4 inches of deposited sediment up stream of silt fences and not over excavate around silt fences or rock filter dams.

31. The Contractor will inform TxDOT of new construction areas and where soil is planned to be disturbed. Sediment controls will be installed at outfalls prior to the Contractor beginning soil disturbing activities up slope from the outfall.

32. Water from concrete saw cutting, concrete grinding and concrete coring activities; or fine materials from concrete chipping and salvage will not be allowed to enter storm drains or enter streams.

33. Storm water containing suspended sediment and turbidity needing to be removed from excavations or low areas will be pumped or gravity drained through vegetated buffer strips (50 foot minimum) or placed in ditches with temporary sediment controls, prior to the water being discharged into a stream.

34. Uncontaminated water from natural groundwater seepage, springs, foundations and drains that does not contain suspended sediment or any pollutants may be discharged without storm water controls.

35. Lime or cement if spilled in ditches or outside the defined limits of application is considered a pollutant and will be excavated and removed the same day, to avoid contaminating streams.

36. If located along the project ROW, RAP stockpiles will be located where there is a minimum 100 feet of vegetative buffer strip before storm water will reach a stream. RAP will not be used as a construction material within the Ordinary High Water Marks of a stream channel of a 404 designated stream.

37. If allowed on the project, concrete truck wash out areas will have adequate volume to allow 12 inch freeboard for rain and will be lined with 6 mils of plastic. No concrete will be stored higher than the 12 inch freeboard. Cleaning of truck chutes and equipment does not constitute concrete truck wash out and this activity may be completed at the concrete placement location. Wash out areas will not be located closer than 50 ft from down slope inlets or stream channels.

38. For outfalls near stock ponds closer than 50 foot from disturbed soil at the ROW line, redundant sediment controls will be provided, typically a combination of rock filter dam and a silt fence constructed in line of the flow.

39. Earth stockpiles will utilize silt fence sediment controls, positioned on the low end of the stockpile drainage area with L-hooks or silt fence installed around the entire stockpile.

40. Sediment controls including rock filter dams and silt fences will not be installed across any 404 streams. Sediment controls at 404 streams will be positioned to limit sediment entering the stream from the banks and around structures/culverts, and will allow free flow of storm water to pass through the ROW without being dammed by any sediment controls. Remove loose materials from stream channels prior to each rain event.

41. Sediment controls for non-404 streams may be constructed across the drainage channel in unlimited locations. It is appropriate to use sediment control details typically used for 404 streams for non-404 streams when flow velocities are high. Remove loose material from stream channels prior to each rain event.

42. Incomplete drainage pipe installation across the roadway does not remove the requirement for having sediment controls around the ends of the pipe. To stay within permit requirements, sediment controls should be installed over and around the terminated end and along each side of the banks as soon as construction on the pipe has been completed. Remove loose material from stream channels prior to each rain event.

43. Safety end / headwall construction temporarily will require the removal of part of the sediment control placed over and around the pipe end. Retain in place as much functioning sediment control as possible. Replace the silt fence over and around the top of the pipe, immediately upon concrete placement and form removal. Do not remove culvert sediment controls that cannot be replaced before the next rain event. Sediment control at the ends of culverts must be in place and available for any rain event until the disturbed soil areas are re-vegetated.

SCALE = NTS SHEET 3 OF 10

Texas Department of Transportation
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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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BEST MANAGEMENT PRACTICE (BMP) GENERAL NOTES

44. Between the Ordinary High Water Marks of a 404 stream channel, the Contractor will disturb only the minimum amount of stream channel that is necessary to complete the work.

45. Rock riprap for erosion control does not replace the requirements to maintain sediment control until vegetation is re-established. Replace sediment controls immediately after installing erosion rock.

46. At the direction of TxDOT, sediment deposited into existing and new culverts will be removed subsidiary to Item 506. Sediment to be removed is either pre-existing material before construction starts or sediment generated as a part of this project.

47. Provide treated 2X4 cross bracing for rectangular inlet silt fence, subsidiary to Item 506.

48. Loose or granular earth materials will not be used to repair silt fence undercuts. Silt fence undercut repairs will be conducted with well compacted soils or the silt fence will be reset in a nearby location.

49. Silt fence steel T posts of approximately 1.25 pounds per foot are allowed at a spacing of 8 feet or less. Silt fence steel T posts between approximately 1.25 pounds per foot and 0.85 pounds per foot are allowed for T post spacing of 5 feet or less.

50. Silt fence to be used to slow the flow of storm water down slopes will be positioned approximately horizontal (on the contour) with L hooks on the ends and limited to approximately 200 feet in length. Multiple sections and levels of silt fence may be required in addition to temporary / permanent erosion control flumes.

51. Soil retention blankets will be installed rolled down the slope with the small dimension side embedded at the top of slope, unless recommended otherwise by the manufacturer. Excess grass, rocks, trash, debris or clods will be removed before seeding and installing soil retention blankets. All installations will be by the manufacturer recommendations. Contractor equipment, including tractor mowers will be kept off areas with soil retention blankets until the grass is established.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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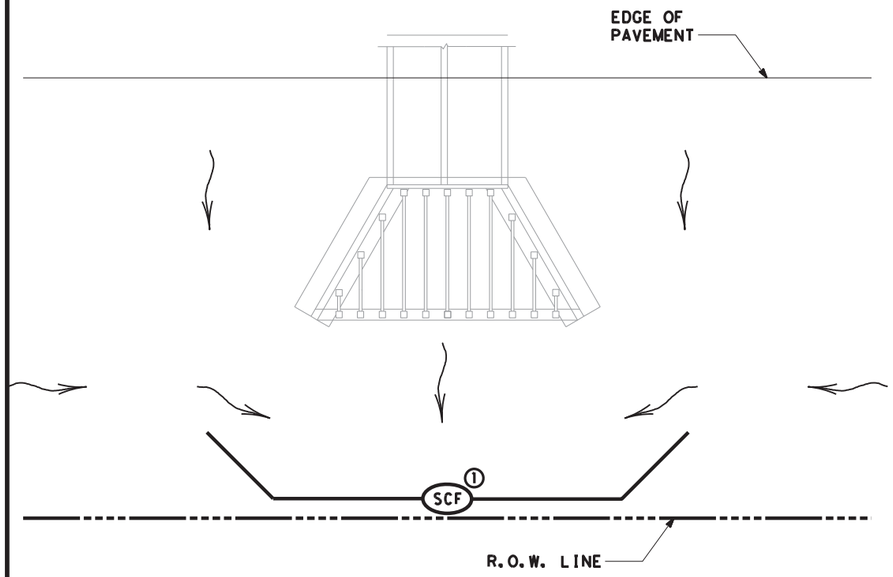
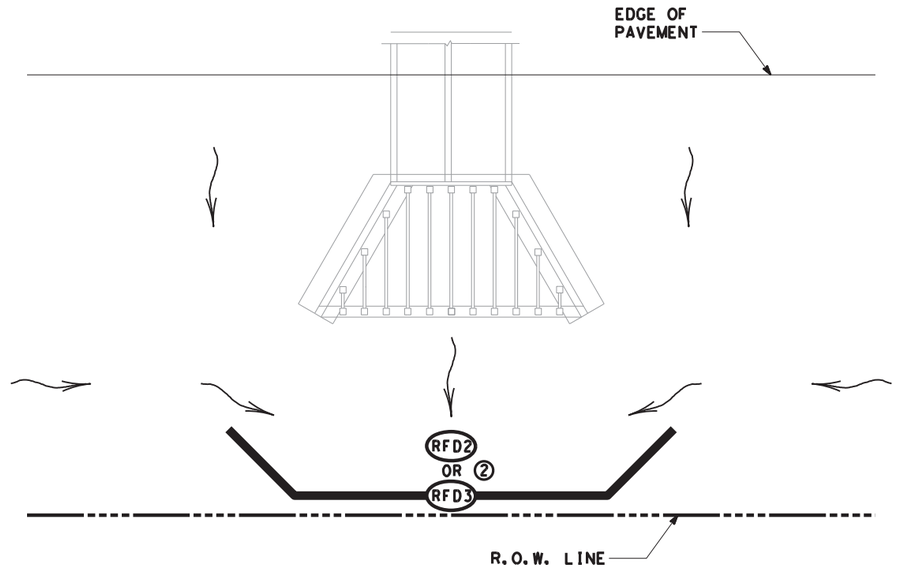


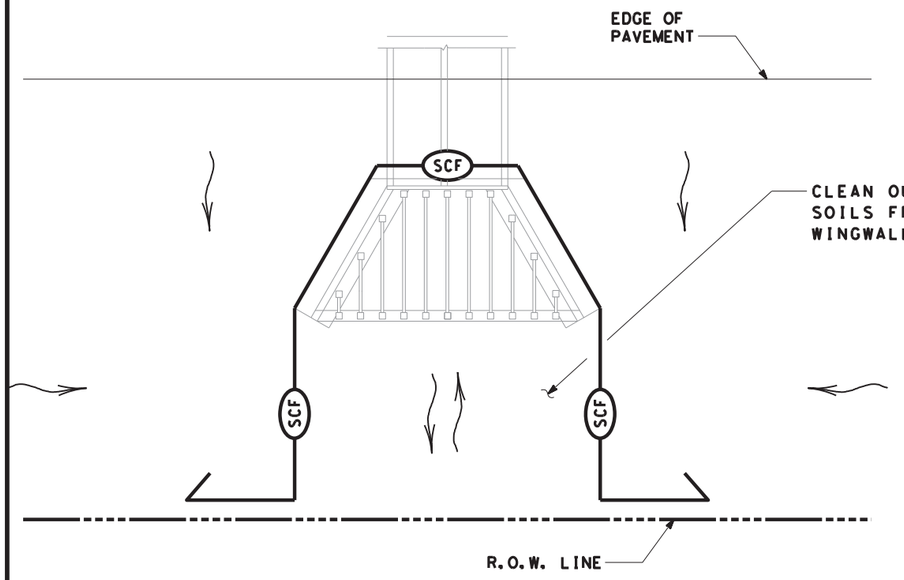
BEST MANAGEMENT PRACTICE (BMP) #1

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



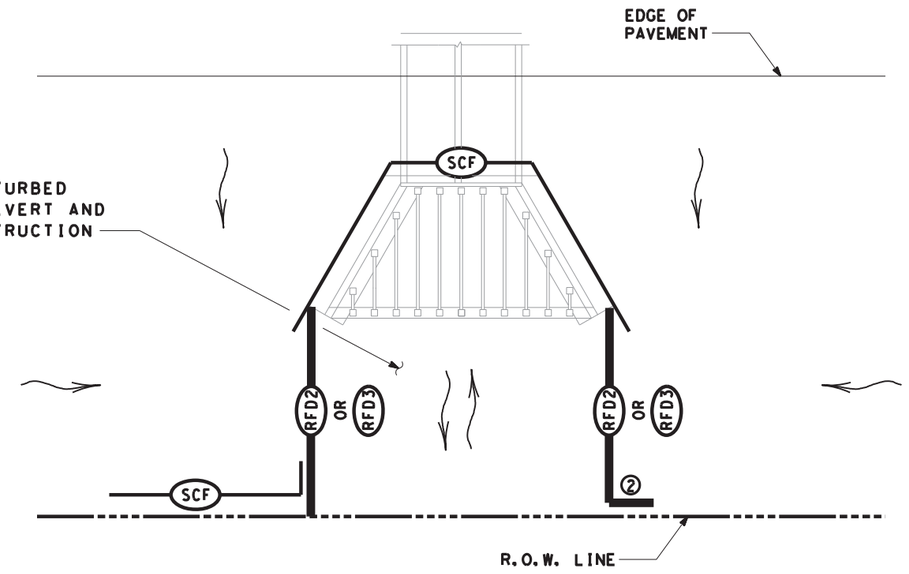
BEST MANAGEMENT PRACTICE (BMP) #2

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #3

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #4

FOR 404 OR NON-404 STREAMS ~ SEDIMENT CONTROL AT EXIT OR ENTRANCE OF CULVERT

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

1. EXTEND SILT FENCE SO STORM WATER DOES NOT GO AROUND THE ENDS. USE L-HOOKS ON ENDS AS REQUIRED.
2. EXTEND ROCK FILTER DAM SO STORM WATER DOES NOT GO AROUND THE ENDS.

SCALE = NTS SHEET 5 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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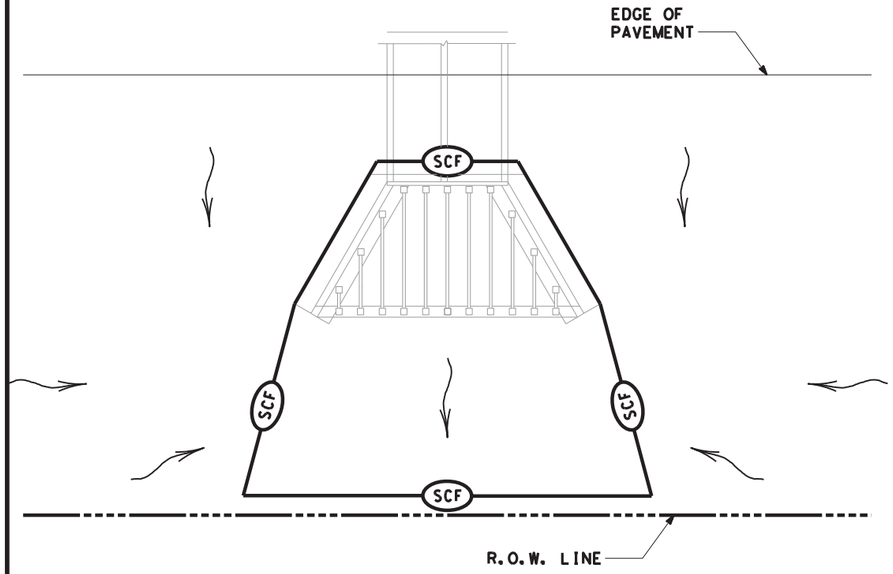
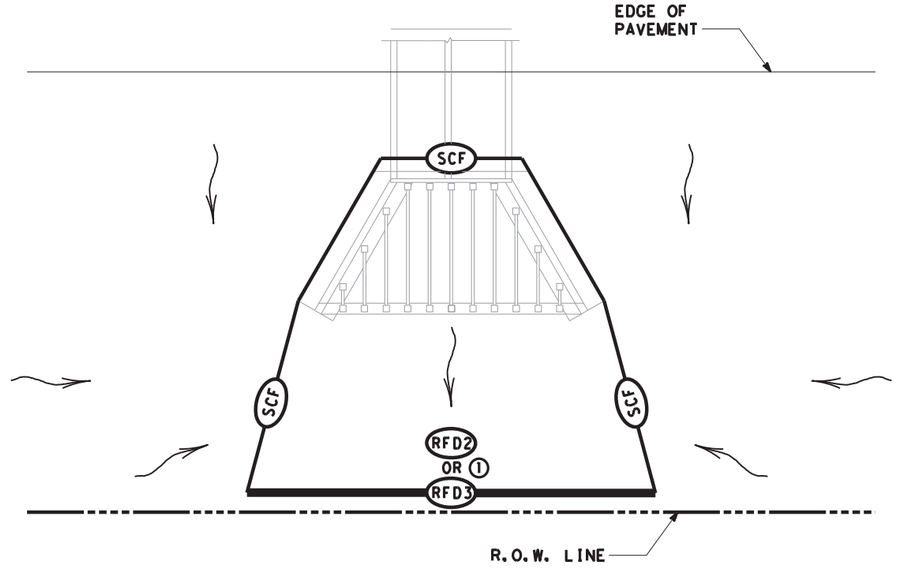


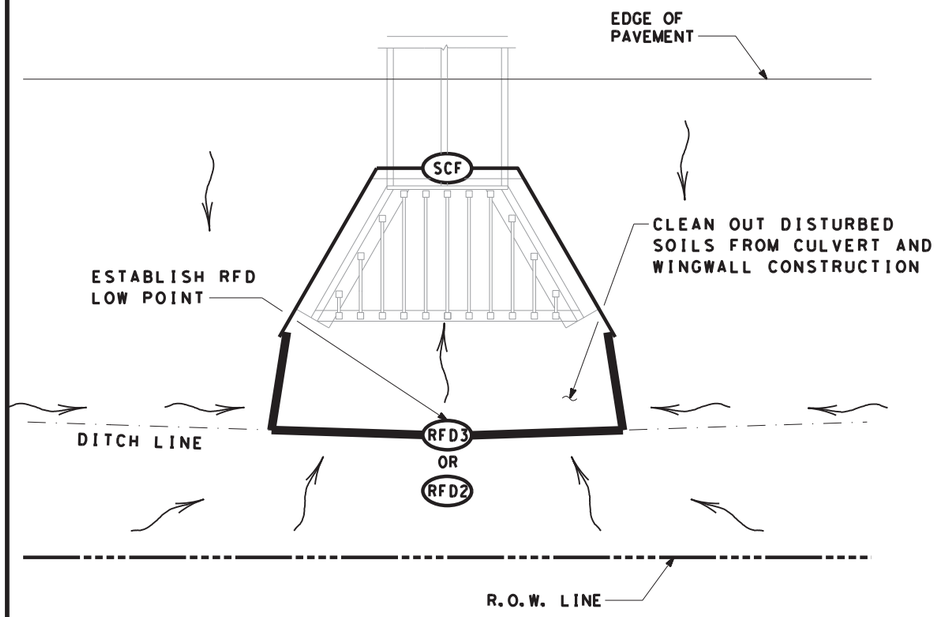
BEST MANAGEMENT PRACTICE (BMP) #5

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



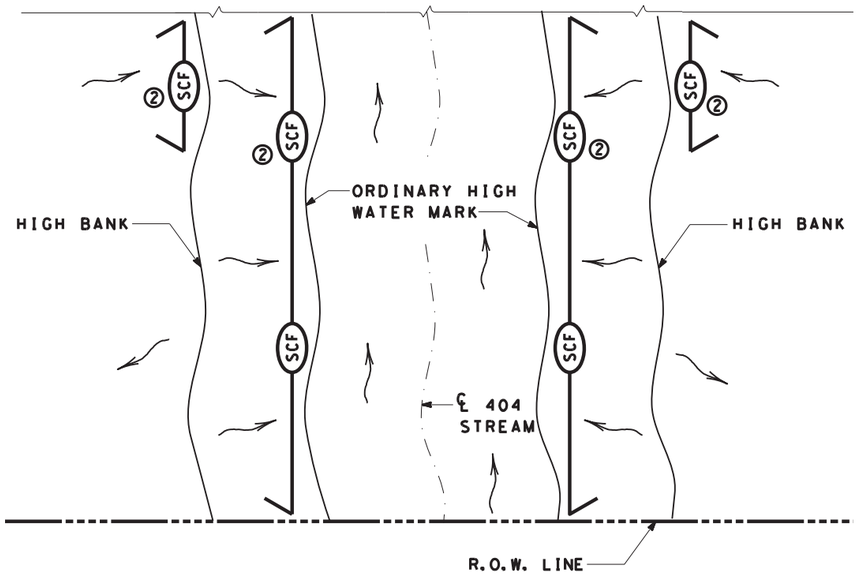
BEST MANAGEMENT PRACTICE (BMP) #6

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT EXIT OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #7

FOR NON-404 STREAMS ONLY ~ SEDIMENT CONTROL AT ENTRANCE OF CULVERT



BEST MANAGEMENT PRACTICE (BMP) #8

FOR 404 STREAMS ~ SEDIMENT CONTROL DURING PROJECT CLEARING AND GRUBBING

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

NOTES:

① PROVIDE OVERLAP OF SILT FENCE WITH ROCK FILTER DAM.

② USE SILT FENCE L-HOOKS ON ENDS TO BLOCK STORM WATER SEDIMENT

SCALE = NTS SHEET 6 OF 10

Texas Department of Transportation
Waco District Standard

TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

TA-BMP

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	DIST	COUNTY		SHEET NO.
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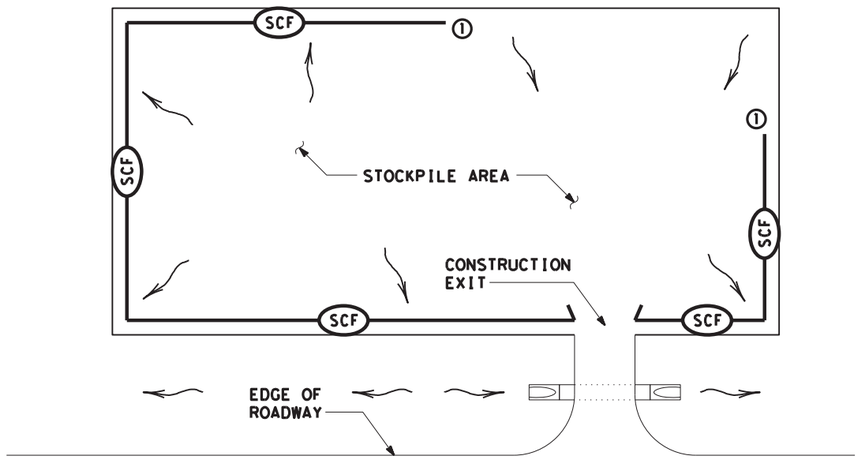
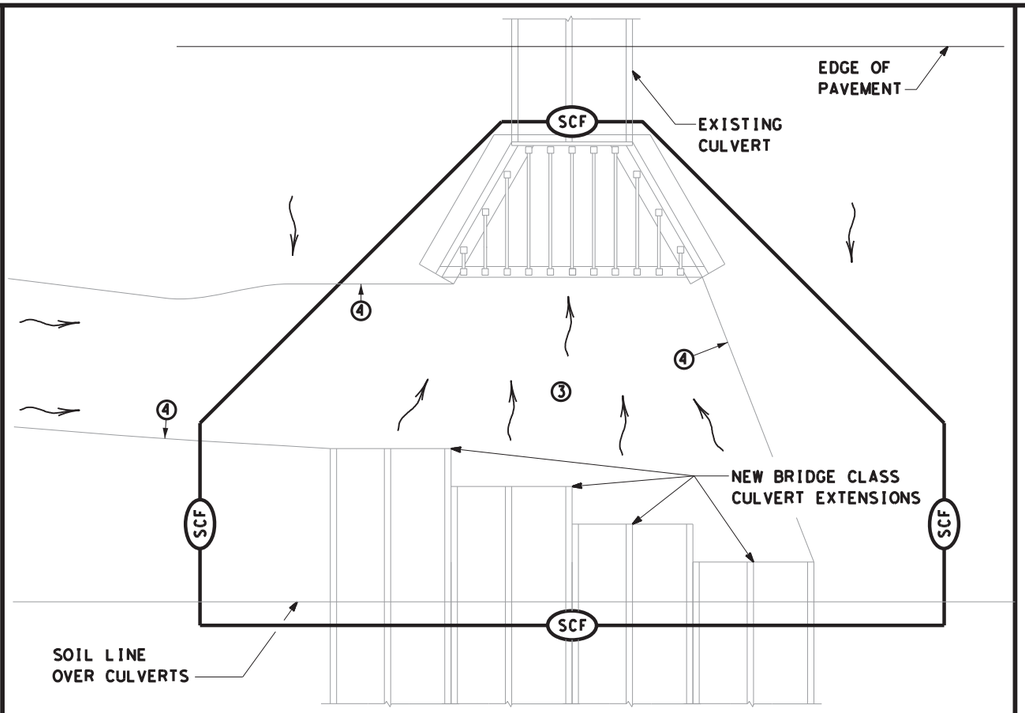


BEST MANAGEMENT PRACTICE (BMP) #9

STOCKPILE SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #10

FOR 404 OR NON-404 STREAMS ONLY ~
SEDIMENT CONTROL AT PHASED CONSTRUCTION OF BRIDGE CLASS CULVERTS

SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)
	DIRECTION OF FLOW

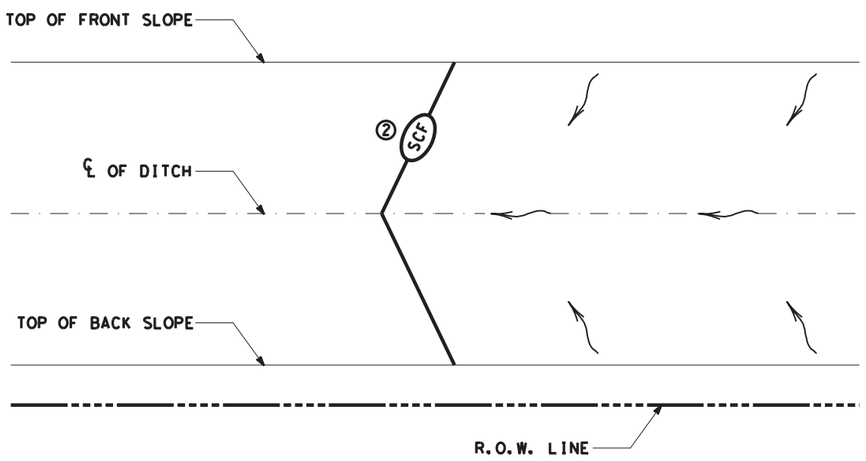
NOTES:

① START SEDIMENT CONTROL AT LOCATION SO ALL STORM WATER WITH SEDIMENT IS COLLECTED

② ROCK FILTER DAMS OR EARTH/GRASSED EMBANKMENTS CAN BE SUBSTITUTED AS DIRECTED.

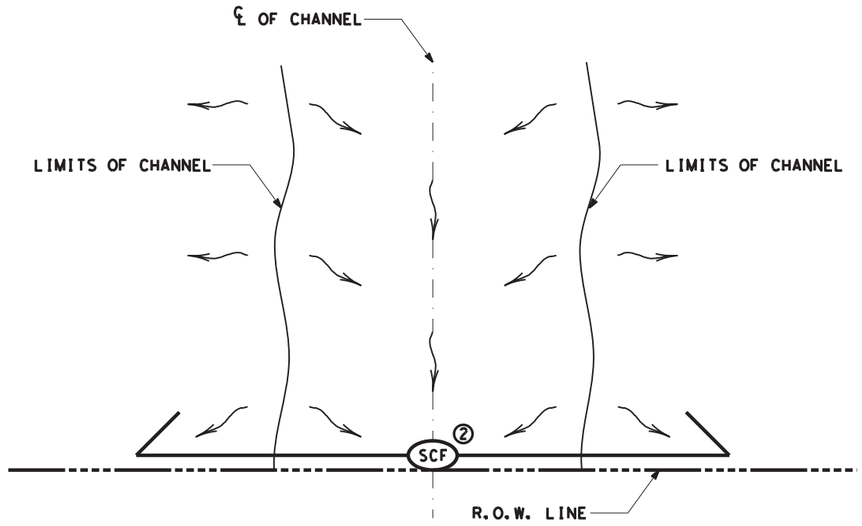
③ PROVIDE A SMOOTH TRANSITION FROM THE INVERT ELEVATIONS BETWEEN CULVERTS. REMOVE LOOSE SOIL FROM EXCAVATED AREA BETWEEN CULVERTS.

④ PROVIDE AND INSTALL PNEUMATICALLY PLACED CONCRETE ON THE DITCH BOTTOM AND SIDE SLOPES BETWEEN TEMPORARY TERMINATIONS BETWEEN OLD AND NEW CULVERTS. PNEUMATICALLY PLACED CONCRETE WILL BE PLACED TO THE HEIGHT OF THE LARGEST CULVERT ON THE DITCH SIDE SLOPES; AND TO A LIMIT 10 FEET OUTSIDE THE LOCATION OF BMPS ALONG THE DITCH BOTTOM. CEMENT STABILIZED SAND MAY BE SUBSTITUTED FOR PNEUMATICALLY PLACED CONCRETE, IN AREAS WHERE INSTALLATION WORKS AND AT THE OPTION OF TxDOT.



BEST MANAGEMENT PRACTICE (BMP) #11

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED UP SLOPE



BEST MANAGEMENT PRACTICE (BMP) #12

BOUNDRY SEDIMENT CONTROL ~ BOTH ENDS OF CONTROL TERMINATED DOWN SLOPE

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Texas Department of Transportation
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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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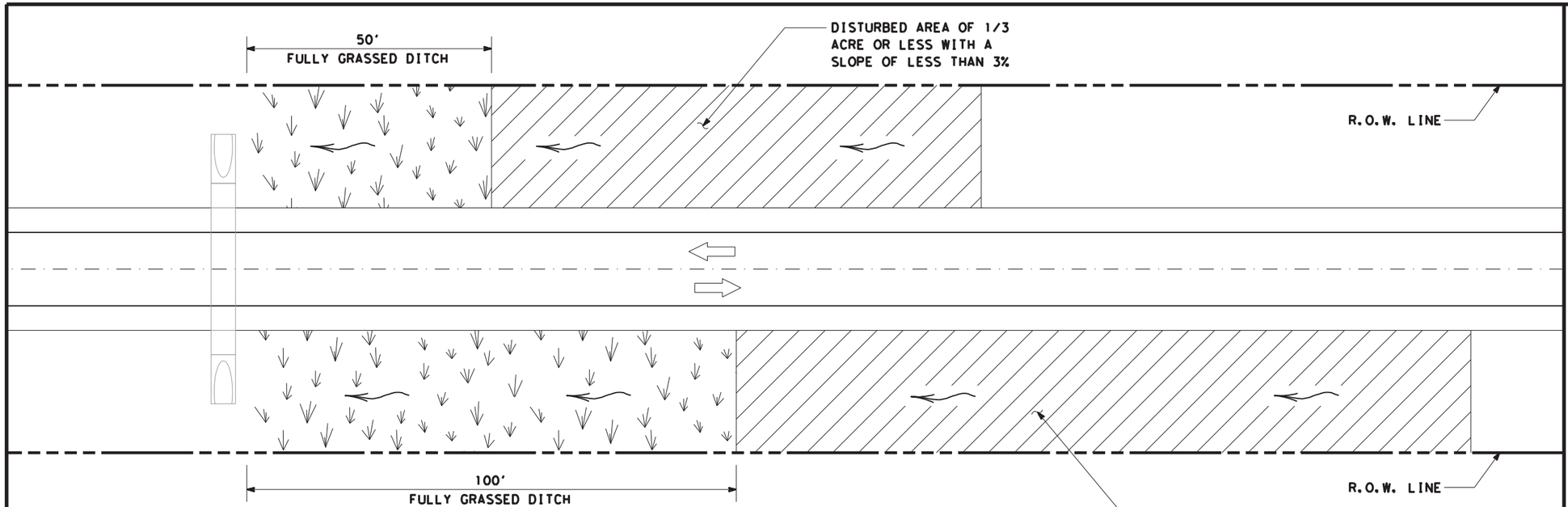
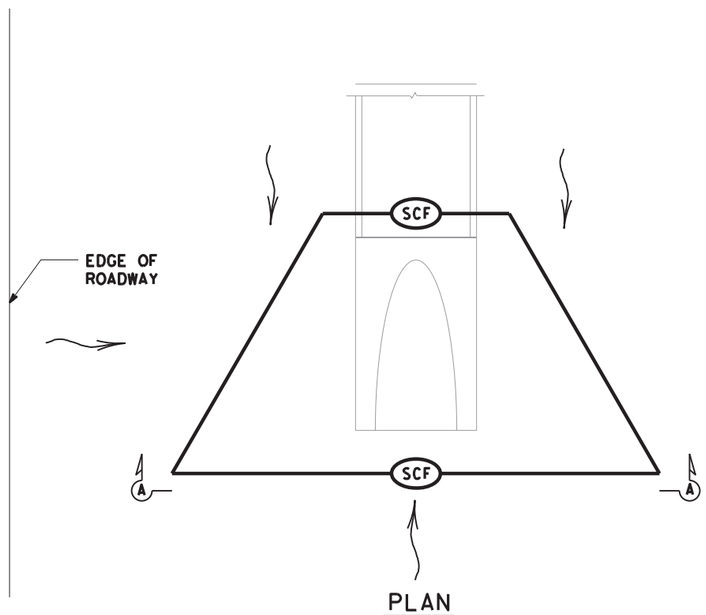
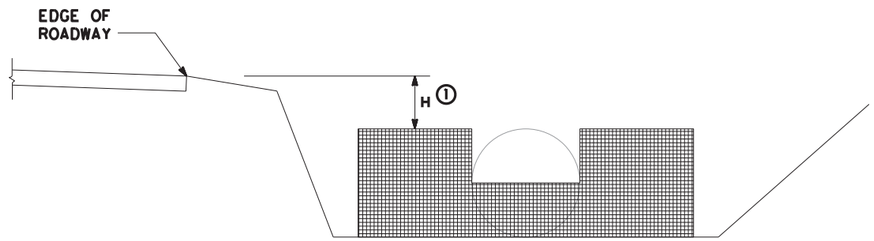


BEST MANAGEMENT PRACTICE (BMP) #13

USE OF VEGETATIVE BUFFERS IN PLACE OF TEMPORARY SEDIMENT CONTROLS SUCH AS SILT FENCE AND ROCK FILTER DAMS



PLAN



VIEW A-A

BEST MANAGEMENT PRACTICE (BMP) #14

NON-404 STREAMS AND DITCHES ONLY ~ SEDIMENT CONTROL AT PARALLEL DRAINAGE STRUCTURE ENTRANCE ②

	FULLY GRASSED DITCH
	DISTURBED AREA
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE

① FOR H DIMENSIONS LESS THAN 1.5' SILT FENCE MAY NEED TO BE NOTCHED AS SHOWN IN VIEW A-A. ADD EXTRA POSTS AT NOTCH.

② BMP #14 MAY BE USED AT CROSS DRAINAGE STRUCTURES AS DIRECTED.

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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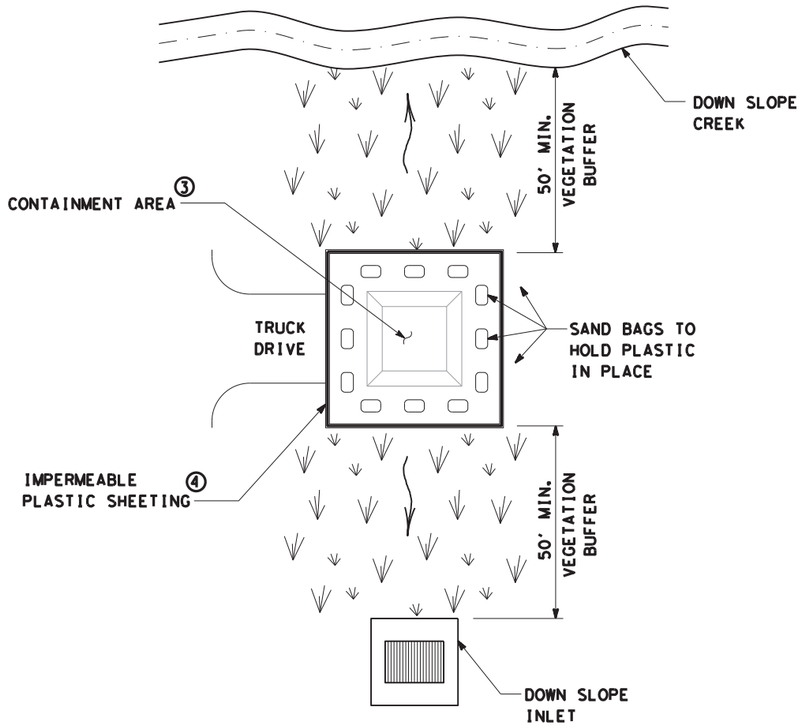
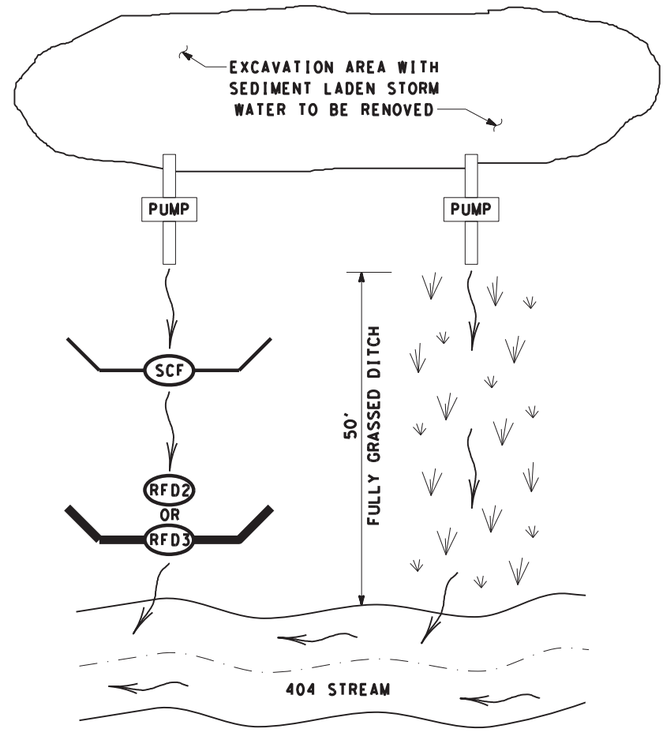


BEST MANAGEMENT PRACTICE (BMP) #15

CONCRETE TRUCK WASHOUT AREA



BEST MANAGEMENT PRACTICE (BMP) #16

PUMPED STORM WATER SEDIMENT CONTROLS ①

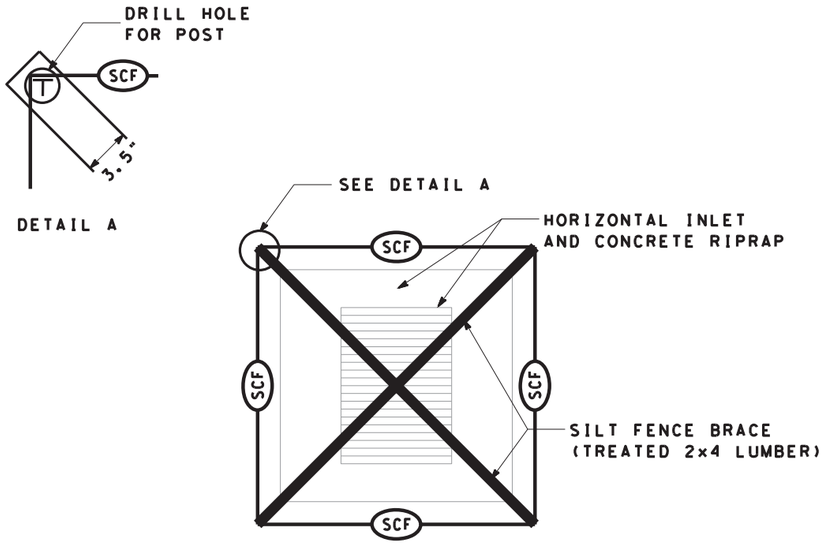
	FULLY GRASSED DITCH
	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD2	ROCK FILTER DAM (TY 2)
RFD3	ROCK FILTER DAM (TY 3)

① PUMPED STROM WATER FROM AN EXCAVATION AREA SHOULD BE DISCHARGED IN A 50' VEGETATIVE BARRIER OR THROUGH TWO TEMPORARY SEDIMENT CONTROLS BEFORE ENTERING A 404 STREAM.

② FOR LANDOWNER STOCKPONDS WITHIN 50' OF THE RIGHT OF WAY LINE, PROVIDE REDUNDANT SEDIMENT CONTROLS AT THE CONVEYANCE OF THE POND. MINIMUM OF TWO SEDIMENT CONTROLS.

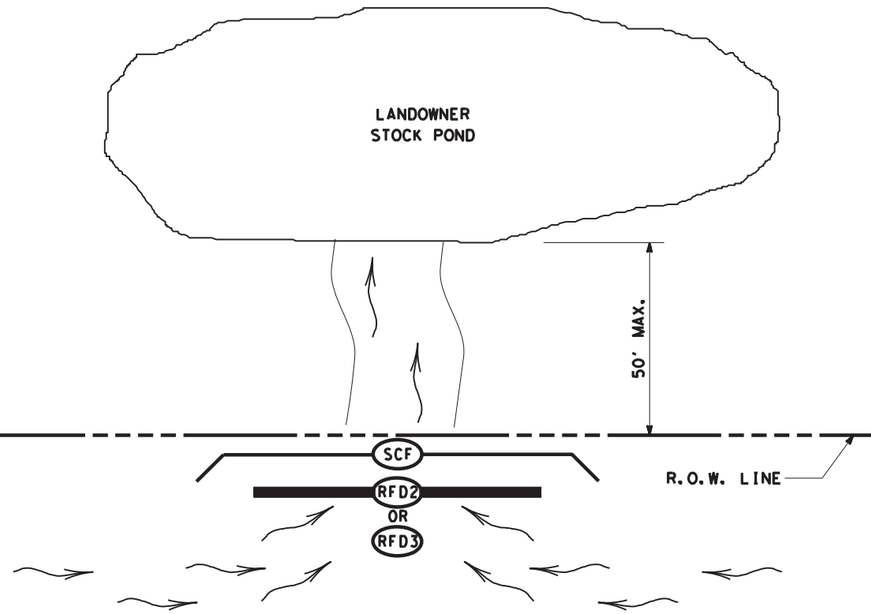
③ WHEN CONTAINMENT AREA REACHES 1' FREEBOARD, DISCONTINUE WASHOUT PLACEMENT AND REMOVE MATERIAL UPON SOLIDIFICATION.

④ EACH TIME SOLIDIFIED MATERIAL IS REMOVED REPLACE PLASTIC SHEETING.



BEST MANAGEMENT PRACTICE (BMP) #17

HORIZONTAL INLET SEDIMENT CONTROL



BEST MANAGEMENT PRACTICE (BMP) #18

LANDOWNER STOCKPOND SEDIMENT CONTROL ②

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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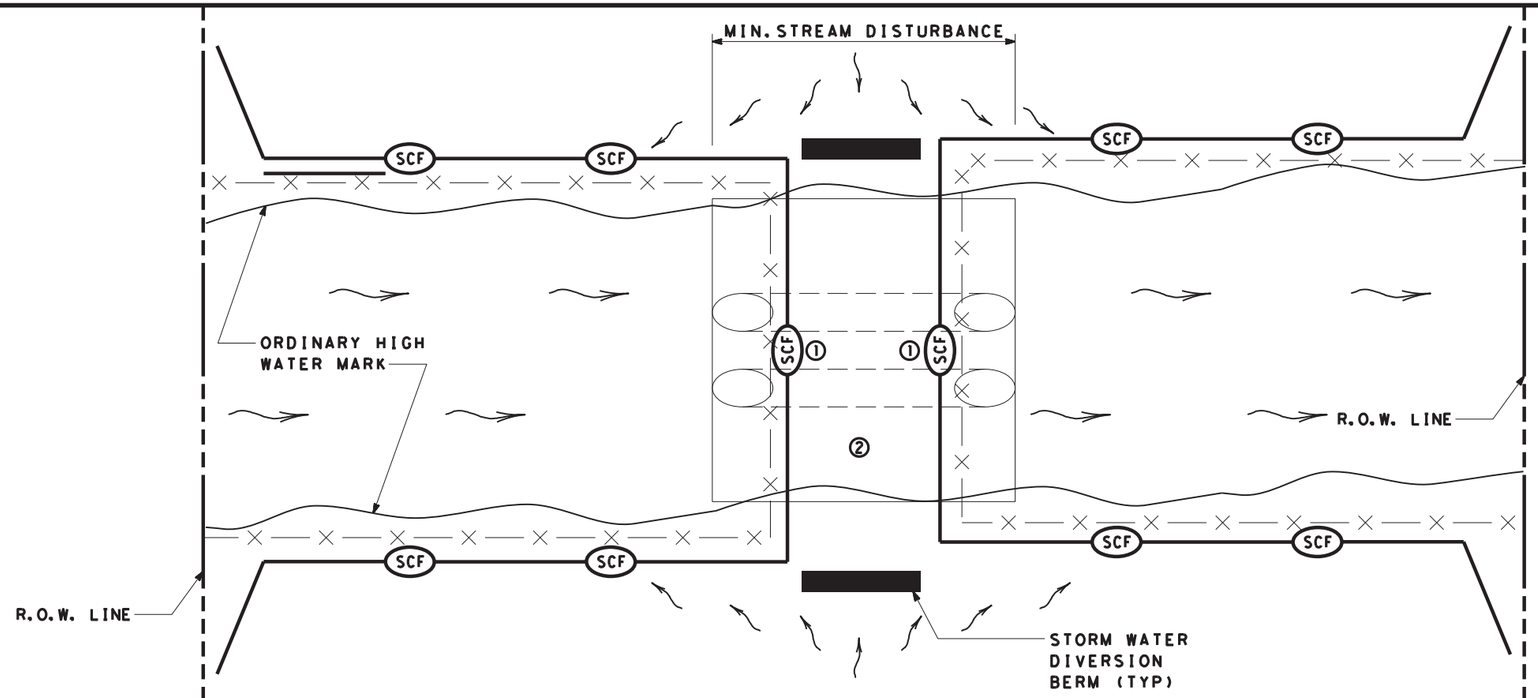


BEST MANAGEMENT PRACTICE (BMP) #19

TYPICAL 404 STREAM CROSSING (SEDIMENT CONTROL AT CROSSING)

	DIRECTION OF FLOW
SCF	SEDIMENT CONTROL FENCE
RFD	ROCK FILTER DAM
× — ×	SECURITY FENCING

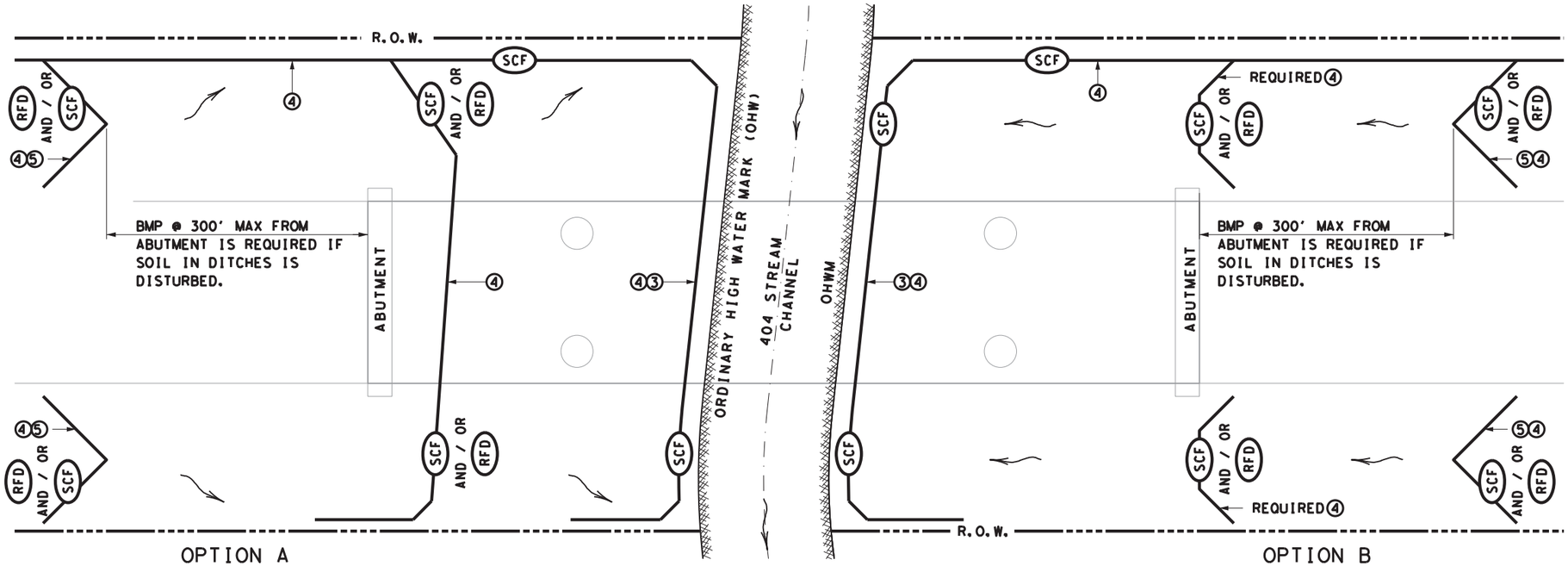
① HAY BALES MAY BE SUBSTITUTED FOR SILT FENCE OVER THE STREAM CROSSING.

② CROSSING WILL BE AS PER REQUIREMENTS OF THE WATERS OF THE US GENERAL NOTES.

③ INSTALL SILT FENCE SLIGHTLY UP FROM OHW MARK FROM R.O.W. TO R.O.W.

④ USE SILT FENCE L-HOOKS ON LEVEL OR DOWN SLOPING ENDS TO BLOCK STORM WATER SEDIMENT

⑤ INSTALL LARGE V OR U SHAPED BMP'S FROM ABUTMENT AS SHOWN. IF THERE IS STEEP DITCH CONDITIONS DECREASE SPACING AND CONSIDER RFD'S. ADD ADDITIONAL BMP'S IF GRADE IS STEEP OR IF FLOW IS HIGH.



BEST MANAGEMENT PRACTICE (BMP) #20

FOR 404 STREAMS ~ BMP'S AT BRIDGES

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TYPICAL APPLICATIONS FOR BEST MANAGEMENT PRACTICES

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