

INDEX OF SHEETS
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STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

STATE AID PROJECT NO. BPM - 640739001

US 277, etc.
KINNEY COUNTY, etc.
BPM: 6407-39-001

NET LENGTH OF PROJECT: VARIOUS
LIMITS: VARIOUS

FOR THE CONSTRUCTION OF BRIDGE PREVENTIVE MAINTENANCE
CONSISTING OF CONCRETE REPAIRS AND EROSION CONTROL MEASURES
FOR VAL VERDE, KINNEY AND LA SALLE

STATE AID PROJECT NO.			
BPM - 640739001			
CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY		SHEET NO.
22	KINNEY, etc.		1
DESIGN CRITERIA: PREVENTIVE MAINTENANCE			
A.D.T. (20XX): N/A			
A.D.T. (20XX): N/A			
% TRUCK IN ADT: N/A			
FUNCTIONAL CLASS: N/A			
DESIGN SPEED: N/A			
TOLA REQUIRED: NO			

FINAL PLANS

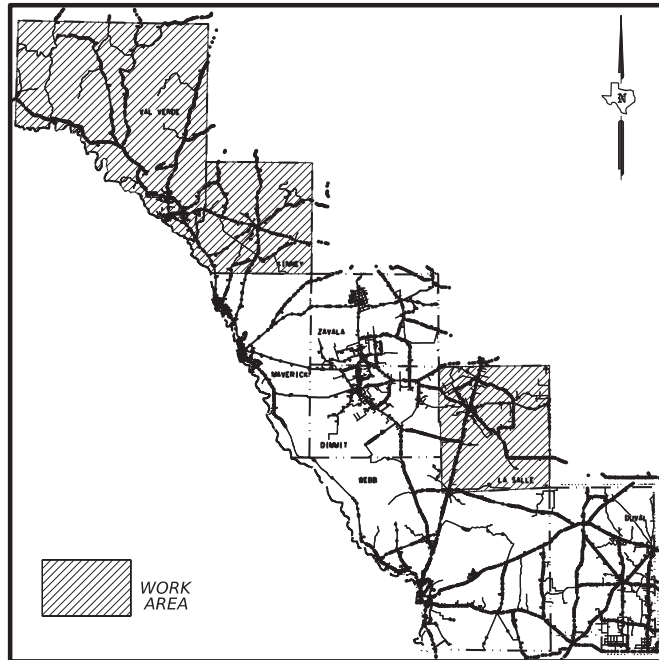
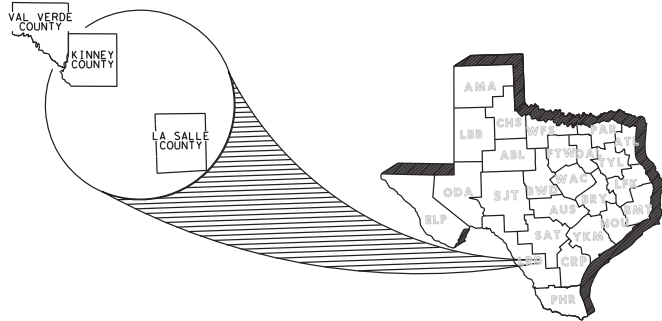
LETTING DATE: _____
DATE CONTRACTOR BEGAN WORK: _____
DATE WORK WAS COMPLETED & ACCEPTED: _____
FINAL CONTRACT COST: \$ _____
CONTRACTOR: _____

FINAL AS BUILT

THE CONSTRUCTION WAS PERFORMED
UNDER MY SUPERVISION IN ACCORDANCE
WITH THE PLANS AND CONTRACT

AREA ENGINEER

DATE




 WORK AREA

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION,
NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS.
SHALL GOVERN ON THIS PROJECT. SPECIAL LABOR PROVISIONS FOR STATE
PROJECTS (000--008).



10/25/2022
SUBMITTED FOR REVIEW DocuSigned by: _____

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RECOMMEND DocuSigned by: _____
Vanessa Rosales-Herrera
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RECOMMEND DocuSigned by: _____
Manibel Kangel
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10/25/2022
RECOMMEND DocuSigned by: _____
Cynthia M. Saldaña
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 THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ON THE
 "INDEX OF SHEETS" HAVE BEEN SELECTED BY ME OR UNDER
 MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO
 THIS PROJECT.


 _____ P.E.
 10/26/2022

 DATE


Texas Department of Transportation

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DWG
 LOC
 DWG

Location #	Structure PSN#	County	Roadway	Crossing	Location	Length (FT.)	REF. MRK.	Latitude	Longitude
1	222330041205028	VALVERDE	SH 163	BRUSHY DRAW	25.8 MI N OF US 90	22	582+.350	30.02642581	-101.1689314
2	221360002302013	KINNEY	US 90	PINTO CREEK	11.20 MI E VAL VERDE C/L	175	442+1.278	29.33529334	-100.5337445
3	221360002304018	KINNEY	US 90	LINDSEY CREEK	2.70 MI E OF SH 131	87	452+1.603	29.29372745	-100.3708174
4	221360002304020	KINNEY	US 90	DRAW	4.80 MI W OF FM 1572	34	458+1.817	29.27081569	-100.2712467
5	221360002304021	KINNEY	US 90	ARENOSA CREEK	9.90 MI E OF SH 131	140	460+.949	29.26768289	-100.252812
6	221360002304024	KINNEY	US 90	DRAW	2.90 MI W OF UVALDE C/L	23	466+1.236	29.23795665	-100.1552207
7	221420001708145	LA SALLE	IH 35	CIBOLO CREEK BRANCH	0.65 MI N OF FM 469 E	93	78+.410	28.58702778	-99.19483056
8	221420001708149	LA SALLE	IH 35	DRAW	2.45 MI S OF FM 469	40	75+.332	28.54378862	-99.20789531
9	221420001708151	LA SALLE	IH 35	DRAW	3.6 MI N OF FM 468	34	71+.438	28.48908475	-99.22436607
10	221420048301044	LA SALLE	SH 97	DRAW	1.45 MI W OF FM 469	34	458+1.418	28.46568839	-99.02467236
11	221420001708244	LA SALLE	IH 35 SB	IH 35 C BUSINESS	0.85 MI NE OF FM 468	220	68+.705	28.45090855	-99.23774811
12	221420048301011	LA SALLE	SH 97	DRAW	2.60 MI E OF BUS 35	34	448+.576	28.447906	-99.196025
13	221420001708246	LA SALLE	IH 35 SB	FM 468	IH 35 @ FM 468	155	67+.824	28.444189	-99.249023
14	221420001708245	LA SALLE	IH 35 NB	FM 468	IH 35 @ FM 468	155	67+.827	28.444085	-99.248855
15	221420048301030	LA SALLE	SH 97	DRAW	0.20 MI E OF IH 35 BU	68	446+.178	28.437724	-99.231334
16	221420143501002	LA SALLE	FM 469	DRAW	3.20 MI S OF SH 97	27	478+1.097	28.418389	-99.000064
17	221420001801107	LA SALLE	IH 35 NB	UPRR & TURNAROUNDS	2.80 MI N OF FM 133	382	58+.828	28.317261	-99.273013
18	221420001802115	LA SALLE	IH 35 NB	2ND ELM CREEK	0.25 MI S OF FM 133	160	55+.701	28.275169	-99.285091
19	221420001802008	LA SALLE	IH 35	1ST RAICES CREEK	1.80 MI S OF FM 133	37	54+.237	28.254746	-99.292287
20	221420001802009	LA SALLE	IH 35	2ND RAICES CREEK	1.90 MI S OF FM 133	89	54+.145	28.253678	-99.292612
21	221420001802121	LA SALLE	IH 35 NB	LAS RAICES CREEK	2.0 MI S OF FM 133	200	53+.976	28.253628	-99.291997
22	221420001802130	LA SALLE	IH 35 NB	SERVICE RD	10.55 MI N OF WEBB C/L	130	48+.714	28.17778586	-99.31576125
23	221420001802011	LA SALLE	IH 35	CAIMAN CREEK	9.25 MI N OF WEBB C/L	30	47+.458	28.160394	-99.323129
24	221420001802137	LA SALLE	IH 35 NB	JABONCILLOS CREEK	4.90 MI N OF WEBB C/L	160	43+.135	28.099014	-99.336448

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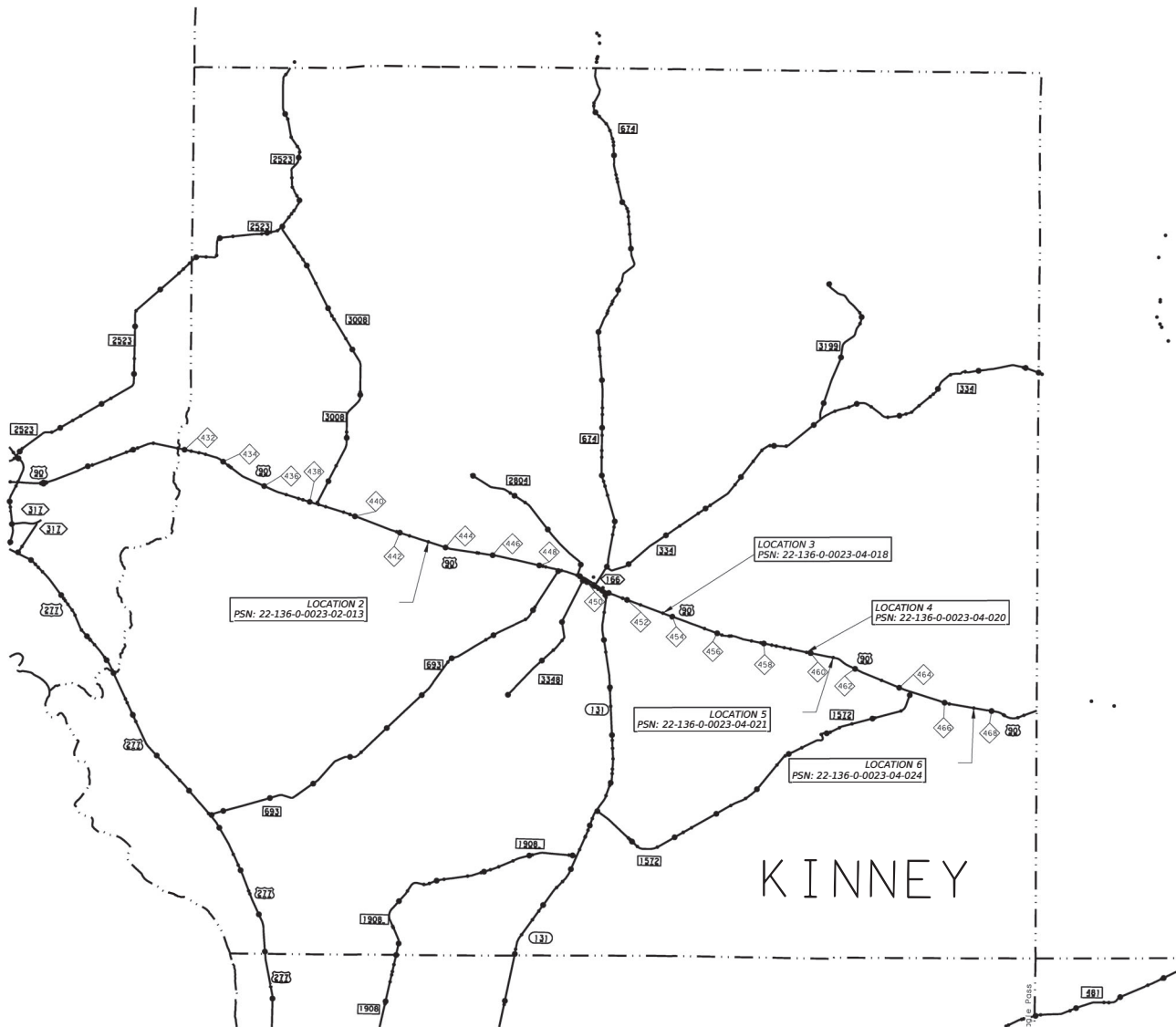
PROJECT LOCATION REFERENCE

SHEET 1 OF 1

COUNT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
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1/4" = 1/4" Mile
1/4" = 1/4" Mile
1/4" = 1/4" Mile

NOTE:
REFER TO "PROJECT LOCATION REFERENCE" SHEET
FOR PROJECT LIMITS NOT SHOWN.



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10/26/2022

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Texas Department of Transportation

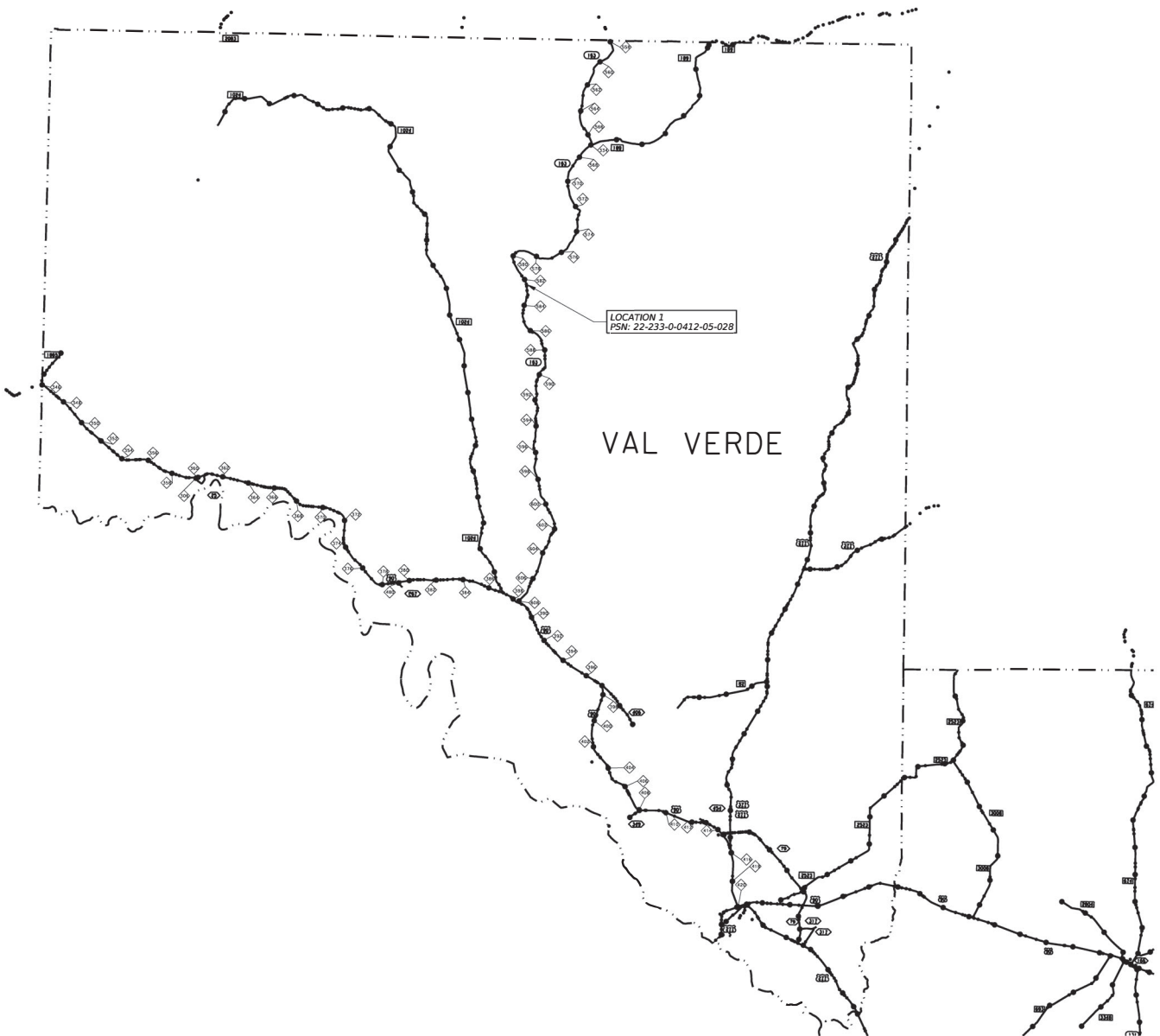
LOCATION MAP
KINNEY

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	4	

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Date
Rev

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FOR PROJECT LIMITS NOT SHOWN.



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P.E. 140491, on

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10/26/2022

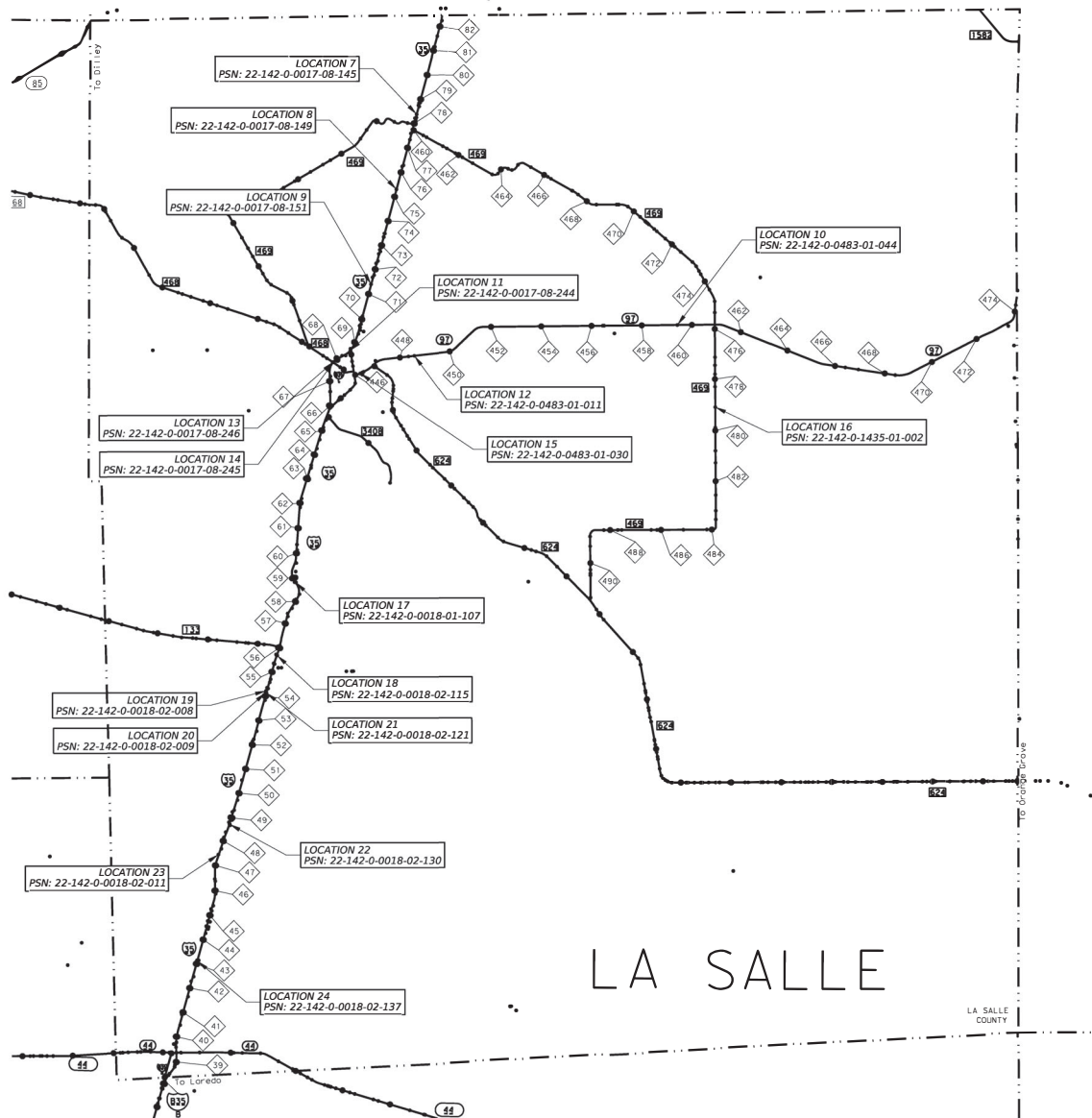


LOCATION MAP VAL VERDE

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CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	5	

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FOR PROJECT LIMITS NOT SHOWN.



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10/26/2022



LOCATION MAP
LA SALLE

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
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LA SALLE

LA SALLE
COUNTY

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Project Number: BPM - 640739001

Sheet

County: Kinney, etc.

Control: 6407-39-001

Highway: US 277, etc.

GENERAL NOTES:

The contract becomes effective upon issuance of the work authorization letter and covers a period of one hundred eighty (120) working days.

Provide and maintain an e-mail address for receipt of work order and correspondence throughout the term of this contract.

Contractor questions on this project are to be emailed to the following individual(s): Angel Alejo at Angel.Alejo@txdot.gov

Contractor questions will only be accepted through email to the above individuals.

All contractors' questions will be reviewed by the Area Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following address: <https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

All questions submitted that generate a response will be posted through this site. This site is organized by: District, Project type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Plans may be reviewed at Laredo District office of the Texas Department of Transportation, 1817 Bob Bullock Loop, Laredo, Texas 78043. The contact person is Angel Alejo at Angel.Alejo@txdot.gov

Questions concerning the specifications, work requirements, etc. of this contract should be directed to Angel Martinez, P.E., Transportation Engineer at angel.martinez@txdot.gov.

This project consists of Concrete Repair on bridge structures, Construct Gabions Mattresses, Clean and Reshape Ditch & Clean Existing Culverts on various roadways in LaSalle, Kinney and ValVerde.

The approximate quantities determined for this project are to be considered as actual quantities. Contractors are hereby instructed to assure themselves of the actual conditions of the work area before bidding. Overruns/under runs of estimated quantities will not be considered as a basis for a claim.

Locations and quantities will be identified by the engineer or assigned inspector on an as needed basis. This is a Plan Quantity Measurement and quantities may be adjusted to meet field conditions. No standby hours will be paid for traffic control vehicles driving to different locations or waiting to perform actual work on any bridge facility.

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County: Kinney, etc.

Control: 6407-39-001

Highway: US 277, etc.

Notify the Engineer's office by telephone each morning by 8:15 a.m. that work is scheduled, with work location and time of arrival or reason for not working that day.

Remove materials or debris within the construction limits not incorporated in the project. This work will not be paid for directly, but will be subsidiary to pertinent bid items.

Visit the sites to examine the work areas and meet with the maintenance supervisor on any areas in question. Carefully examine the specifications and secure from the State any additional information, if necessary, that may be essential for a clear and full understanding of the work.

SUPERVISION:

The Engineer's representatives in charge of all work orders issued by the District for this contract will be the respective Maintenance Supervisor for the county in which work is being performed. The office of the county where work is being completed certifies all requests for payment. The Maintenance Supervisor contacts for this contract are:

LaSalle County

Jimmy Lozano
900 FM 468
Cotulla, TX 78014
830-879-2428

Kinney County

Brandon Baxter
602 E Military Hwy
Brackettville, TX 78832
830-563-2326

ValVerde County

Francis A. Schell
319 E. Gibbs St,
DelRio, TX 78840
830-775-2440

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Sheet

County: Kinney, etc.

Control: 6407-39-001

Highway: US 277, etc.

Employees are required to wear proper safety equipment. Contractor is responsible for supplying proper safety equipment for employees.

The Contractor is responsible that all material used in this contract be approved and certified by the Materials & Test Section. A listing of state approved material producers is available on the Department's website.

WORK PROSECUTION:

Prior to beginning work, attend a TxDOT arranged Pre-Construction meeting. The Pre-Construction meeting will consider the sequence of work, work locations, traffic control, plans, specifications, unusual conditions, and other pertinent items regarding the work. Written notification will be given advising of when operations may begin. The Contractor will be advised of the applicable number of days allowed to complete the work and the date when the time charges commence. Additional working days for any added work will be determined and allowed by the Engineer.

Designate an on-site representative who has full authority to make decisions with respect to the project. Coordinate all project issues with the Texas Department of Transportation (TxDOT) through the designated on-site representative.

Perform the required work according to the latest and current TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, TEXAS DEPARTMENT OF TRANSPORTATION CONCRETE REPAIR MANUAL manuals and applicable details, specifications, and special provisions noted in the plans. Have a copy of the standard specification manual at the work site at all times. Purchase standard specification books from the General Services Division, publications sales office at (512)302-0985.

Repair any damage caused by daily operations and restore the facility to serve the public in a timely manner, as directed, at no additional cost to TxDOT.

On a daily basis, clean up all work areas and remove all loose materials resulting from everyday operations before the work is suspended for the day. No loose material will remain at the worksite overnight. Legally dispose of all debris, including any waste material resulting from construction.

The plans have been prepared on the assumption that embankment material will be constructed within the channel creek bed for purposes of the temporary earth berms. Do not permit any other foreign material or debris resulting from construction activities to enter the creek waterway. Remove such debris which falls into the creek waterway immediately. This work is subsidiary to the plan items.

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Sheet 8

County: Kinney, etc.

Control: 6407-39-001

Highway: US 277, etc.

At the time of the pre-construction meeting submit a sequence of work that will be followed in order to complete the contract in the allocated time. Show a begin date and duration period in working days. Submit any changes to this sequence for approval.

The attention of prospective bidders is directed to ordinances and regulations of local, municipal, and county governments. The Contractor will procure all municipal, county, and federal government permits and licenses necessary to perform the work.

Leave the project site clean and neat in appearance upon completion and before final acceptance of the project.

EQUIPMENT AND SUPPLIES:

Furnish suitable machinery, equipment, and construction forces as deemed necessary for proper prosecution of the work. The Contractor's attention is directed to the fact that the creek channel bed may or may not contain runoff during the time of construction. Weather patterns will dictate the use of certain construction equipment and material as pertained bid items. The plans however, have been prepared on the assumption that the temporary earth berms and gabion mattresses will be constructed.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

Any materials removed and not reused on the project and determined to be salvageable by the Engineer, will be retained by the owner and will be stored within the project limits at an approved secure location or delivered undamaged to the salvage/storage yard as directed by the Engineer. Materials that are not determined to be salvageable by the Engineer will become the property of the Contractor for proper management in accordance with local, state and/or federal requirements at the Contractor's expense. Traffic signs must be defaced in such a manner that they will not reappear in public as signs.

SITE MANAGEMENT:

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission may be granted to store materials on deck surfaces if no damage or discoloration will result. As determined by the Engineer, calculations proving no negative impacts

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to the structural integrity of the bridge may be required of the Contractor (at the Contractor's expense) prior to granting authorization for this action.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the District Engineer.

ITEM 4 - SCOPE OF WORK:

If agreed upon in writing by both parties to the Contract, the Contract may be extended for an additional period of time not to exceed the original Contract time period. The extended Contract shall be for the original bid quantities, terms and conditions plus any approved, applicable change orders.

When the Contract is extended by agreement, a performance and/or payment bond, if required shall be executed in the amount of the extension before the additional work begins.

ITEM 7 - LEGAL RELATIONS & RESPONSIBILITIES:

Roadway closures during the following key dates and/or special events are prohibited: January 1, Easter weekend, the last Monday in May, July 4, the first Monday in September, the fourth Thursday in November, and December 24 or 25.

ITEM 8 - PROSECUTION & PROGRESS:

Working days will be computed and charged in accordance with Article 8 3.1.4, Standard Workweek. Work hours will be between 7:00 a.m. and 6:00 p.m. unless otherwise approved.

Refer to the Sequence of Work, Traffic Control Plan, etc. shown in the plans, for other details.

Contractor shall provide 48 hour courtesy notice prior to beginning work for each work order.

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Control: 6407-39-001

Highway: US 277, etc.

ITEM 401 – FLOWABLE BACKFILL

The contractor is advised that the flowable backfill quantities noted in the plans are assumed quantities. This material is to be used to fill voids located beneath existing concrete riprap and there is no method to determine (without actual removal of the riprap) the quantity needed to backfill the voids. Thus, an assumed quantity was noted in the plan sheet summaries. The quantity to be paid is that which will be placed in the field.

ITEM 421 – HYDRAULIC CEMENT CONCRETE

Sulfate resistant cement concrete shall be used in all situations for structural elements in contact with the natural ground. These includes, but is not limited to, all reinforced concrete pipe, concrete box culverts, drill shafts, bridge columns, bridge abutments, wingwalls, approach slabs, inlets, manholes, junction boxes, ground boxes and all concrete riprap.

Air entrainment is not required. If concrete is supplied with air entrainment, the concrete must adhere to the requirements of item 421.4.2.4.

ITEM 429 – CONCRETE STRUCTURE REPAIR

Use the following types of repair materials:

Provide Class C concrete for repairs on substructures (Vertical and Overhead).

Use epoxy mortars for repairs less than 1 inch thick unless noted otherwise on the plans.

These materials are for estimated bidding purposes and other materials can be approved as directed by the engineer.

Refer to the 2014 Standard Specifications and Concrete Repair Manual for additional information.

ITEM 432 – RIPRAP

Provide Class B Concrete for riprap.

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County: Kinney, etc.

Control: 6407-39-001

Highway: US 277, etc.

ITEM 500 MOBILIZATION:

The Contractor will be paid an initial Mobilization of one (1) each with the issuance of the first Work Order Letter. If the Contractor is currently working in any one of the counties and a second work order or revision to a work order is issued, the Contractor will not be paid additional mobilization for extra work issued. A second, etc. Mobilization will be paid when the Contractor has no pending work in any of the three counties (issued under the first, second, etc. revision to work orders) and a Work Order Letter is issued for such work needed.

ITEM 502 BARRICADES, SIGNS AND TRAFFIC HANDLING:

Designate, as the Contractor Responsible Person (CRP), an English speaking employee on-call nights and weekends (or any other time that work is not in progress) with a local address and telephone number for maintenance of signs and barricades. This employee will be located within one (1) hour of traveling time to the project site. Notify the Engineer in writing of the name, address and telephone number of this employee. Furnish this information to local law enforcement officials.

The time frame for the Contractor to provide properly maintained traffic control devices before they are considered to be in non-compliance with this Item, is 48 hours regardless of the days of the week involved after notification is done in writing by the Engineer.

Notify the Engineer (830)703-1422 at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals. This is required to provide the State/City time to perform a traffic study, determine the new signal timing and phasing settings that need to be implemented with the traffic change.

Provide two-way radios in areas where flagmen do not have visual contact with one another or cannot communicate with one another.

Limit lane closures to a maximum of 2 miles. If more than one lane closure location is desired, provide a minimum of a 2 mile passing zone between locations. Provide a separate sign set up for each location.

Ensure equipment not in use, stockpile aggregate, and other working materials are:

- A minimum of 30 feet from the edge of the travel lane;
- Do not obstruct traffic or sight distance;
- Do not interfere with the access from abutting property; or
- Do not interfere with roadway drainage.

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County: Kinney, etc.

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Erect signs in locations not obstructing the traveling public's view of the normal roadway signing or necessary sight distance at intersections and curves.

During the holiday time frame of December 21st through January 1st, every effort should be taken to ensure that all travel lanes remain open where possible.

ITEM 760 DITCH CLEANING AND RESHAPING:

The contractor will perform work to remove excess of material/debris located along the channel of the bridge. Maintain existing drainage flow during cleaning and reshaping work.

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN:

Provide two (2) electronic portable changeable message signs as required by the Engineer. Provide backups and keep operational and available on the jobsite at all times during traffic control operations. The electronic portable changeable message signs will be made available for utilization for the entire duration of the project, including all alternative locations.

ITEM - 6185 TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER:

Provide a maximum of three (3) Truck Mounted Attenuator as required by the Engineer. Provide backup and keep operational and available on the jobsite at all times during traffic control operations. The Truck Mounted Attenuator will be made available for utilization for the entire duration of the project, including all alternative locations.



Estimate & Quantity Sheet

CONTROLLING PROJECT ID 6407-39-001

DISTRICT Laredo
HIGHWAY US0277

COUNTY Kinney

CONTROL SECTION JOB				6407-39-001		TOTAL EST.	TOTAL FINAL
PROJECT ID				A00188341			
COUNTY				Kinney			
HIGHWAY				US0277			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	401-6001	FLOWABLE BACKFILL	CY	1.000		1.000	
	429-6007	CONC STR REPAIR (VERTICAL & OVERHEAD)	SF	718.500		718.500	
	432-6001	RIPRAP (CONC)(4 IN)	CY	10.000		10.000	
	459-6007	GABION MATTRESSES (GALV)(12 IN)	SY	75.000		75.000	
	467-6004	SET (REPLACE PIPE RUNNER)	EA	3.000		3.000	
	480-6001	CLEAN EXIST CULVERTS	EA	8.000		8.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6.000		6.000	
	760-6001	DITCH CLEANING AND RESHAPING (FOOT)	LF	100.000		100.000	
	780-6004	CNC CRCK REPAR(DISCRETE)(ROUT AND SEAL)	LF	10.000		10.000	
	780-6010	CNC CRACK REPAIR (DISCRETE)(SURF SEAL)	LF	100.000		100.000	
	6001-6002	PORTABLE CHANGEABLE MESSAGE SIGN	EA	2.000		2.000	
	6185-6002	TMA (STATIONARY)	DAY	72.000		72.000	
	7212-6002	CLEANING SUBSTRUCTURE (ABUT)	EA	8.000		8.000	

TCP GENERAL NOTES

1. THIS IS A SUGGESTED TRAFFIC CONTROL PLAN. AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A REGISTERED ENGINEER IN TEXAS, MAY BE SUBMITTED FOR REVIEW AND APPROVAL TO THE AREA ENGINEER.
2. REFER TO ITEM 8-PROSECUTION AND PROGRESS, PROJECT GENERAL NOTES, AND SEQUENCE OF WORK FOR ADDITIONAL INFORMATION REGARDING THE TRAFFIC CONTROL PLAN.
3. TAKE SPECIAL NOTICE OF THE REQUIREMENTS OF ITEM 7: "LEGAL RELATIONS AND RESPONSIBILITIES" OF THE STANDARD SPECIFICATIONS.
4. USE ADDITIONAL BARRICADES AND SIGNS TO SAFELY GUIDE TRAFFIC AND PROTECT THE WORKERS IN THE IMMEDIATE VICINITY OF CONSTRUCTION OPERATIONS, AS DIRECTED BY THE ENGINEER. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBSIDIARY TO ITEM 502 "BARRICADES, SIGNS, AND TRAFFIC HANDLING".
5. PLACE ALL BARRICADES AND SIGNS IN ACCORDANCE WITH THE LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD), THE STATE STANDARD TRAFFIC CONTROL PLANS (TCP) SHEETS, THE BARRICADES, CONSTRUCTION (BC) SHEETS, AND THE TCP LAYOUT SHEETS INCLUDED IN THE PLANS. EXCEPT AS NOTED IN THE PLANS, ALL WORK AND MATERIALS REQUIRED FOR TRAFFIC HANDLING WILL NOT BE PAID FOR DIRECTLY BUT WILL BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING".
6. ALL BARRICADES AND SIGNS WILL BE INSTALLED BY THE CONTRACTOR. AT ALL TIMES, THE CONTRACTOR WILL HAVE ENOUGH BARRICADES, CHANNELIZING DEVICES, AND SIGNS TO REPLACE THOSE DAMAGED.
7. REFER TO THE SEQUENCE OF WORK FOR CONSTRUCTION PHASING.
8. VERIFY THE LOCATION OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ENSURE THEIR VISIBILITY TO ALL MOTORISTS. VARY THE SPACING OF SIGNS TO MEET TRAFFIC CONDITIONS OR AS DIRECTED BY THE ENGINEER AND ASSURE THAT ALL TRAFFIC CONTROL DEVICES AND PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT, AND IN THEIR PROPER LOCATION).
9. MAINTAIN THE ROADWAY SURFACE WITHIN THE PROJECT LIMITS WHILE THE TRAFFIC CONTROL PLAN IS IN EFFECT.
10. DURING CONSTRUCTION OPERATIONS, COVER ALL EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER THEM DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGN OR COVERAGE BY MATERIAL THAT DOES NOT COVER THE ENTIRE SIGN FOR THE REQUIRED TIME IS NOT PERMITTED.
11. ALL CONSTRUCTION TRAFFIC WILL BE REGULATED SO AS TO CAUSE A MINIMUM OF INCONVENIENCE TO THE TRAVELING PUBLIC. AT TIMES WHEN IT IS NECESSARY FOR TRUCKS OR OTHER CONSTRUCTION EQUIPMENT TO STOP, UNLOAD, SET-UP, OR CROSS ROADWAYS UNDER TRAFFIC, WARNING SIGNS AND FLAGGERS WILL BE PROVIDED AS DEEMED NECESSARY TO ADEQUATELY PROTECT THE TRAVELING PUBLIC, AND AS DIRECTED BY THE ENGINEER. FURNISH FLAGGERS WITH TWO-WAY RADIOS OR OTHER ENGINEER APPROVED METHODS OF COMMUNICATION FOR HANDLING OF TRAFFIC.
12. USE FLASHING WARNING LIGHTS AND FLAGS TO CALL ATTENTION TO ADVANCED WARNING SIGNS. USE FLASHING WARNING LIGHTS TO MARK CHANNELIZING DEVICES AT NIGHT AS NEEDED. PROVIDE THE NECESSARY FLAGGERS AND APPROPRIATE SIGNING (TO BE CONSIDERED SUBSIDIARY TO ITEM 502, "BARRICADES, SIGNS, AND TRAFFIC HANDLING") TO SAFELY GUIDE TRAFFIC THROUGH THE WORKING AREA.
13. DURING NON-WORKING HOURS, REMOVE ALL SIGNS, BARRICADES, AND CHANNELIZING DEVICES NOT IN EFFECT FROM THE CONSTRUCTION SITE AND STORE OFF STATE RIGHT-OF-WAY OR AS DIRECTED BY THE ENGINEER.
14. MAINTAIN ALL EXISTING DRAINAGE CONDITIONS DURING ALL CONSTRUCTION PHASES.
15. WORK VEHICLES, AND ALL SIGNS, BARRICADES, AND CHANNELIZING DEVICES NOT IN USE, STOCKPILED MATERIAL, AND WASTE MATERIAL WILL BE PLACED AT A MINIMUM OF 30 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE OR AS DIRECTED BY THE ENGINEER.
16. UPON COMPLETION OF WORK, CLEAN THE PROJECT OF ALL CONSTRUCTION MATERIALS, HAVE ALL EXCESS DEBRIS BROOMED AND ALL LOCATIONS ADEQUATELY CLEANED TO A FINAL ACCEPTANCE BEFORE BARRICADES MAY BE REMOVED FROM THE PROJECT.
17. USE OF PORTABLE CHANGEABLE MESSAGE SIGN AS ADVANCE NOTICE OF LANE CLOSURES WILL BE REQUIRED, AS DIRECTED BY THE ENGINEER. FOR LOCATIONS THAT ARE ADJACENT TO EACH OTHER, A SINGLE SIGN IN ADVANCE OF THE ENTIRE WORK AREA IS ACCEPTABLE.



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TCP
GENERAL NOTES

SHEET 1 OF 1

CDIST	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
CDIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	12	

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SEQUENCE OF CONSTRUCTION

SUGGESTED SEQUENCE OF CONSTRUCTION

THE CONTRACTOR WILL PLACE ALL GENERAL PROJECT TRAFFIC CONTROL SIGNS, BARRICADES, AND CHANNELIZING DEVICES AS SHOWN IN THE TCP LAYOUTS INCLUDED IN THE PLANS, LATEST VERSION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TXMUTCD), BARRICADES AND CONSTRUCTION (BC) SHEETS, WORK ZONE STANDARD SHEETS, CONSTRUCTION STANDARD SHEETS, AND AS NOTED IN THE GENERAL NOTES.

THE FOLLOWING BRIEFLY DESCRIBES THE SEQUENCE OF WORK, UNLESS OTHERWISE SPECIFIED, ALL CONSTRUCTION IS TO BE PERFORMED OFF THE ROADWAY LIMITS USING TCP (2-1)-18.

- A. IDENTIFY REPAIR LOCATION AS SHOWN ON PLANS.
- B. CONCRETE REPAIR AREAS IDENTIFIED ON PLANS AS PER CONCRETE REPAIR MANUAL.
- C. PLACE FLOWABLE BACKFILL AND RIPRAP AS SHOWN ON PLANS.
- D. CONSTRUCT GABIONS MATTRESSES AS SHOWN ON PLANS.
- E. WHERE APPLICABLE, CLEAN AND RESHAPE DITCH.
- F. WHERE APPLICABLE, CLEAN EXISTING CULVERT.

UPON COMPLETION OF ALL CONSTRUCTION AND WITH THE APPROVAL OF THE ENGINEER, RELOCATE THE MATERIALS AS DIRECTED BY THE ENGINEER.

AFTER THIS TASK HAS BEEN COMPLETED, INITIATE PROJECT CLEAN-UP WITH THE APPROVAL OF THE ENGINEER AND REMOVAL OF TCP MAY INITIATE.



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TCP
SEQUENCE OF
CONSTRUCTION

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	13	

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

- 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).
- The development and design of the Traffic Control Plan (TCP) is the responsibility of the Engineer.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Traffic control devices should be in place only while work is actually in progress or a definite need exists.
- The Engineer has the final decision on the location of all traffic control devices.
- 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:


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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

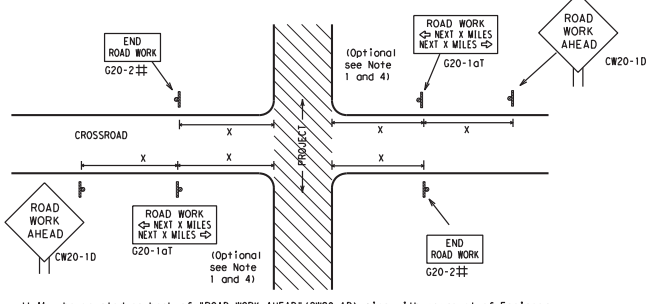
SHEET 1 OF 12

 Texas Department of Transportation		Traffic Safety Division Standard	
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS			
BC(1) - 21			
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HIGHWAY:	001	DN:	TxDOT
REVISONS:	4-03 7-13	US	277, etc.
	9-07 8-14	DIST	COUNTY
	5-10 5-21	22	KINNEY, etc.
			SHEET NO. 14

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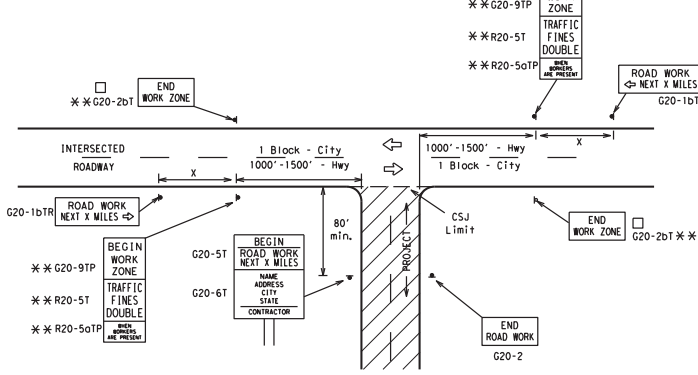
TYPICAL LOCATION OF CROSSROAD SIGNS



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

- 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.
- 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 TMTUCD Part 5. This information shall be shown in the plans.
- 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.
- 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.
- Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
- 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

- 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.
- 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 SPACING¹⁵⁻⁶

Sign Number or Series	SIZE		SPACING	
	Conventional Road	Expressway/Freeway	Posted Speed	Sign Spacing "X"
CW20 ⁴	48" x 48"	48" x 48"	MPH	Feet (Approx.)
CW21			30	120
CW22			35	160
CW23			40	240
CW25			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
			55	500 ²
			60	600 ²
			65	700 ²
			70	800 ²
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	75	900 ²
			80	1000 ²
			*	*
			*	3

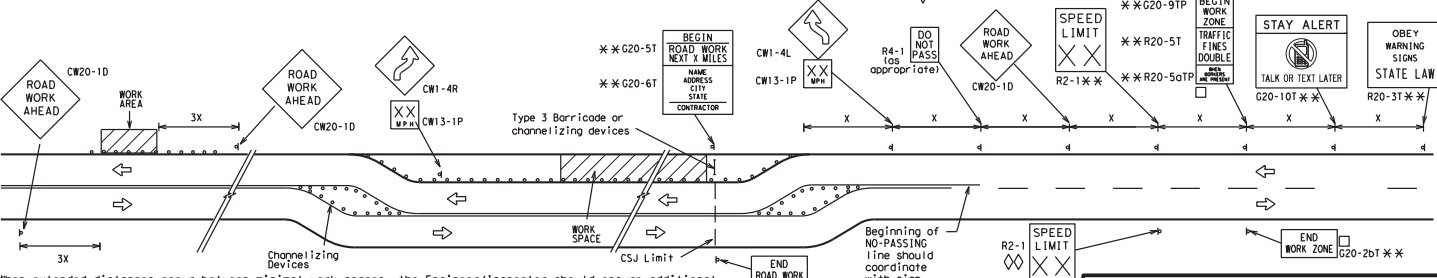
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMTUCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

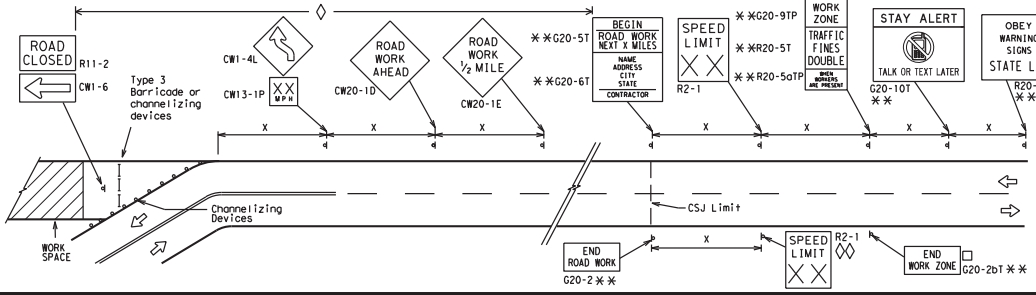
- Special or larger size signs may be used as necessary.
- Distance between signs should be increased as required to have 1500 feet advance warning.
- Distance between signs should be increased as required to have 1/2 mile or more advance warning.
- 36" x 36" "ROAD WORK AHEAD" (CW20-1D) signs may be used on low volume crossroads at the discretion of the Engineer as per TMTUCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
- Only diamond shaped warning sign sizes are indicated.
- See sign size listing in "TMTUCD", 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 TMTUCD for sign spacing requirements.

SHEET 2 OF 12

Texas Department of Transportation
 Traffic Safety Division

BARRICADE AND CONSTRUCTION PROJECT LIMIT

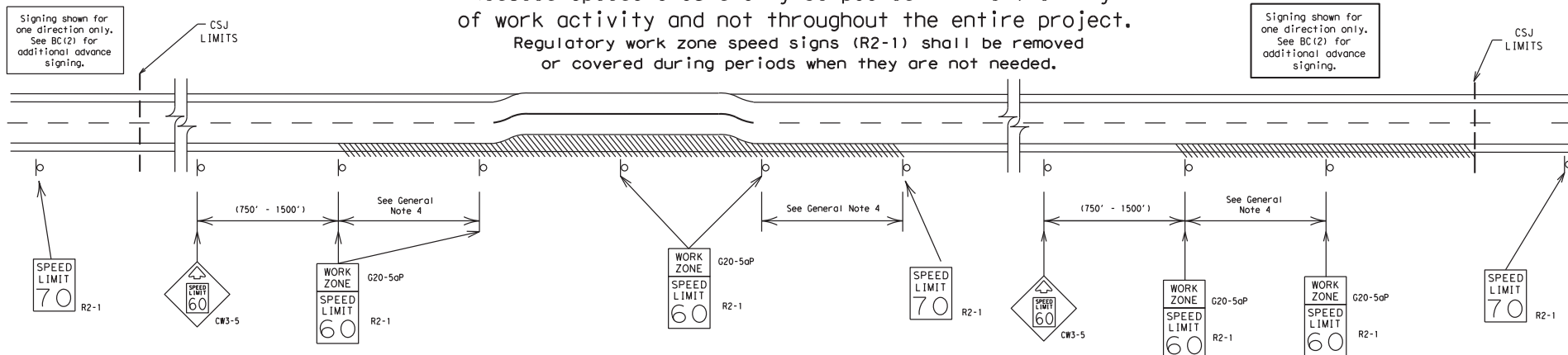
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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	22	KINNEY, etc.		15

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

- Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
- Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
- Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
- 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
- Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
- 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.
- Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
- 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.
- Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
- 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.

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SHEET 3 OF 12



Traffic
Safety
Division
Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

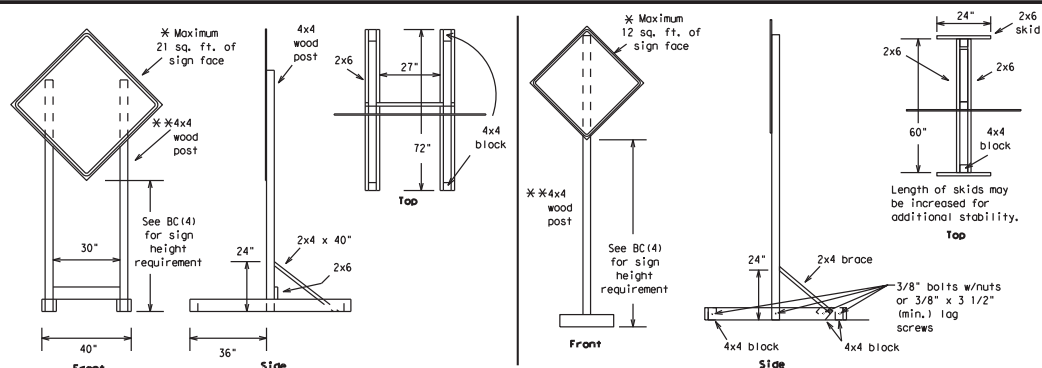
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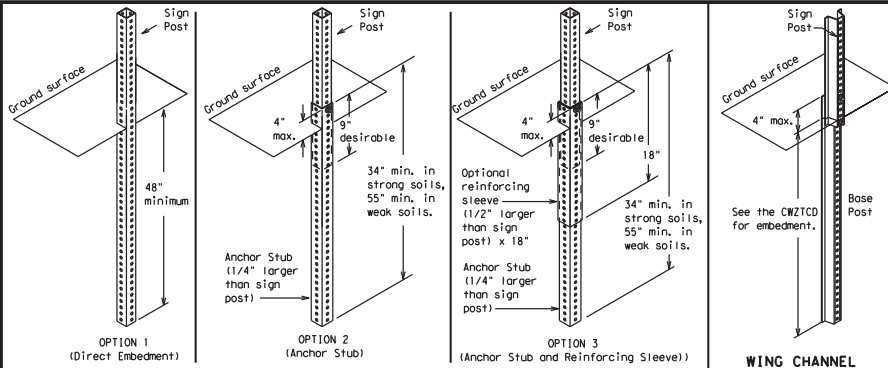
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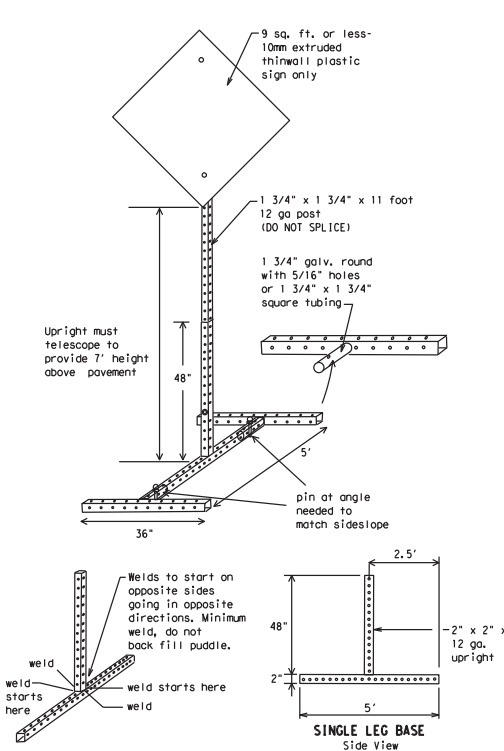
SKID MOUNTED WOOD SIGN SUPPORTS

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



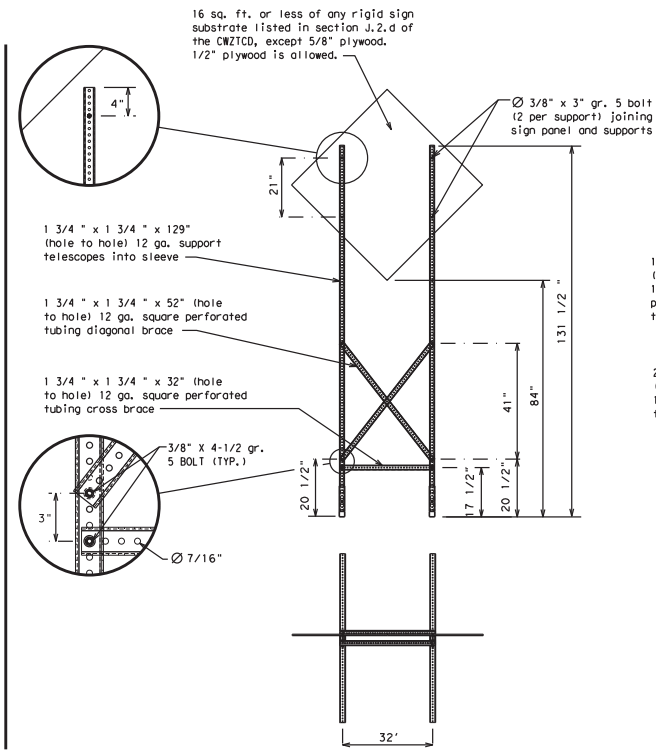
GROUND MOUNTED SIGN SUPPORTS

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 BC111).

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.

SHEET 5 OF 12



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

- The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
- 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.
- 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.
- Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
- Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
- When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
- 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.
- 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. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
- 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.
- Do not use the word "Danger" in message.
- Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
- Do not display messages that scroll horizontally or vertically across the face of the sign.
- 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 table.
- 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.
- Each line of text should be centered on the message board rather than left or right justified.
- 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.

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 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 *
	XXXXXXXXXX

* 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 XXXX 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	XXXXXX TO XXXXXXX	US XXX TO FM XXXX
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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
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**** 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
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** See Application Guidelines Note 6.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Canal	CANT	North	N
Center	CTR	Northbound (route) N	
Construction Ahead	CONST AHD	Parking	PKING
CROSSING	XING	Road	RD
Detour Route	DETOUR RTE	Right Lane	RT LN
Do Not	DONT	Saturday	SAT
East	E	Service Road	SERV RD
Eastbound (route) E		Shoulder	SHLDR
Emergency	EMER	Slippery	SLIP
Emergency Vehicle	EMER VEH	South	S
Entrance, Enter	ENT	Southbound (route) S	
Express Lane	EXP LN	Speed	SPD
Expressway	EXPWY	Street	ST
XXXX Feet	XXXX FT	Sunday	SUN
Fog Ahead	FOG AHD	Telephone	PHONE
Freeway	FRWY, FWY	Temporary	TEMP
Freeway Blocked	FWY BLKD	Thursday	THURS
Friday	FRI	To Downtown	TO DOWNTN
Hazardous Driving	HAZ DRIVING	Traffic	TRAF
Hazardous Material	HAZMAT	Travelers	TRVLRS
High Occupancy	HOV	Tuesday	TUES
Vehicle Highway	HWY	Time Minutes	TIME MIN
Hour(s)	HR, HRS	Upper Level	UPR LEVEL
Information	INFO	Vehicles (s)	VEH, VEHs
ITS		Warning	WARN
Junction	JCT	Wednesday	WED
Left	LFT	Weight Limit	WT LIMIT
Left Lane	LFT LN	Westbound (route) W	
Lane Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LRR LEVEL	Will Not	WONT
Maintenance	MAINT		

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

APPLICATION GUIDELINES

- Only 1 or 2 phases are to be used on a PCMS.
- The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
- A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
- A Location Phase is necessary only if a distance or location is not included in the first phase selected.
- 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.
- 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

- The words RIGHT, LEFT and ALL can be interchanged as appropriate.
- Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
- EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
- Highway names and numbers replaced as appropriate.
- ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
- AHEAD may be used instead of distances if necessary.
- FT and MI, MILE and MILES interchanged as appropriate.
- AT, BEFORE and PAST interchanged as needed.
- 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

- 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.
- 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.
- 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.
- 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.

SHEET 6 OF 12

Texas Department of Transportation

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

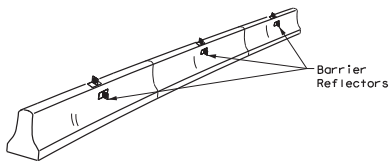
BC (6) - 21

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© TXDOT November 2002	CONT	SECT	JOB	HIGHWAY
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9-07	8-14	DIST	COUNTY	SHEET NO.
7-13	5-21	22	KINNEY, etc.	

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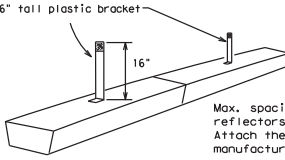
- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMTUCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

- 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 gable 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.
- 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.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.

Barrier Reflector on 16" tall plastic bracket

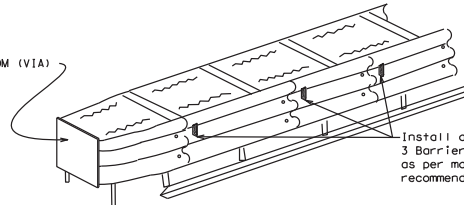


LOW PROFILE CONCRETE BARRIER (LPCB)

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.

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



DELINEATION OF END TREATMENTS

END TREATMENTS FOR CTB'S USED IN WORK ZONES

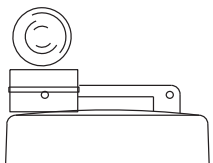
End treatments used on CTB's in work zones shall meet the appropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTC List for approved end treatments and manufacturers.

Install a minimum of 3 Barrier Reflectors as per manufacturer's recommendations.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

WARNING LIGHTS

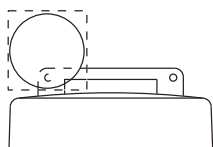
- Warning lights shall meet the requirements of the TMTUCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn or mark a potentially hazardous area. Their use shall be as indicated on this sheet 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.
- 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".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- 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.
- 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.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.



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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- 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.
- 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.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.



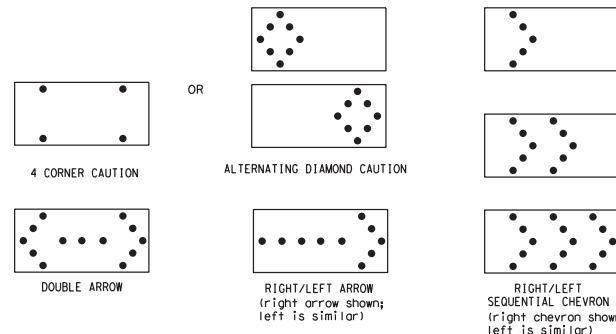
Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

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

- 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.
- 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 CWZTC.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- 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.
- 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.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- 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 barrier, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- 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.
- 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.
- 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.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- 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.
- 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.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PMS 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.
- 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

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTC for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTC for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- 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.
- 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
 Safety
 Division
 Standard

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

BC (7) - 21

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GENERAL NOTES

- For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
- 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.
- 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.
- 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).
- 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.
- 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:

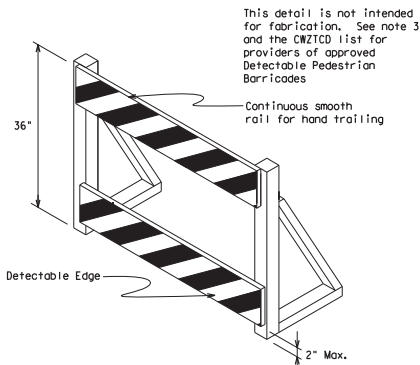
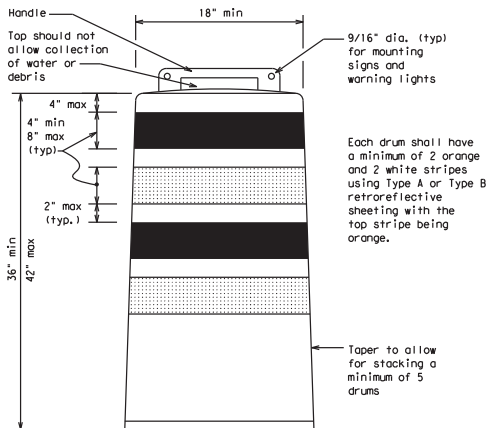
- Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
- The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
- 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.
- 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.
- 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.
- 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.
- 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.
- Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
- Drum body shall have a maximum unballasted weight of 11 lbs.
- Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

- 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.
- 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

- 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.
- 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.
- Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
- 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.
- 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.
- Ballast shall not be placed on top of drums.
- Adhesives may be used to secure base of drums to pavement.



DETECTABLE PEDESTRIAN BARRICADES

- 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.
- 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.
- 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.
- 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.
- Warning lights shall not be attached to detectable pedestrian barricades.
- Detectable pedestrian barricades should use 8" nominal barricade rolls as shown on BC(10) provided that the top roll provides a smooth continuous roll 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

- Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
- Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_L Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
- 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.
- 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.
- Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
- Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
- 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.
- 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.

SHEET 8 OF 12



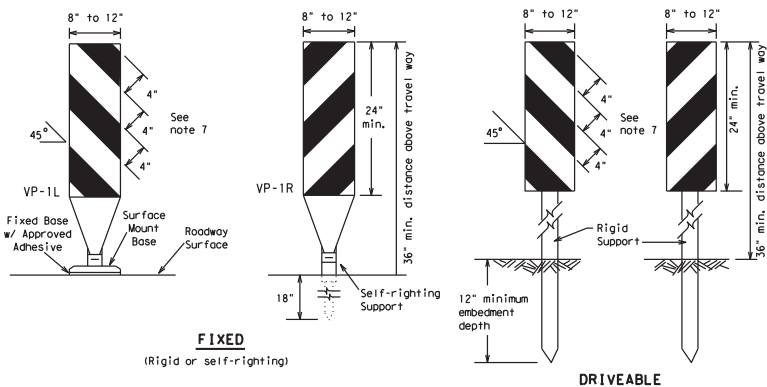
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 21

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	EX: TxDOT
© TxDOT November 2002	CONF	SECT	JOB	HIGHWAY
REVISIONS	6407	39	001	US 277, etc.
4-03 8-14	DIST	COUNTY		SHEET NO.
9-07 5-21	22	KINNEY, etc.		21
7-13				

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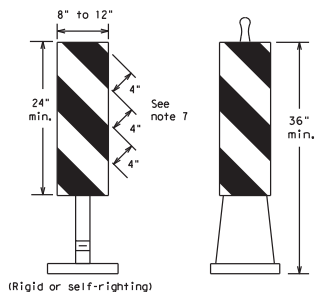
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FIXED
(Rigid or self-righting)

DRIVEABLE

- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- 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.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The height for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

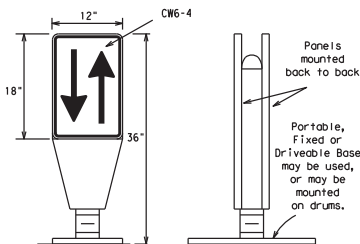


(Rigid or self-righting)

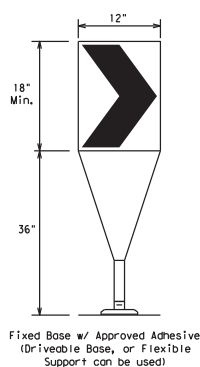
PORTABLE

VERTICAL PANELS (VPs)

- 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.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.



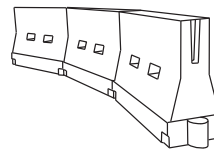
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- 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.
- 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.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B₁ or Type C₁ conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- 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)

- 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.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades 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

- 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.
- 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.
- 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.
- 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.
- 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 cones 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

- 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).
- 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.
- 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).
- 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.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- 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.
- 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 **			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	L = WS / 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
 Safety
 Division
 Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 21

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REVISED:	November 2002	CONF:	SECT	JOB:	HIGHWAY				
9-07	8-1	6407	39	001	US 277, etc.				
7-13	5-21	DIST:	COUNTY	SHEET NO.					
		22	KINNEY, etc.	22					

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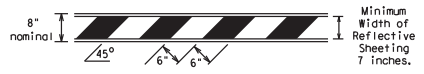
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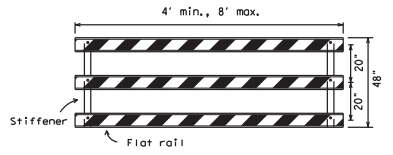
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTD) 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 fire 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.

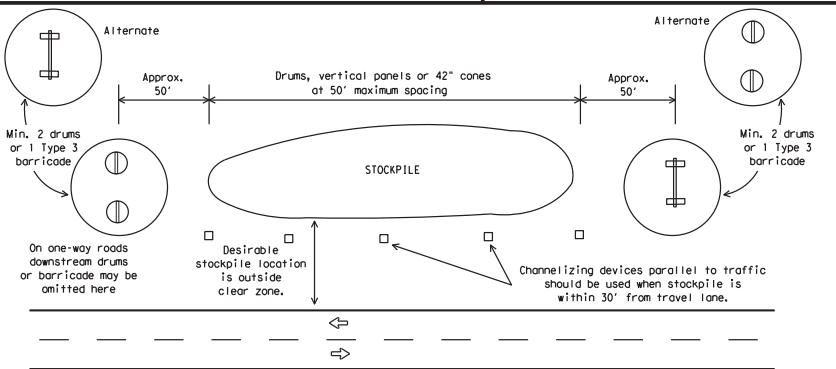


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



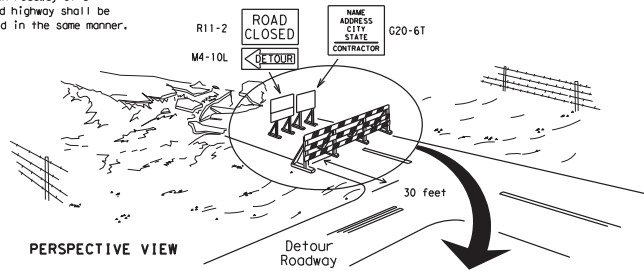
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



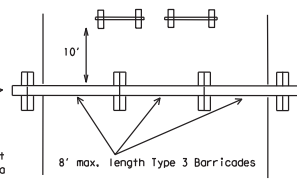
TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



PERSPECTIVE VIEW

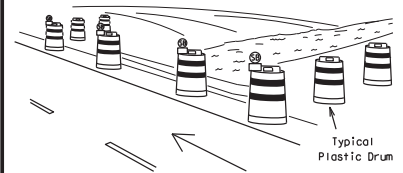
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic. Barricade striping should slant downward in the direction of detour.



PLAN VIEW

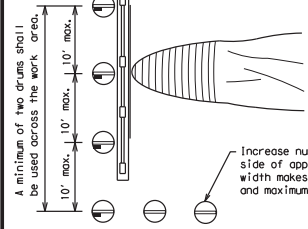
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

These drums are not required on one-way roadway



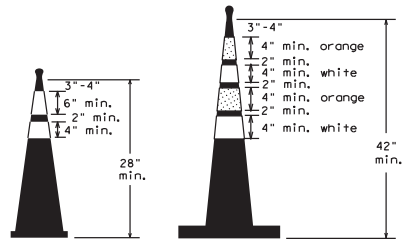
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

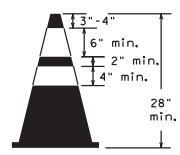
1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

LEGEND

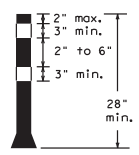
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector



Two-Piece cones



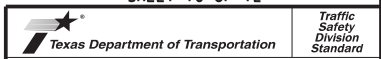
One-Piece cones



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.



Texas Department of Transportation
Traffic Safety Division
Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (10) - 21

FILE: dc-21.dgn	DATE: TxDOT November 2002	CONF: 6407	SECT: 39	JOB: 001	US 277, etc.
REVISIONS	9-07	8-14	DIST: 22	COUNTY: KINNEY, etc.	SHEET NO. 23
7-13	5-21				

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WORK ZONE PAVEMENT MARKINGS

GENERAL

- 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.
- Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Additional supplemental pavement marking details may be found in the plans or specifications.
- Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
- 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(SIPM).
- 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.
- All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

- Raised pavement markers are to be placed according to the patterns on BC(1)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

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

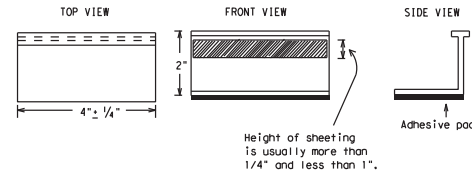
MAINTAINING WORK ZONE PAVEMENT MARKINGS

- The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
- 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.
- 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.
- 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

- 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.
- 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.
- 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".
- The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
- Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
- Blast cleaning may be used but will not be required unless specifically shown in the plans.
- Over-painting of the markings SHALL NOT BE permitted.
- Removal of raised pavement markers shall be as directed by the Engineer.
- 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.
- 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**

- Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
- 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.
 - 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.
 - 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.
- Small design variances may be noted between tab manufacturers.
- See Standard Sheet WZ(SIPM) 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

- Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
- All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
- 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).

SHEET 11 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(1) - 21

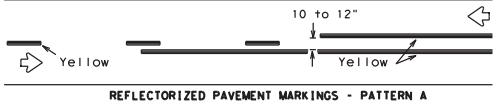
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© TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
2-98	9-07	6407	39	001	US 277, etc.				
1-02	7-13	DIST	COUNTY	SHEET NO.					
11-02	8-14	22	KINNEY, etc.	24					

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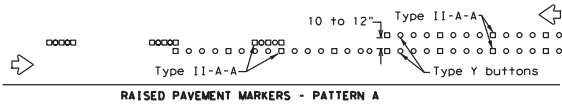
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PAVEMENT MARKING PATTERNS



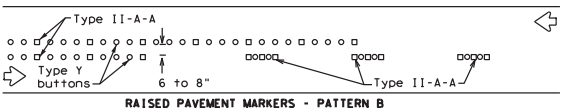
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



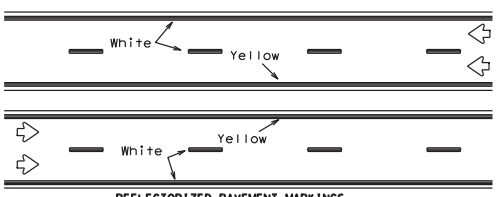
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



RAISED PAVEMENT MARKERS - PATTERN B

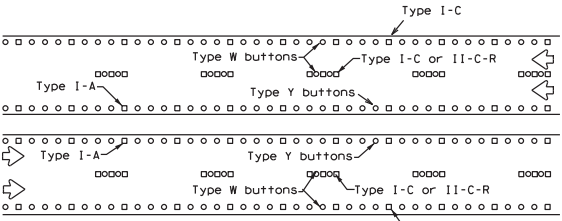
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer. Prefabricated markings may be substituted for reflectORIZED pavement markings.

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



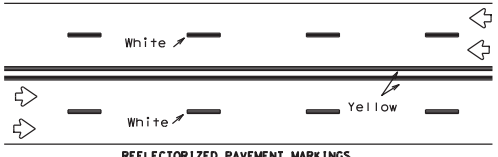
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



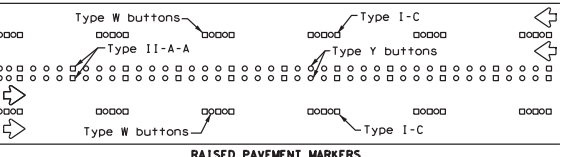
RAISED PAVEMENT MARKERS

EDGE & LANE LINES FOR DIVIDED HIGHWAY



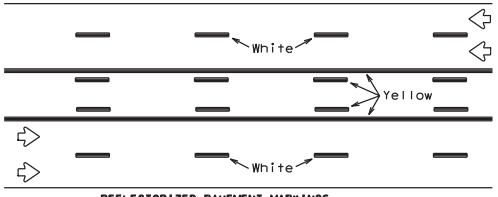
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.



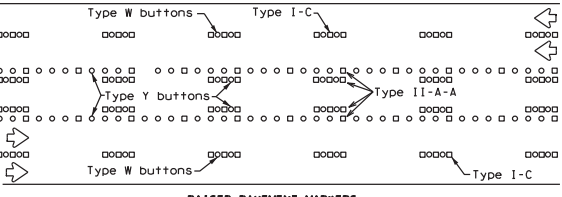
RAISED PAVEMENT MARKERS

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

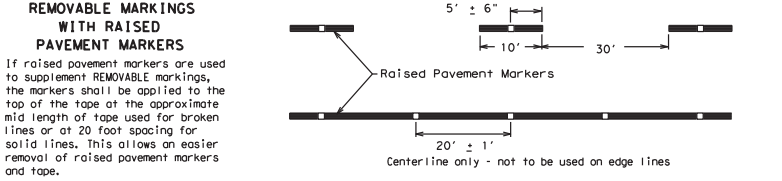
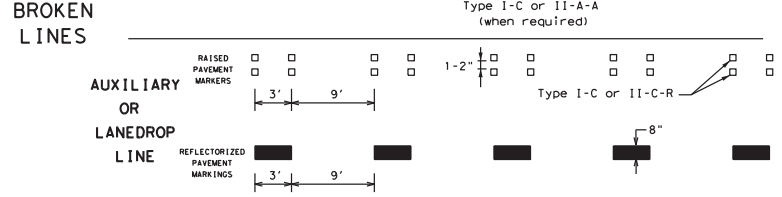
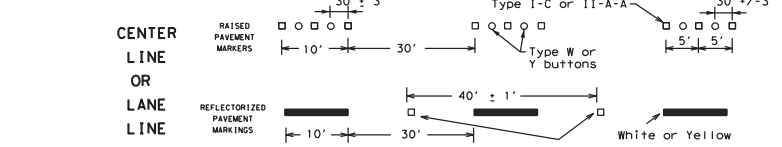
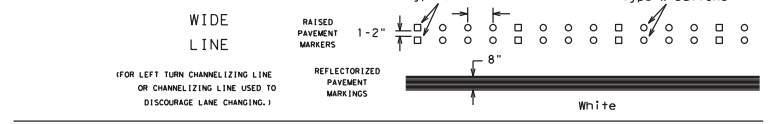
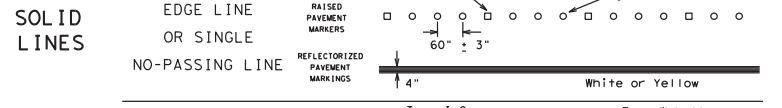
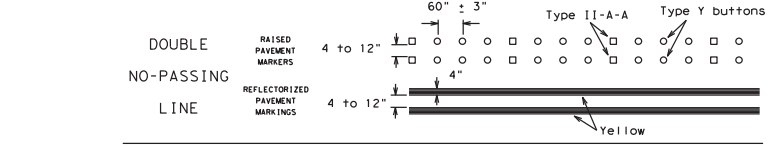
Prefabricated markings may be substituted for reflectORIZED pavement markings.



RAISED PAVEMENT MARKERS

TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SHEET 12 OF 12



BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

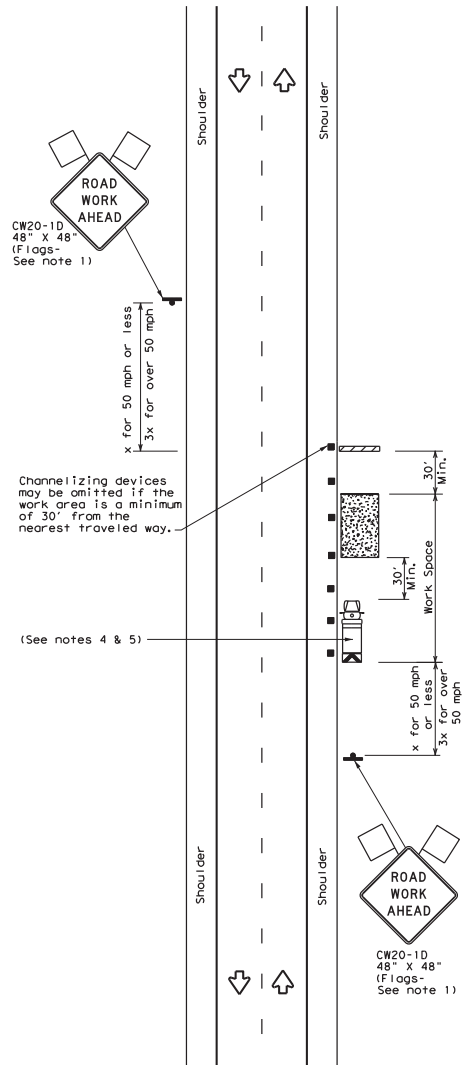
BC (12) - 21

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."

FILE: bc-21.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	EX: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
1-97 9-07 5-21	6407	39	001	US 277, etc.
2-98 7-13			COUNTY	SHEET NO.
11-02 8-14	22		KINNEY, etc.	25

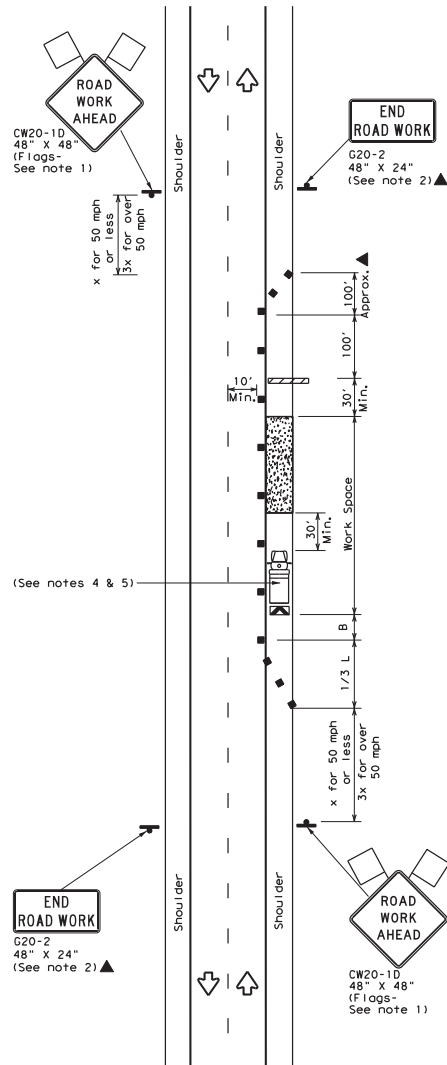
DISCLAIMER:
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DATE: 10/26/2022 8:05:09 AM
FILE: c:\txdot\p_w\on\line\txdot\5\ger-ar.do.m.sporzoi\ez\0802088\tcp2-1-18.dgn



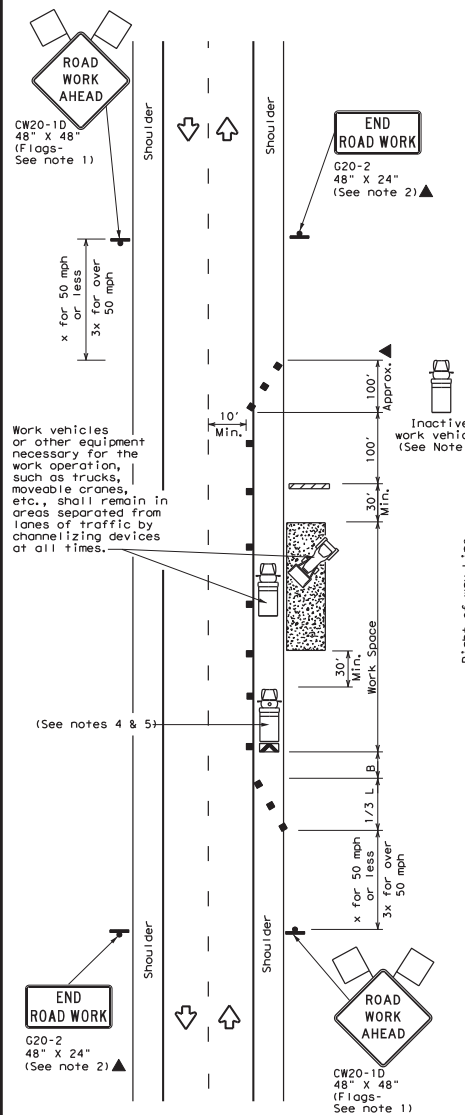
TCP (2-1a)

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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed * X	Formula	Minimum Desirable Taper Lengths ** X			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing * 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)

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

GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
- 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.
- Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
- 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.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation
Traffic Operations Division Standard

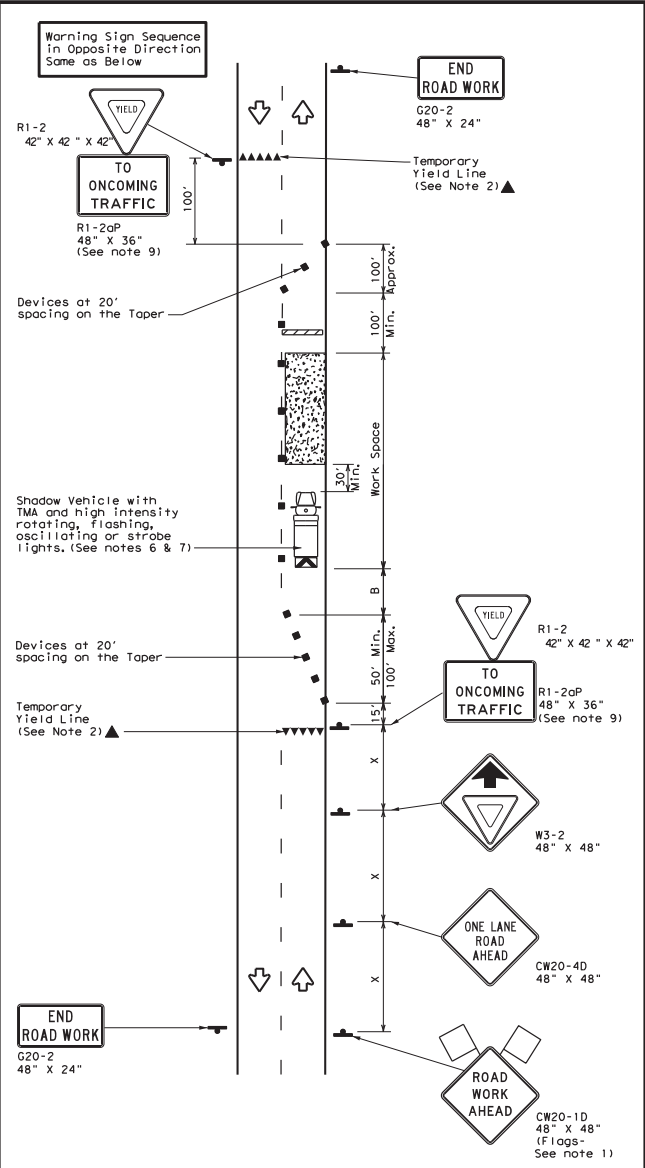
TRAFFIC CONTROL PLAN
CONVENTIONAL ROAD
SHOULDER WORK

TCP (2-1) - 18

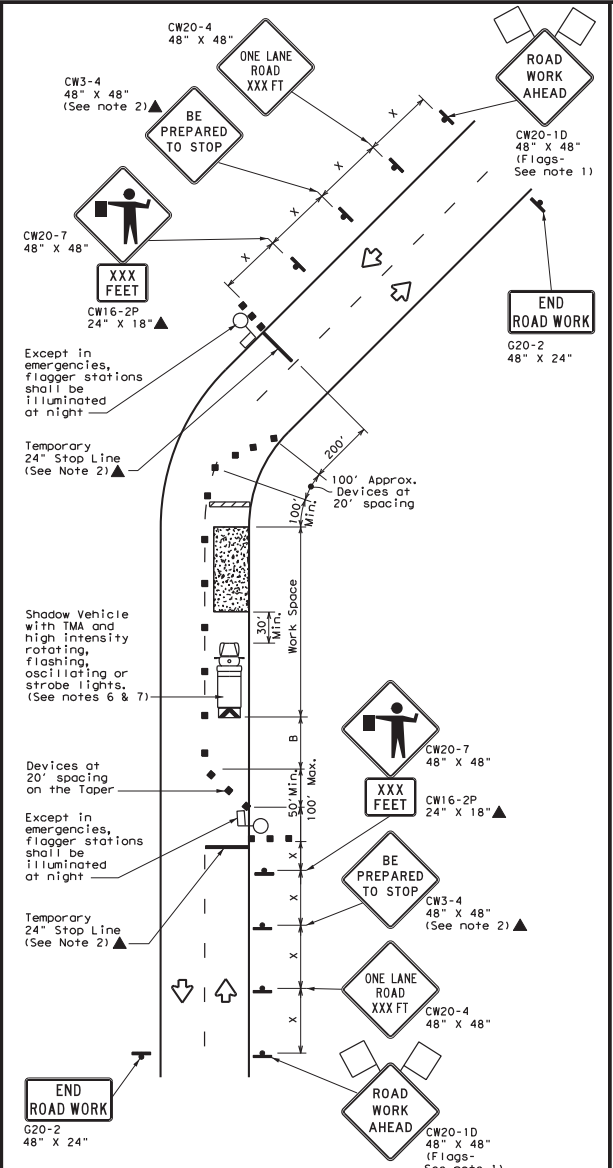
FILE: tcp2-1-18.dgn	DATE: December 1985	CONT: 6407	SECT: 39	JOB: 001	COUNTY: KINNEY, etc.	SHEET NO.: 26
REVISIONS						
2-94	4-98					
8-95	2-12					
1-97	2-18					

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DATE: 10/26/2022 8:05:18 AM
 FILE: c:\txdot\p_w\on_line\txdot\5\gerard.do.m.sporzoi\ez\0802088\tcp2-2-18.dgn



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)
	Sign		Portable Changeable Message Sign (PCMS)
	Flag		Traffic Flow
	Flagger		

Posted Speed * 30 40 45 50 55 60 65 70 75	Formula L = WS ² / 60	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "b"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30		150'	165'	180'	30'	60'	120'	90'	200'
40		205'	225'	245'	35'	70'	160'	120'	250'
45		265'	295'	320'	40'	80'	240'	155'	305'
50		450'	495'	540'	45'	90'	320'	195'	360'
55		500'	550'	600'	50'	100'	400'	240'	425'
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	LONG TERM STATIONARY
	✓	✓	✓

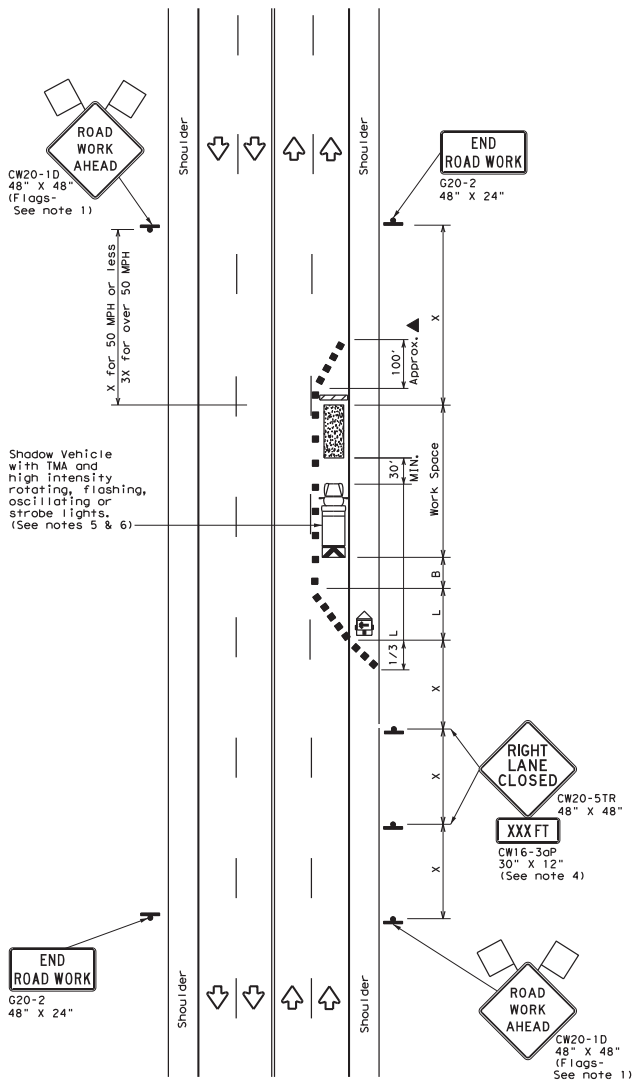
GENERAL NOTES

- Flags attached to signs where shown, are REQUIRED.
 - 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.
 - 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.
 - Flaggers should use two-way radios or other methods of communication to control traffic.
 - Length of work space should be based on the ability of flaggers to communicate.
 - 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.
 - 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)**
- 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.
 - The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.
- TCP (2-2b)**
- Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
 - 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).
 - Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

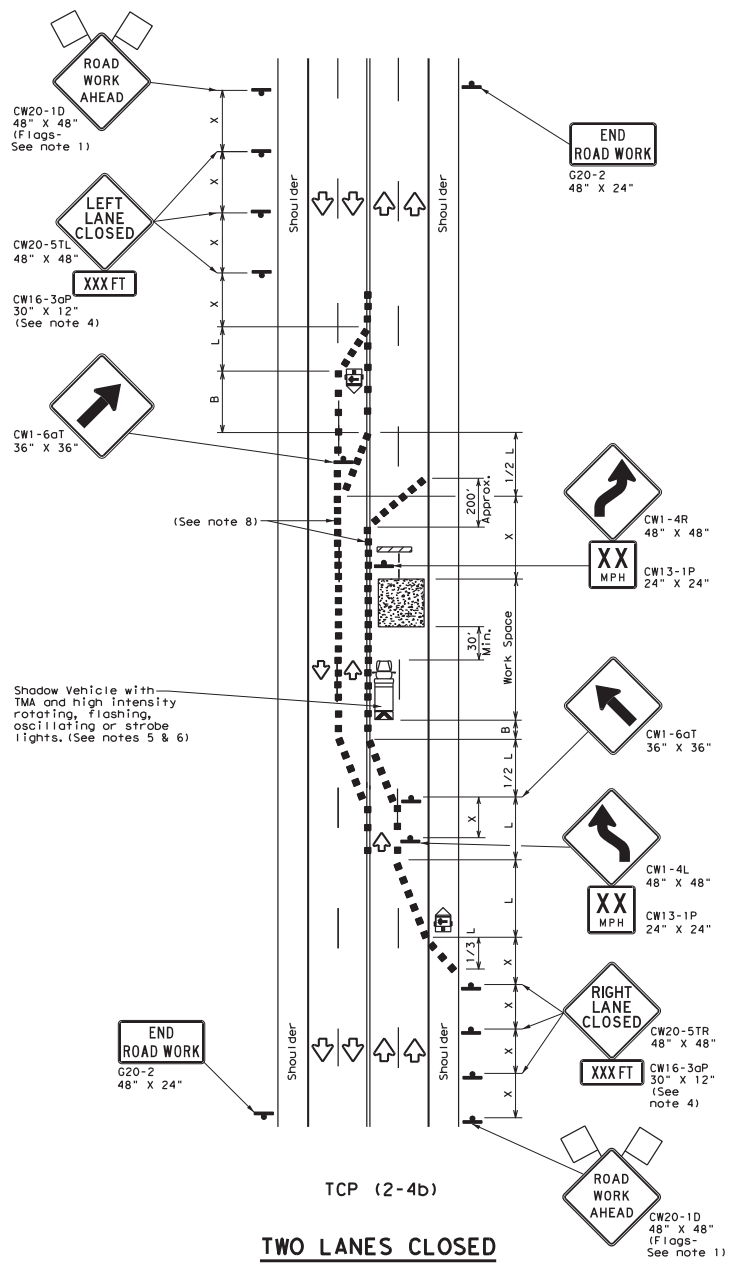
		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN			
ONE-LANE TWO-WAY			
TRAFFIC CONTROL			
TCP (2-2) - 18			
FILE: tcp2-2-18.dgn	DATE: December 1985	CNT: 6407	SECT: 39
REVISIONS		JOB: 001	HIGHWAY: US 277, etc.
8-95 3-03		DIST: COUNTY	SHEET NO.
1-97 2-12		22	KINNEY, etc.
4-98 2-18			27

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DATE: 10/26/2022 8:05:29 AM
 FILE: c:\txdot\p_w\on_line\txdot\5\gerardo.m.gonzalez\0802088\tcp2-4-18.dgn



TCP (2-4a)
ONE LANE CLOSED



TCP (2-4b)
TWO LANES CLOSED

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

Posted Speed *	Formula	Minimum Desirable Taper Lengths X*			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing 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)

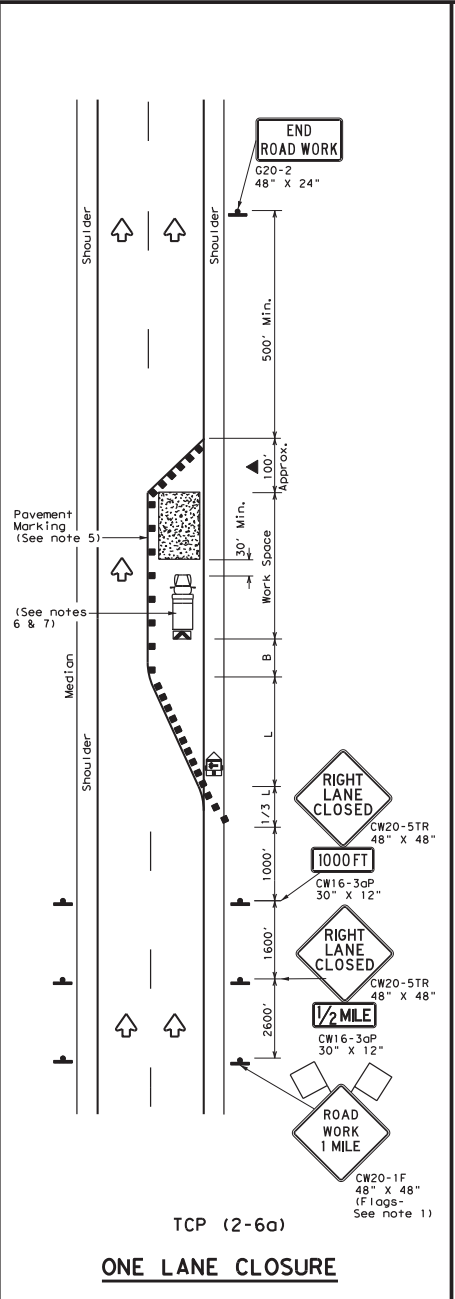
MOBILE	TYPICAL USAGE			
	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - 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.
 - The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
 - 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.
 - 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.
 - 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)**
- 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)**
- 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 device spacing is intended for the area of conflicting markings, not the entire work zone.

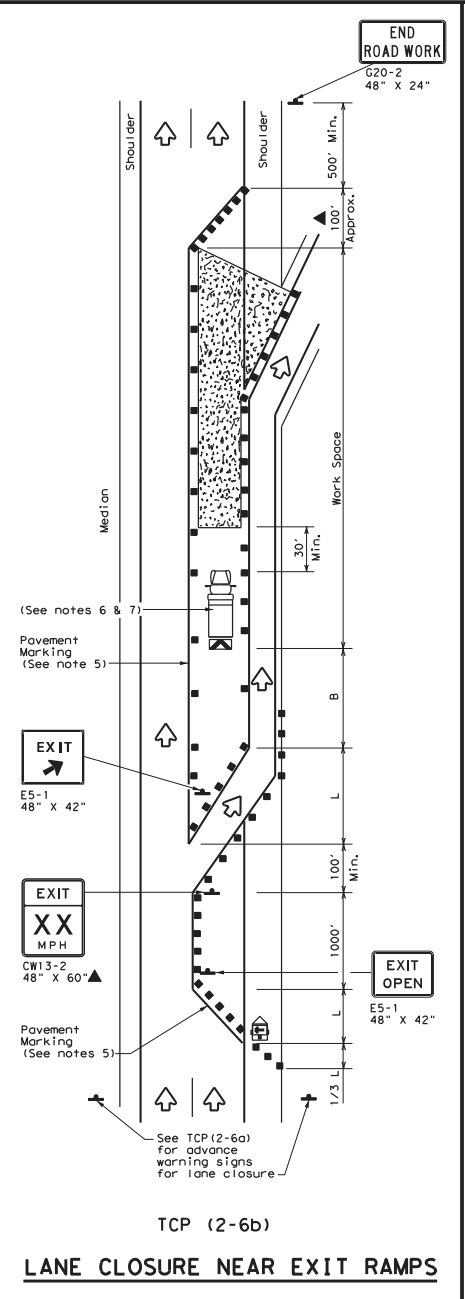
				Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN					
LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS					
TCP (2-4) - 18					
FILE: tcp2-4-18.dgn	DATE: December 1985	CONTRACT: 640739	SECTION: 001	JOB: US 277, etc.	CITY: KINNEY, etc.
REVISIONS: 1-97 2-12	DIST: 22	COUNTY: KINNEY, etc.	SHEET NO.:	28	

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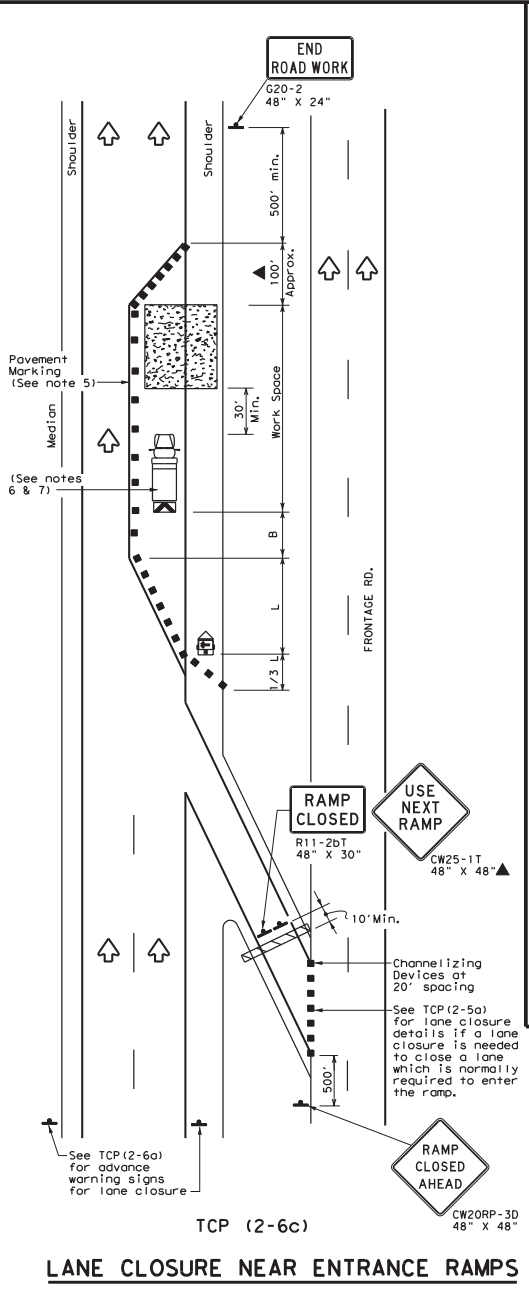
DATE: 10/26/2022 8:05:39 AM
FILE: c:\txdot\p_w\on_line\txdot\5\gerard.do.m.sporzoi.ez.v0802088\tcp2-6-18.dgn



TCP (2-6a)
ONE LANE CLOSURE



TCP (2-6b)
LANE CLOSURE NEAR EXIT RAMP



TCP (2-6c)
LANE CLOSURE NEAR ENTRANCE RAMP

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

Posted Speed * *	Formula	Minimum Desirable Spacing of Channelizing Devices **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing * Distance	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	L = WS / 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	LONG TERM STATIONARY

- GENERAL NOTES**
- Flags attached to signs where shown, are REQUIRED.
 - 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.
 - 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.
 - Channelizing devices used along the work space or along tangent sections may be supplemented with vertical panels (VP) placed on every other channelizing device. If night time conditions make it difficult to see at least two VPs, the VPs may be placed on each channelizing device.
 - The placement of pavement markings may be omitted on intermediate-term stationary work zones with the approval of the Engineer.
 - Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. 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.
 - 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 ON
DIVIDED HIGHWAYS**

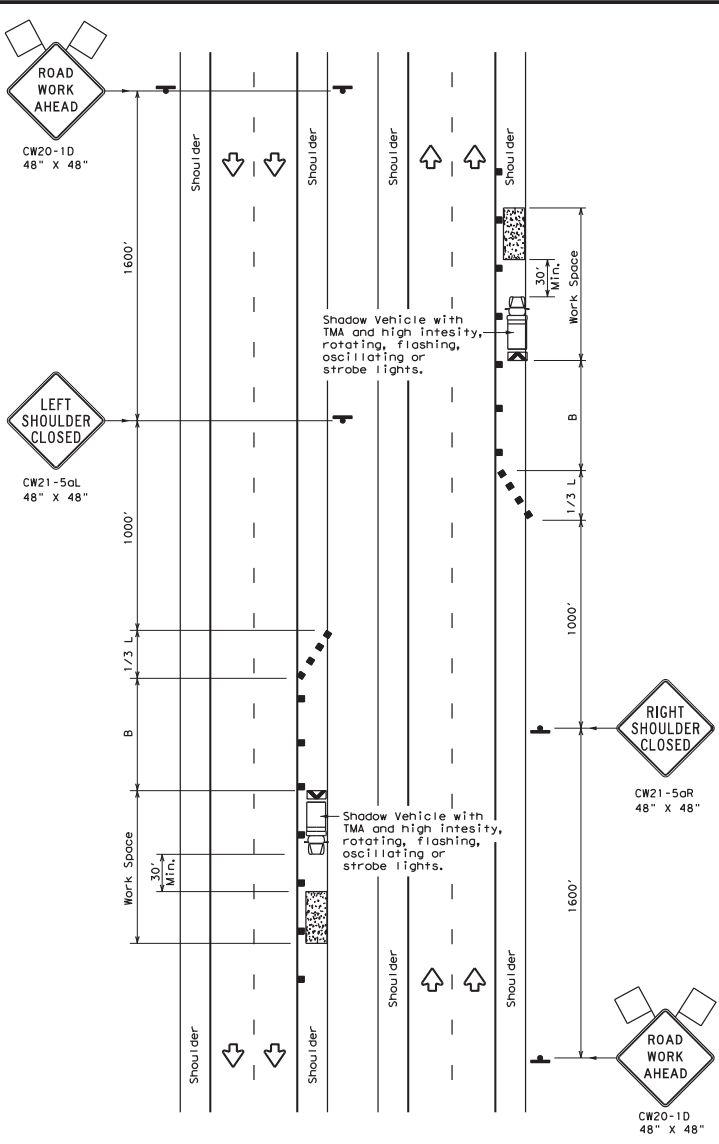
TCP (2-6) - 18

FILE:	tcp2-6-18.dgn	DATE:	08/11/2018	BY:	CK1
© TxDOT	December 1985	CONT:	6407	SECT:	39
2-94	4-98	REVISIONS:	001	JOB:	US 277, etc.
8-95	2-12			COUNTY:	
1-97	2-18		22	KINNEY, etc.	29

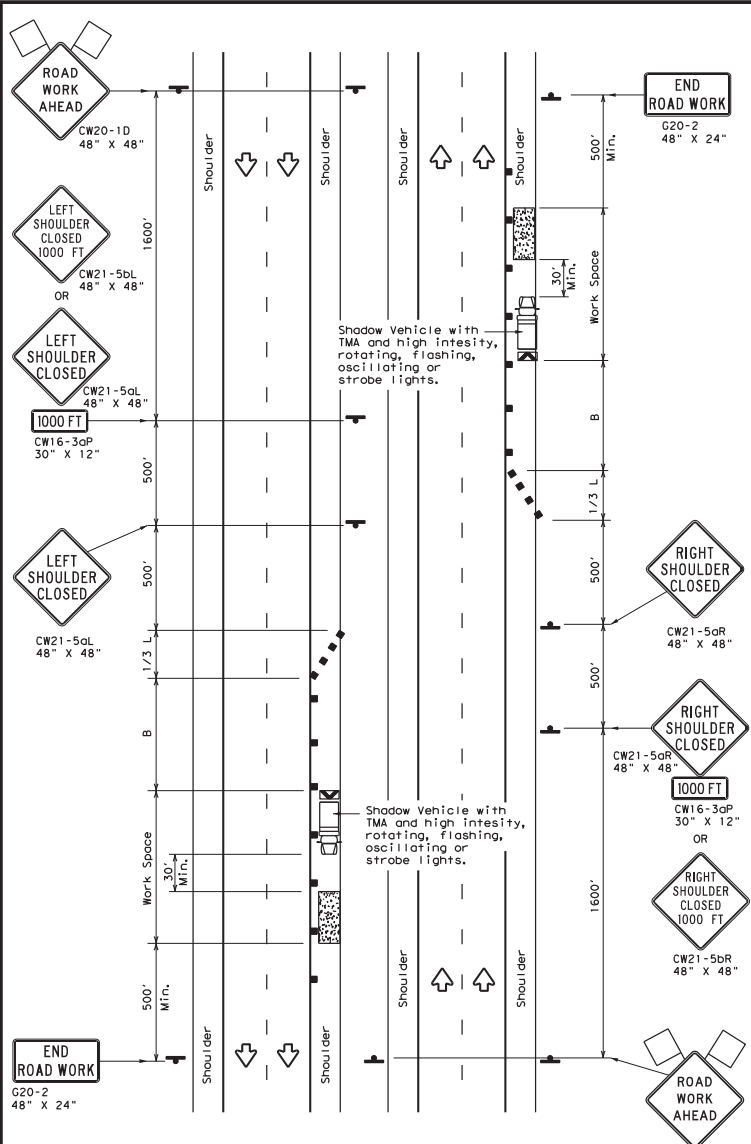
[166]

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DATE: 10/26/2022 8:05:48 AM
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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		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed * *	Formula	Minimum Desirable Taper Lengths			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
30	L = 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	L = WS	600'	660'	720'	60'	120'	350'
65		650'	715'	780'	65'	130'	410'
70		700'	770'	840'	70'	140'	475'
75	L = WS	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**
- 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 affecting 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.
 - 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.



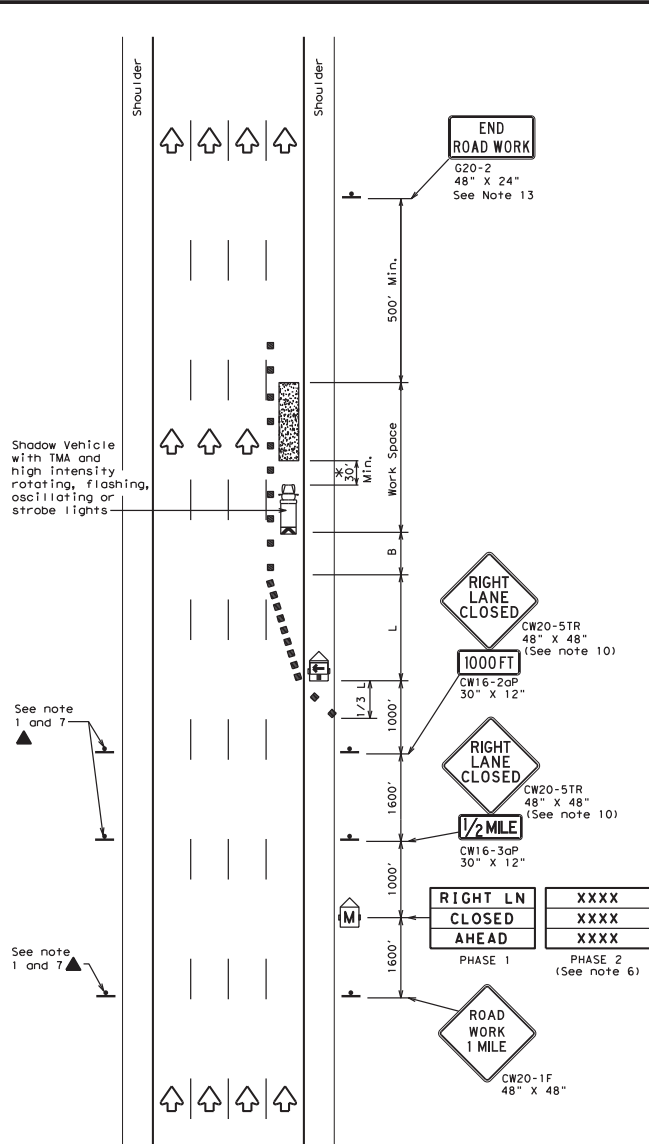
**TRAFFIC CONTROL PLAN
 SHOULDER WORK FOR
 FREEWAYS / EXPRESSWAYS**

TCP (5-1) - 18

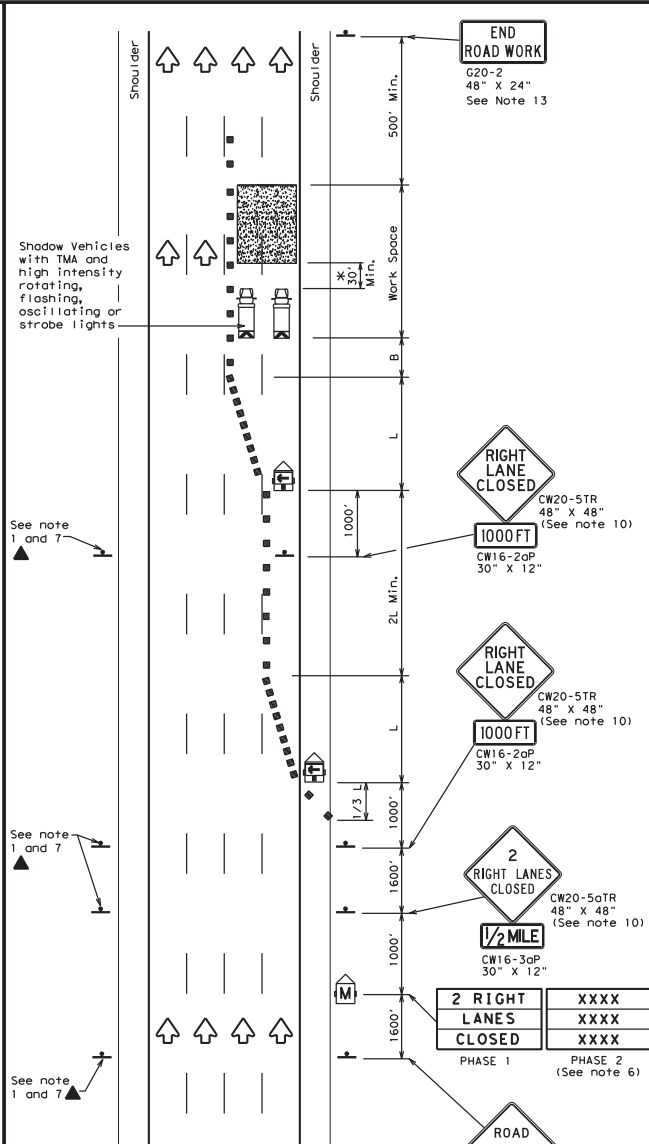
FILE: tcp5-1-18.dgn	DATE: February 2012	CONTRACT NO: 6407	SECTION: 39	JOB NO: 001	HIGHWAY: US 277, etc.
2-18	REVISIONS	DIST: 22	COUNTY: KINNEY, etc.	SHEET NO: 30	

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TCP (6-1-a)
**TYPICAL FREEWAY
ONE LANE CLOSURE**



TCP (6-1-b)
**TYPICAL FREEWAY
TWO LANE CLOSURE**

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L"			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
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'

**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

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- Drums or 42" cones are the typical channelizing devices. For Intermediate Term Stationary work, drums shall be used on tapers with drums or 42" cones used on tangent sections. Other channelizing devices may be used as directed by the Engineer.
- All construction signs and barricades placed during any phase of work shall remain in place until removal is approved by the Engineer.
- The Engineer may direct the Contractor to furnish additional signs and barricades as required to maintain traffic flow, detours and motorist safety during construction.
- Static message boards or changeable message signs stating the date and duration of ramp or freeway lane closures shall be placed a minimum of seven (7) calendar days in advance of the actual closure.
- Phase 2 of the PCMS message should include appropriate information formatted as shown on BC(6), such as "MERGE LEFT," recommended advisory speed, delay information, or other specific warnings.
- Duplicate construction warning signs should be erected on the medians side of freeways where median width will permit and traffic volume justifies the signing.
- The number of closed lanes may be increased provided the spacing of traffic control devices, taper lengths and tangent lengths meet the requirements of the MUTCD.
- Warning signs for intermediate term stationary work should be mounted at 7' to the bottom of the sign.
- Warning signs shown shall be appropriately altered for left lane closures. When signs are mounted at 1' height for short term stationary or short duration work, sign versions shown in the SHSD for Texas with distances on the sign face rather than mounted on a plaque below the sign may be used.
- When possible, PCMS units should be located in advance of the last available exit ramp prior to the lane closure to allow motorists an alternate route. They may also be relocated to improve advance warning in case of unanticipated queuing or congestion.
- For Intermediate Term Stationary work at night, floodlights should be used to illuminate the work area and equipment crossings. Floodlights shall not produce a disabling glare condition for road users or workers.
- The END ROAD WORK (G20-2) sign may be omitted when it conflicts with G20-2 signs already in place on the project.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.



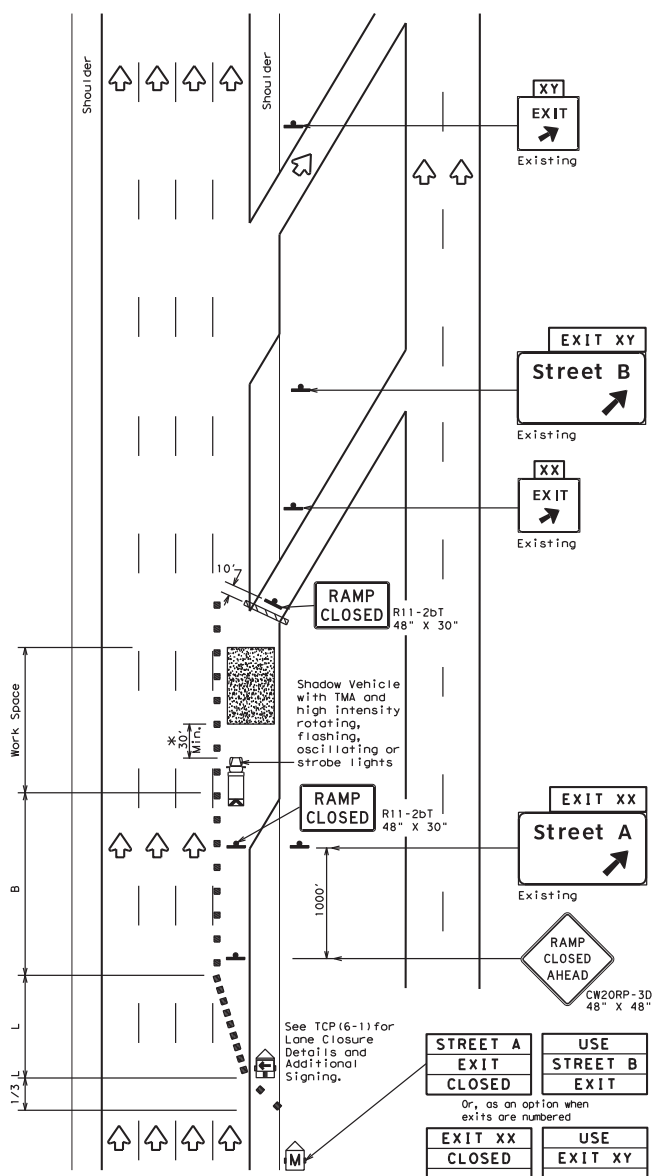
**TRAFFIC CONTROL PLAN
FREEWAY LANE CLOSURES**

TCP (6-1) - 12

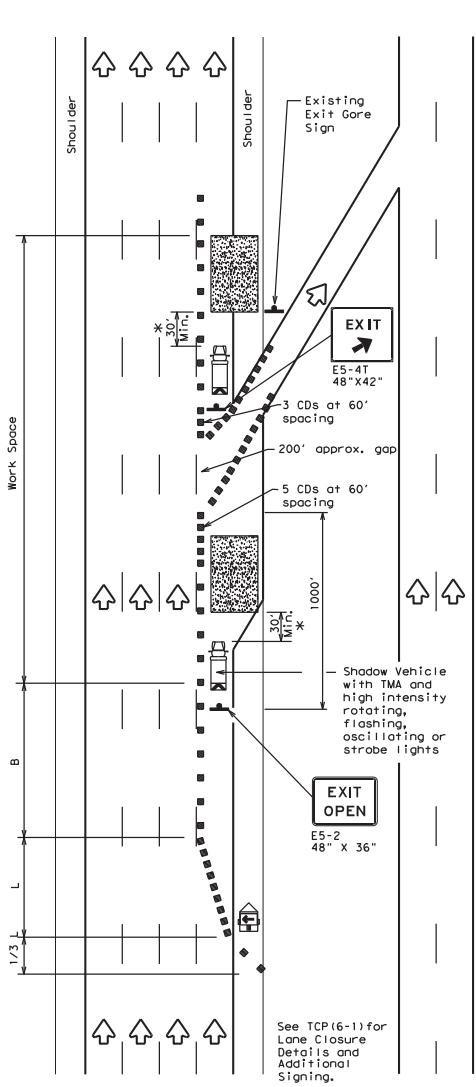
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© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
8-12	6407	39	001	US 277, etc.
	DIST	COUNTY		SHEET NO.
	22	KINNEY, etc.		31

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TCP (6-4a)
EXIT RAMP CLOSED
TRAFFIC EXITS PAST CLOSED RAMP



TCP (6-4b)
EXIT RAMP OPEN

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

Posted Speed	Formula	Minimum Desirable Taper Lengths "L"			Suggested Maximum Spacing of Channelizing Devices		Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent	
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'

**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

- All traffic control devices illustrated are REQUIRED. Devices denoted with the triangle symbol may be omitted when stated elsewhere in the plans.
- See BC Standards for sign details.

*A shadow vehicle equipped with a Truck Mounted Attenuator is typically required. A shadow vehicle equipped with a TMA shall be used if it can be positioned 30' to 100' in advance of the area of crew exposure without adversely affecting the work performance.

Additional requirements for lane closures and advance signing shall be as shown on TCP (6-1) or as directed by the Engineer.

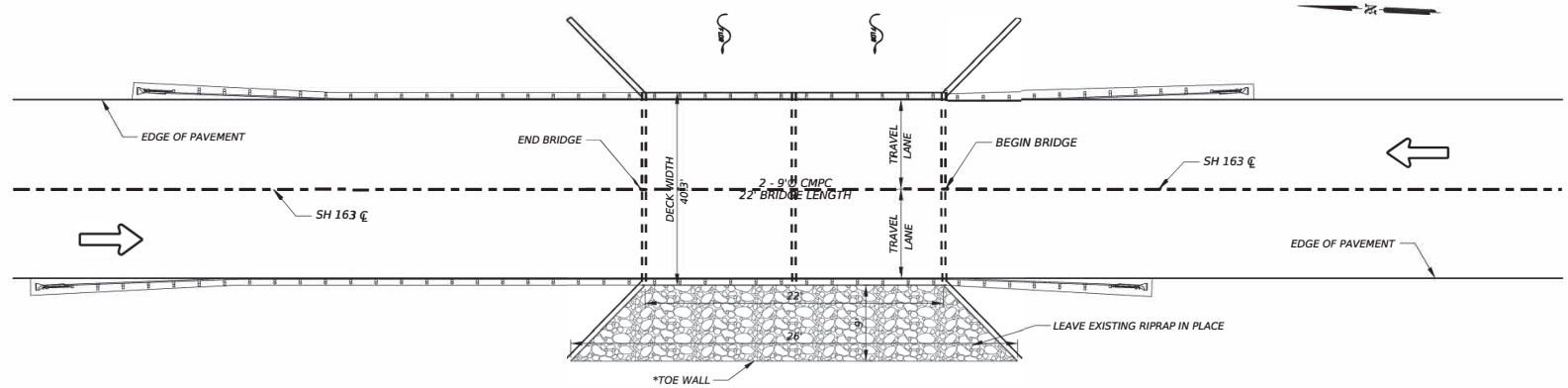


TRAFFIC CONTROL PLAN
WORK AREA AT EXIT RAMP

TCP (6-4) - 12

FILE: tcp6-4.dgn	DN: TxDOT	CR: TxDOT	DR: TxDOT	CK: TxDOT
© TxDOT February 1994	CONT	SECT	JOB	HIGHWAY
REVISIONS	6407	39	001	US 277, etc.
1-97 8-98	DIST	COUNTY	SHEET NO.	
4-98 6-12	22	KINNEY, etc.	32	

1/2" = 1'-0"



LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 NORTHWEST RIPRAP
72 SY GABION MATTRESS

SUMMARY OF BRIDGE ITEMS	
PSN	459
	6007
	GABION MATTRESSES (GALV)(12 IN)
	SY
22-233-00412-05-028	72
PROJECT TOTALS	72

* PLAN VIEW OF BRIDGE IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
4. CONCRETE REPAIR DIMENSIONS ARE APPROXIMATE. ACTUAL REPAIR DIMENSIONS WILL VARY. PAYMENT FOR EXTRA WORK DIRECTED, PERFORMED, AND ACCEPTED WILL BE MADE IN ACCORDANCE TO ARTICLE 4.4. "CHANGES IN WORK" FROM TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES.
5. FILTER FABRIC WILL BE USED IN GABION MATTRESS CONSTRUCTION.
6. ALL THE NECESSARY EQUIPMENT, MATERIAL, PERSONEL, AND ANY INCIDENTALS NEEDED TO CARRY OUT THE CONSTRUCTION OF THE GABION MATTRESS, INCLUDING ANY REGRADING AND PLACEMENT OF FILTER FABRIC, WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
7. ALL THE NECESSARY EQUIPMENT, MATERIAL, PERSONEL, AND ANY INCIDENTALS NEEDED TO CARRY OUT THE REMOVAL OF THE SEDIMENTED SHOULDER ROCK, INCLUDING THE DISPOSAL, WILL BE SUBSIDIARY TO THE PERTINENT BID ITEMS.
8. PROPOSED DIMENSIONS AND DEPICTED LOCATION OF GABION MATTRESS MAY BE ADJUSTED TO FIT FIELD CONDITIONS.

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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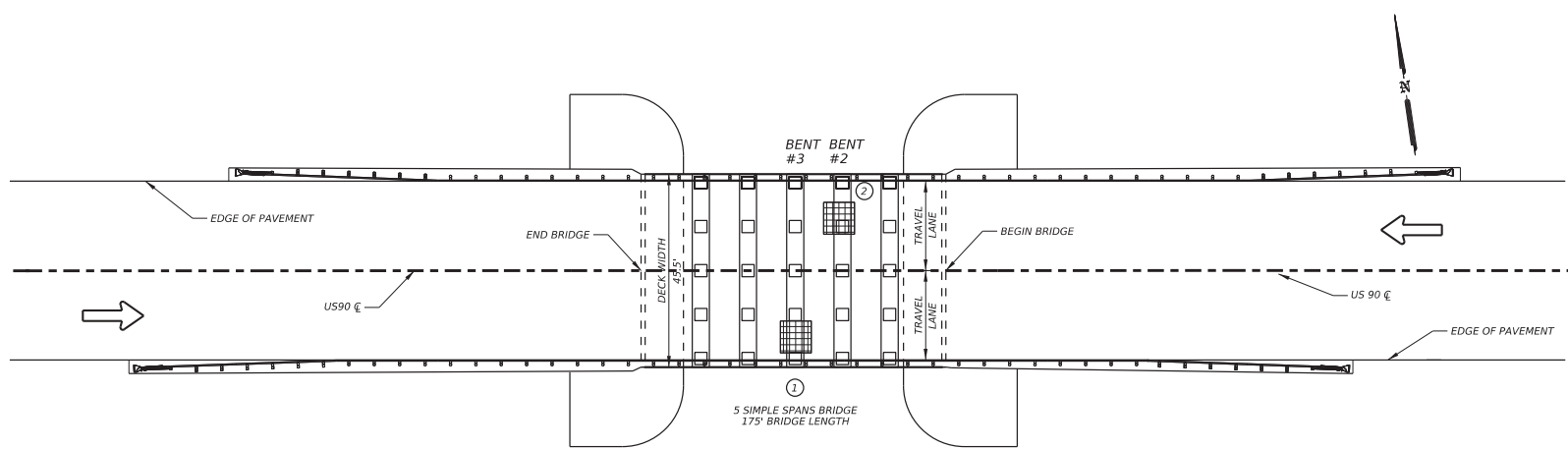


SH 163
BRIDGE LAYOUT
LOCATION 1

SHEET 1 OF 1

CDIST	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	33	

OK
 DWG
 LOC
 DWG



LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



- ① BENT 3 COLUMN No. 2
16 SOFT INTERMEDIATE SPALL REPAIR
- ② BENT 2 COLUMN No. 5
10 SOFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS			
PSN	429	780	
	6007	6010	
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CNC CRACK REPAIR (DISCRETE) (SURF SEAL)	
	SF	LF	
22-123-00023-02-013	26	50	
PROJECT TOTALS	26	50	

* PLAN VIEW OF BRIDGE IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

- THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
- LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
- ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PAVEMENT ITEMS.
- CONCRETE REPAIR DIMENSIONS ARE APPROXIMATE, ACTUAL REPAIR DIMENSIONS WILL VARY. PAYMENT FOR EXTRA WORK DIRECTED, PERFORMED, AND ACCEPTED WILL BE MADE IN ACCORDANCE TO ARTICLE 4.4. *CHANGES IN WORK* FROM TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES.
- PINTO CREEK IS HABITAT FOR THE FEDERALLY LISTED DEVILS RIVER MINNOW (DIONDA DIABOLI). NO DISTURBANCE IS ALLOWED WITHIN THE WATER OF PINTO CREEK. THE CONTRACTOR IS NOT ALLOWED TO PLACE ANY MATERIALS OR EQUIPMENT IN THE WATER AT THIS LOCATION. FOR WORK PERFORMED OVER THE WATER, THE CONTRACTOR IS REQUIRED TO ENSURE THAT NONE OF THE CONSTRUCTION OR DEMOLITION MATERIALS FALL INTO WATERS OF PINTO CREEK WHILE PERFORMING THE LISTED MAINTENANCE ACTIVITY. IF THE CONTRACTOR HAS ANY QUESTIONS ABOUT THIS PROJECT LOCATION, PLEASE CONTACT CHRIS KLOSS, THE LAREDO DISTRICT ENVIRONMENTAL COORDINATOR, AT 956-712-74445 OR CHRIS.KLOSS@TXDOT.GOV

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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Texas Department of Transportation

US 90

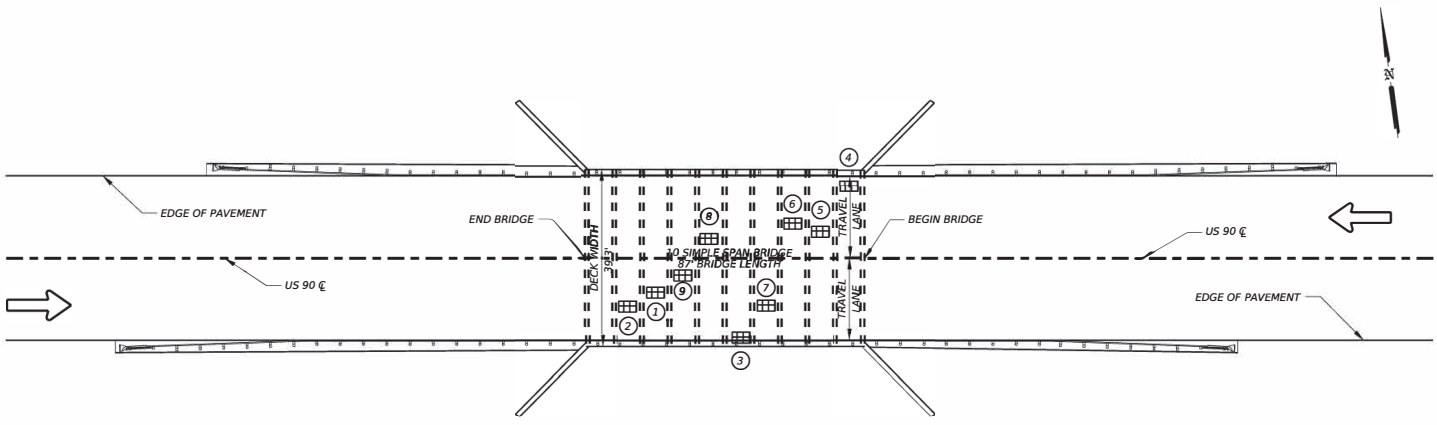
BRIDGE LAYOUT
LOCATION 2

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	34	

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1/2" = 1' 0"
 1/4" = 1' 0"
 1/8" = 1' 0"
 1/16" = 1' 0"
 1/32" = 1' 0"
 1/64" = 1' 0"

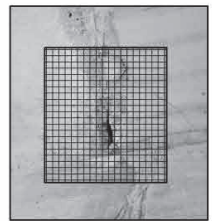


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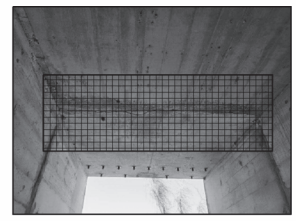
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

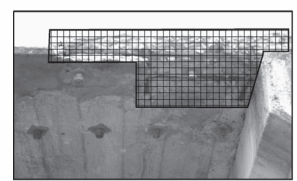
FLOW OF TRAFFIC



1 BOTTOM TOP SLAB BARREL No. 8
4 SQFT INTERMEDIATE SPALL REPAIR



2 BOTTOM TOP SLAB BARREL No. 9
8 SQFT INTERMEDIATE SPALL REPAIR



3 BOTTOM TOP SLAB BARREL No. 5
4 SQFT INTERMEDIATE SPALL REPAIR

- 4 BARREL No. 1
4 SQFT INTERMEDIATE SPALL REPAIR
- 5 BARREL No. 2
4 SQFT INTERMEDIATE SPALL REPAIR
- 6 BARREL No. 3
4 SQFT INTERMEDIATE SPALL REPAIR
- 7 BARREL No. 4
4 SQFT INTERMEDIATE SPALL REPAIR
- 8 BARREL No. 6
4 SQFT INTERMEDIATE SPALL REPAIR
- 9 BARREL No. 7
4 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS			
PSN	429	438	
	6007	6001	
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXISTING JOINTS	
22-136-00023-04-018	SF	LF	
	42	100	
PROJECT TOTALS	42	100	

* PLAN VIEW OF BRIDGE IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

- THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA, REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
- LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
- ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
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* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



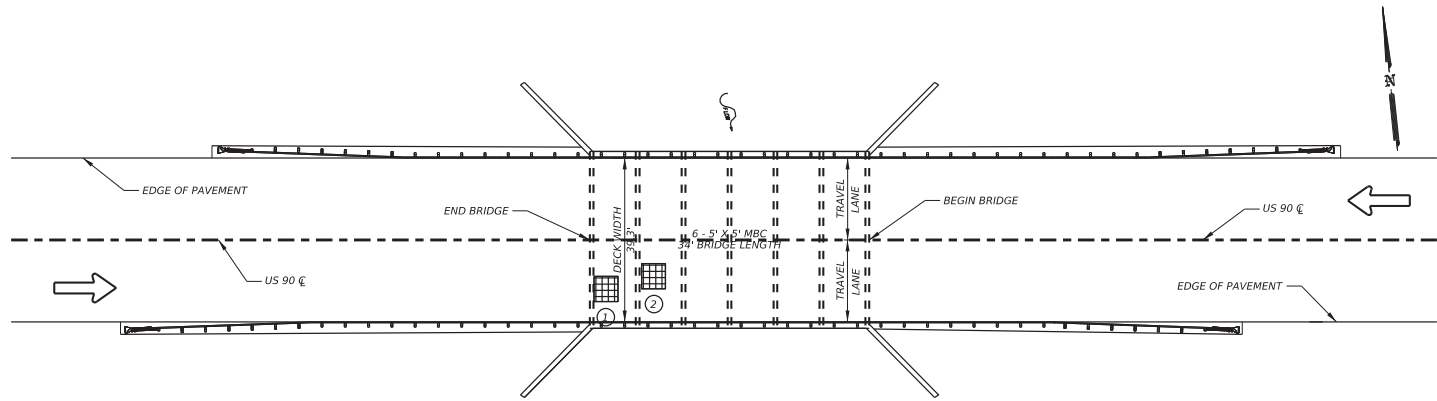
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10/26/2022



US 90			
BRIDGE LAYOUT LOCATION 3			
SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	35	

DWG
 LOC
 DATE
 CHK



LEGEND

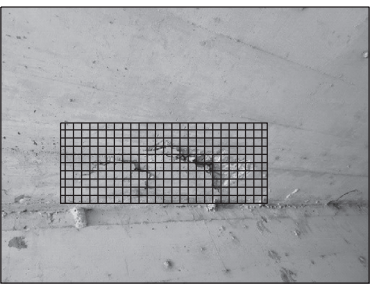
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BOTTOM TOP SLAB BARREL No. 6
 5 SQFT INTERMEDIATE SPALL REPAIR



1 BOTTOM TOP SLAB BARREL No. 5
 16 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS

PSN	CONC STR REPAIR (VERTICAL & OVERHEAD)
22-136-00023-04-020	21
PROJECT TOTALS	21

* PLAN VIEW OF BRIDGE CULVERT IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
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US 277, etc.

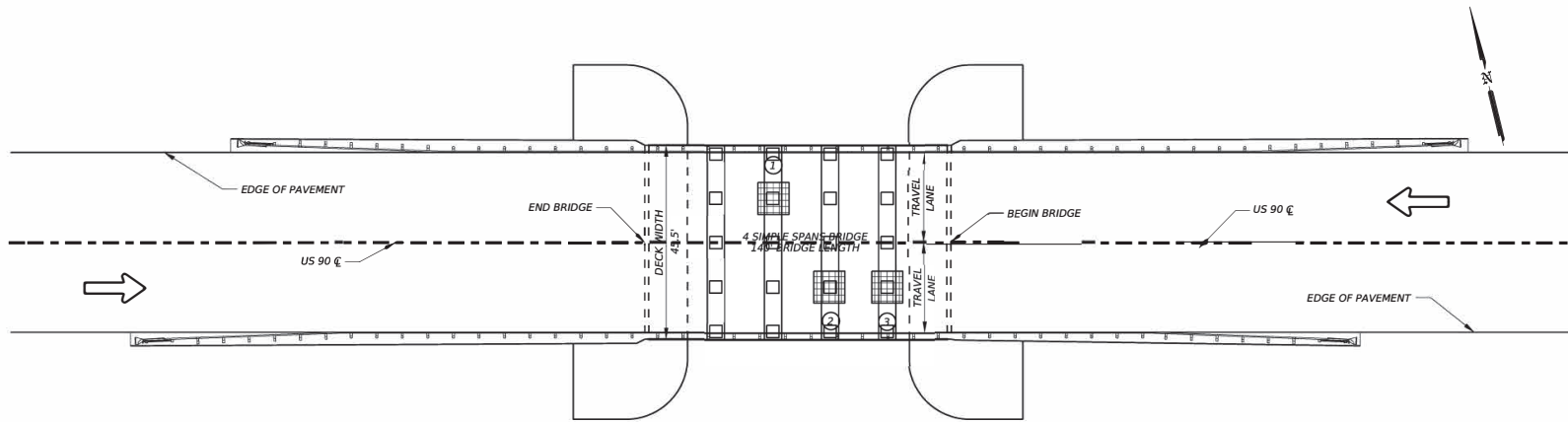
BRIDGE LAYOUT
 LOCATION 4

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	36	

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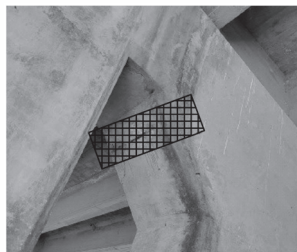


LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BENT 3 RIGHT COLUMN
4 SQFT INTERMEDIATE SPALL REPAIR



2 BENT 2 CAP
6 SQFT INTERMEDIATE SPALL REPAIR



3 BENT 1 CAP
20 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
	429 6007	438 6001
PSN	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING AND SEALING EXISTING JOINTS
	SF	LF
22-136-00023-04-021	30	250
PROJECT TOTALS	30	250

* PLAN VIEW OF BRIDGE CULVERT IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

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2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
4. CONCRETE REPAIR DIMENSIONS ARE APPROXIMATE. ACTUAL REPAIR DIMENSIONS WILL VARY. PAYMENT FOR EXTRA WORK DIRECTED, PERFORMED, AND ACCEPTED WILL BE MADE IN ACCORDANCE TO ARTICLE 4.4. "CHANGES IN WORK" FROM TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES.

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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US 277, etc.




BRIDGE LAYOUT
LOCATION 5

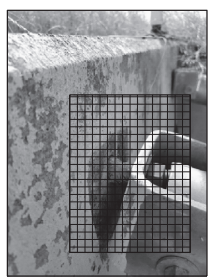
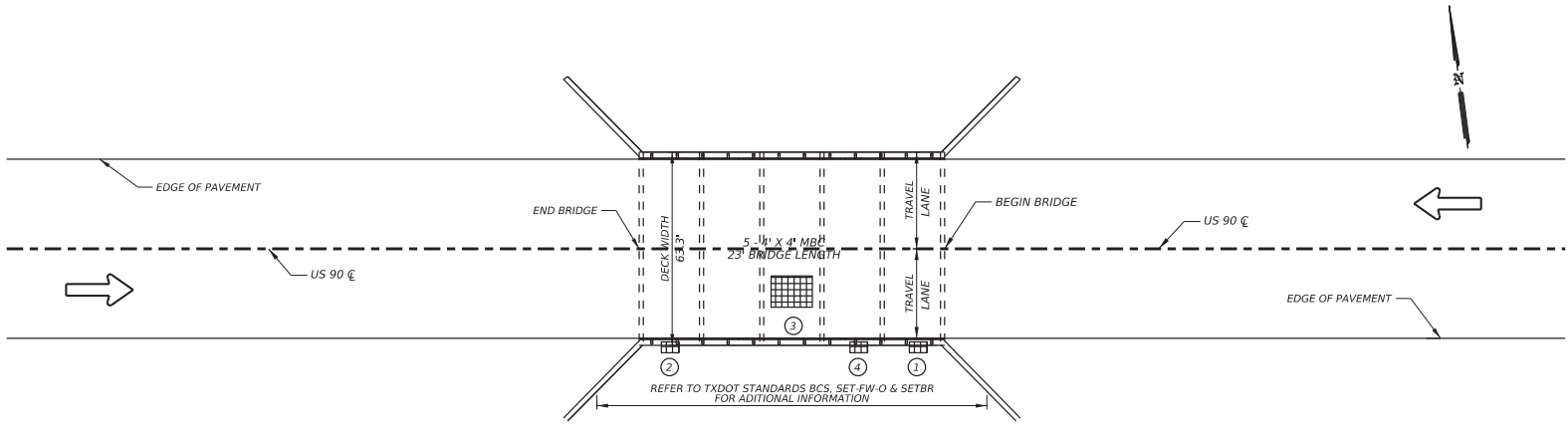
SHEET 1 OF 1

CDIST	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	37	

DWG
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 SEC
 DRAW
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LEGEND

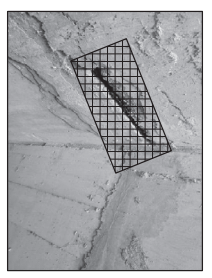
-  WORK AREA TO BE REPAIRED
-  CALLOUT TO BE WORKED ON
-  FLOW OF TRAFFIC



1 PIPE RUNNER 1 SOUTHEAST



1 PIPE RUNNER 3 SOUTHWEST



1 BOTTOM TOP SLAB BARREL No. 8
12 SQFT INTERMEDIATE SPALL REPAIR

1 PIPE RUNNER 2 SOUTHEAST

SUMMARY OF BRIDGE ITEMS

PSN	457 6002	429 6007
	SET (REPLACE PIPE RUNNER)	CONC STR REPAIR (VERTICAL & OVERHEAD)
	EA	SF
22-136-00023-04-024	3	12
PROJECT TOTALS	3	12

* PLAN VIEW OF BRIDGE IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES:

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
4. CONCRETE REPAIR DIMENSIONS ARE APPROXIMATE. ACTUAL REPAIR DIMENSIONS WILL VARY. PAYMENT FOR EXTRA WORK DIRECTED, PERFORMED, AND ACCEPTED WILL BE MADE IN ACCORDANCE TO ARTICLE 4.4. "CHANGES IN WORK" FROM TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS AND BRIDGES.

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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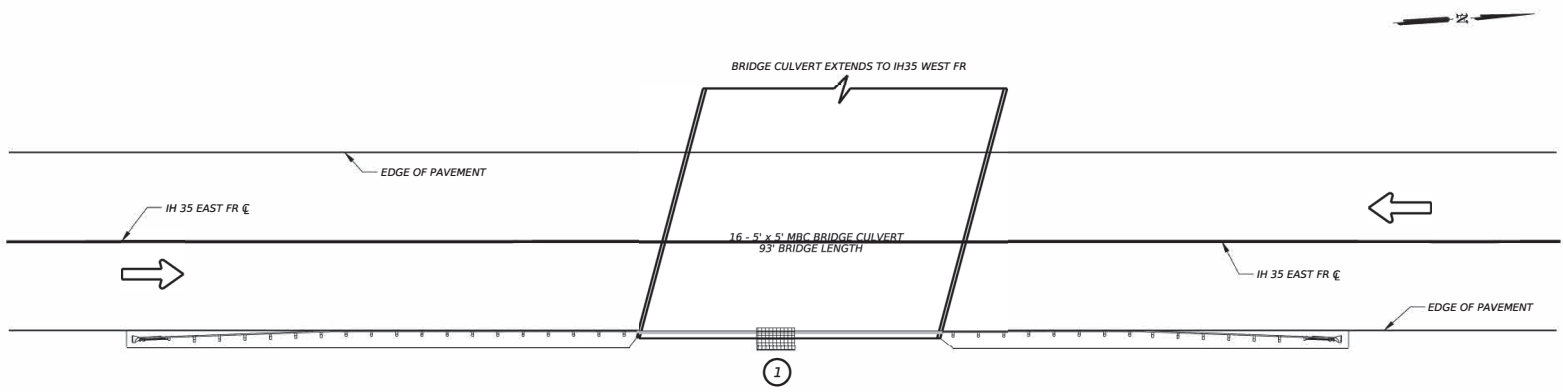
US 277, etc.

BRIDGE LAYOUT
LOCATION 6

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	38	

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LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



① INTERIOR WALL No. 8
4.5 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS			
PSN#	429 6007	480 6001	
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEAN EXIST CULVERTS	
	SF	EA	
22-142-00017-08-145	4.5	1	
PROJECT TOTALS	4.5	1	

NOTES

- THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
- LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
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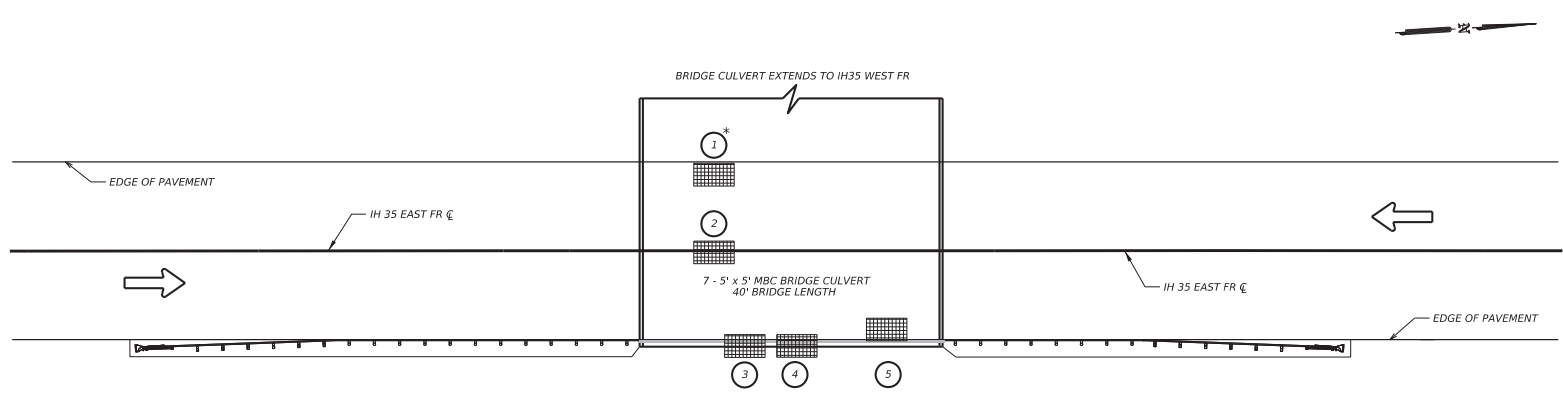


IH 35 EAST FR
BRIDGE LAYOUT
LOCATION 7

SHEET 1 OF 1

CDMT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	39	

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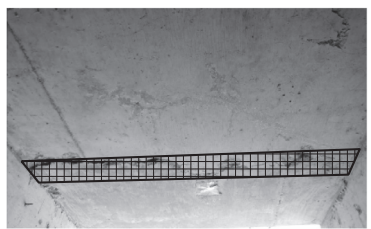


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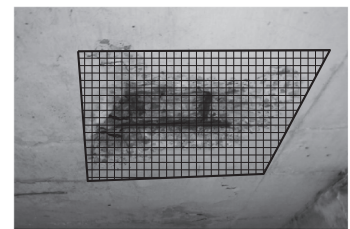
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BOTTOM TOP SLAB BARREL No. 2 (WEST FR)
10 SOFT INTERMEDIATE SPALL REPAIR



4 BOTTOM TOP SLAB BARREL No. 4
9 SOFT INTERMEDIATE SPALL REPAIR



2 INTERIOR WALL CENTER OF BARREL No. 2
2 SOFT INTERMEDIATE SPALL REPAIR

3 BOTTOM TOP SLAB BARREL No. 3
9 SOFT INTERMEDIATE SPALL REPAIR

5 BOTTOM TOP SLAB BARREL No. 6
6 SOFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
PSN#	429 6007	480 6001
		CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF	EA
22-142-00017-08-149	36	1
PROJECT TOTALS	36	1

* SPALL REPAIR LOCATED ON IH35 WEST FRONTAGE ROAD SIDE. PLAN VIEW OF BRIDGE CULVERT IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES

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- LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
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US 277, etc.

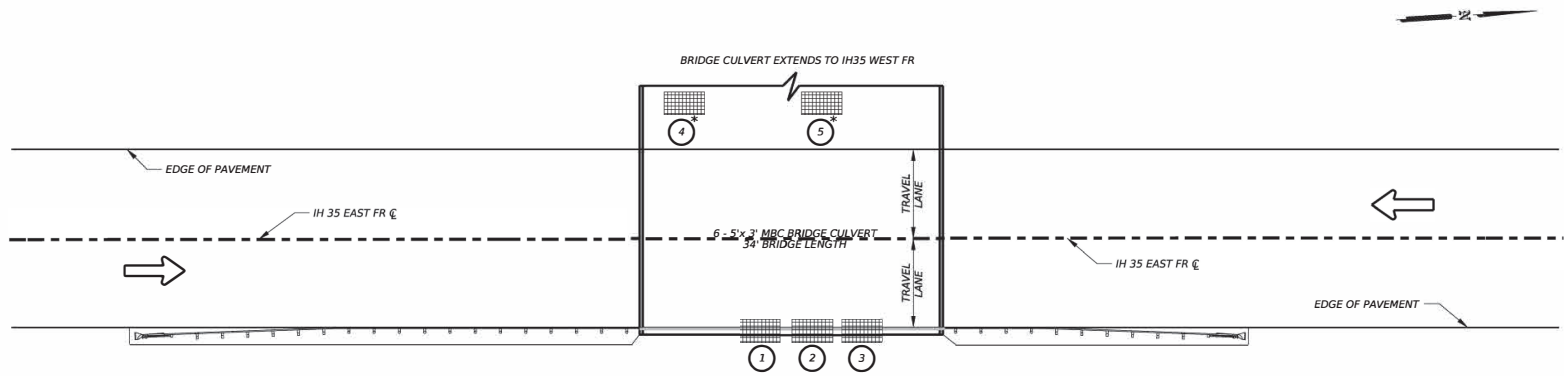
BRIDGE LAYOUT
LOCATION 8

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	40	

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LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BARREL No. 3
2 SOFT INTERMEDIATE SPALL REPAIR



2 BARREL No. 4
8 SOFT INTERMEDIATE SPALL REPAIR



5 BOTTOM TOP SLAB BARREL No. 4 (WEST FR)
15 SOFT INTERMEDIATE SPALL REPAIR

3 BARREL No. 4
5 SOFT INTERMEDIATE SPALL REPAIR

4 HEADWALL SPALL BARREL No. 1 (WEST FR)
1 SOFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
PSN#	429	480
	6007	6001
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEAN EXIST CULVERTS
	SF	EA
22-142-00017-08-151	31	1
PROJECT TOTALS	31	1

* SPALL REPAIR LOCATED ON IH35 WEST FRONTAGE ROAD SIDE. PLAN VIEW OF BRIDGE CULVERT IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES

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


IH 35 EAST FR
BRIDGE LAYOUT
LOCATION 9

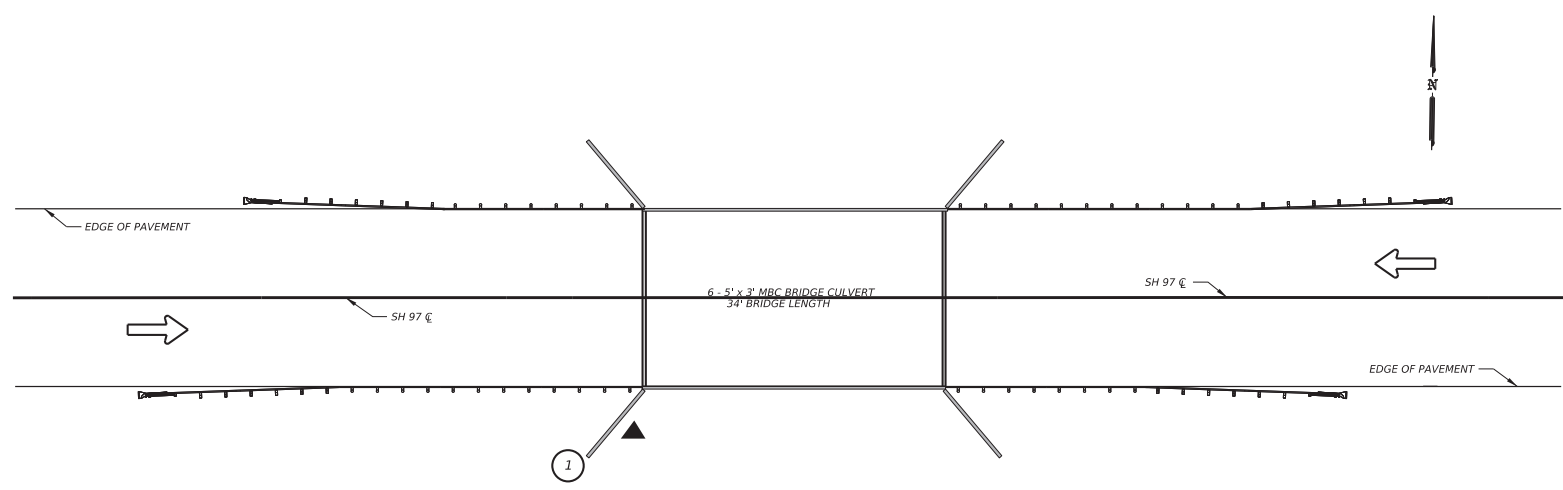
SHEET 1 OF 1

CDWT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	41	

OK
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LOC
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LEGEND

-  WORK AREA TO BE REPAIRED
-  CALLOUT TO BE WORKED ON
-  FLOW OF TRAFFIC



1 SOUTHWEST WINGWALL
10 LF CONCRETE CRACK REPAIR

SUMMARY OF BRIDGE ITEMS	
	780
	6004
PSN #	CONC CRCK REPR(DISCRETE)(ROUT AND SEAL)
	LF
22-142-00483-01-044	10
PROJECT TOTALS	10

NOTES

1. REFER TO CHAPTER 3 SECTION 7 CRACK REPAIR SURFACE SEALING ON THE CONCRETE REPAIR MANUAL FOR MORE INFORMATION. CRACK REPAIRS TO BE DETERMINED BY THE ENGINEER.
- ▲ LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING JOINTS AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.



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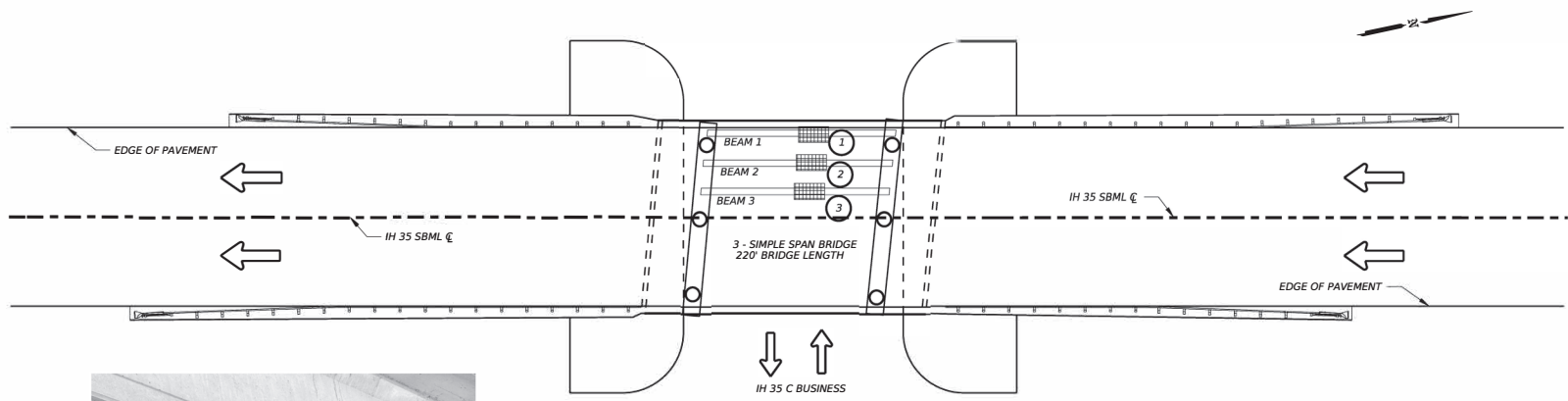


SH 97
BRIDGE LAYOUT
LOCATION 10

CONT	SECT	JOB	HS&RBAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	42	

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LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



- 1 BEAM 1
8 SOFT INTERMEDIATE SPALL REPAIR
- 2 BEAM 2
5 SOFT INTERMEDIATE SPALL REPAIR
- 3 BEAM 3
1 SOFT INTERMEDIATE SPALL REPAIR



PSN #	429 6007	7212 6002
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEANING SUBSTRUCTURE (ABUT)
	SF	EA
22-142-00017-08-244	14	2
PROJECT TOTALS	14	2

NOTES

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


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BRIDGE LAYOUT
LOCATION 11

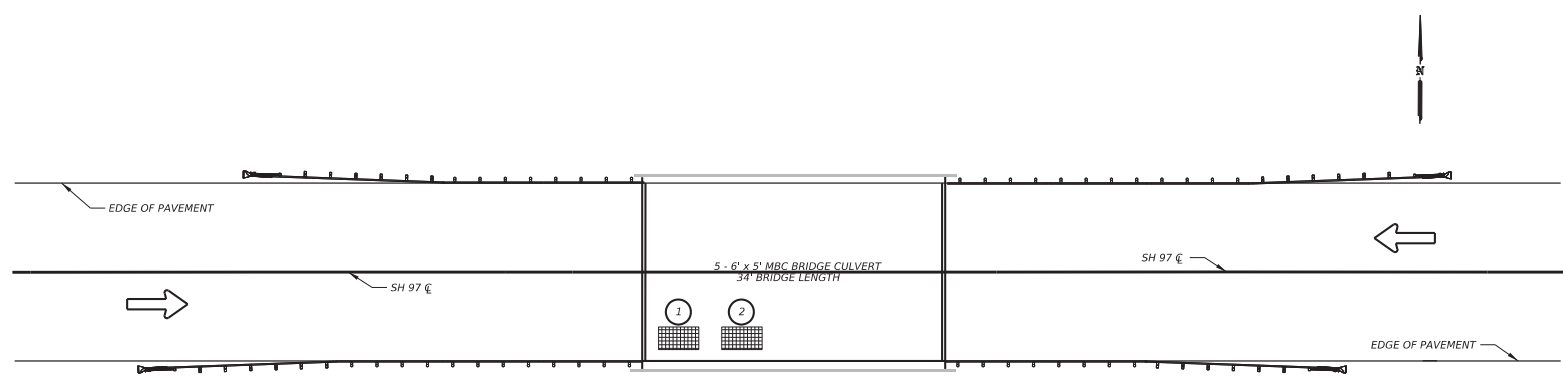
SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	43	

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LEGEND

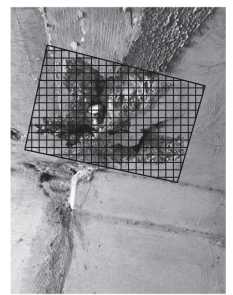
-  WORK AREA TO BE REPAIRED
-  CALLOUT TO BE WORKED ON
-  FLOW OF TRAFFIC



1 SIDEWALL BARREL No. 1
2 SOFT INTERMEDIATE SPALL REPAIR
SIDEWALL BARREL No. 1
3 SOFT INTERMEDIATE SPALL REPAIR



1 BOTTOM TOP SLAB BARREL No. 1
3 SOFT INTERMEDIATE SPALL REPAIR



2 BOTTOM TOP SLAB BARREL No. 2
6 SOFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS	
	429 6007
PSN#	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
22-142-00483-01-011	14
PROJECT TOTALS	14

NOTES

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
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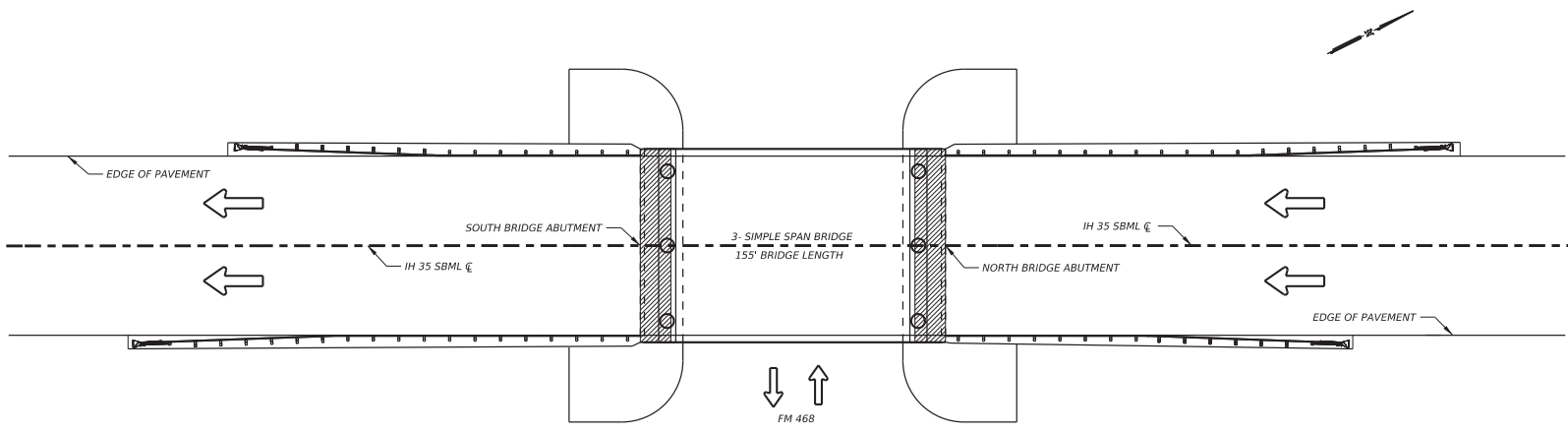
BRIDGE LAYOUT
LOCATION 12

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	44	

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LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



NORTH ABUTMENT

SUMMARY OF BRIDGE ITEMS	
PSN#	7212
	6002
	CLEANING SUBSTRUCTURE (ABUT)
	EA
22-142-00017-08-246	2
PROJECT TOTALS	2

NOTES

1. REMOVE ALL DEBRIS MATERIAL FROM ABUTMENT BY METHODS THAT WILL NOT DAMAGE CONCRETE OR BEARING DEVICES. ANY DAMAGE TO THE SUBSTRUCTURE WILL RESULT AT CONTRACTOR'S EXPENSE AND WILL NOT BE COMPENSATED UNDER SPECIAL SPECIFICATION "7212".



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US 277, etc.

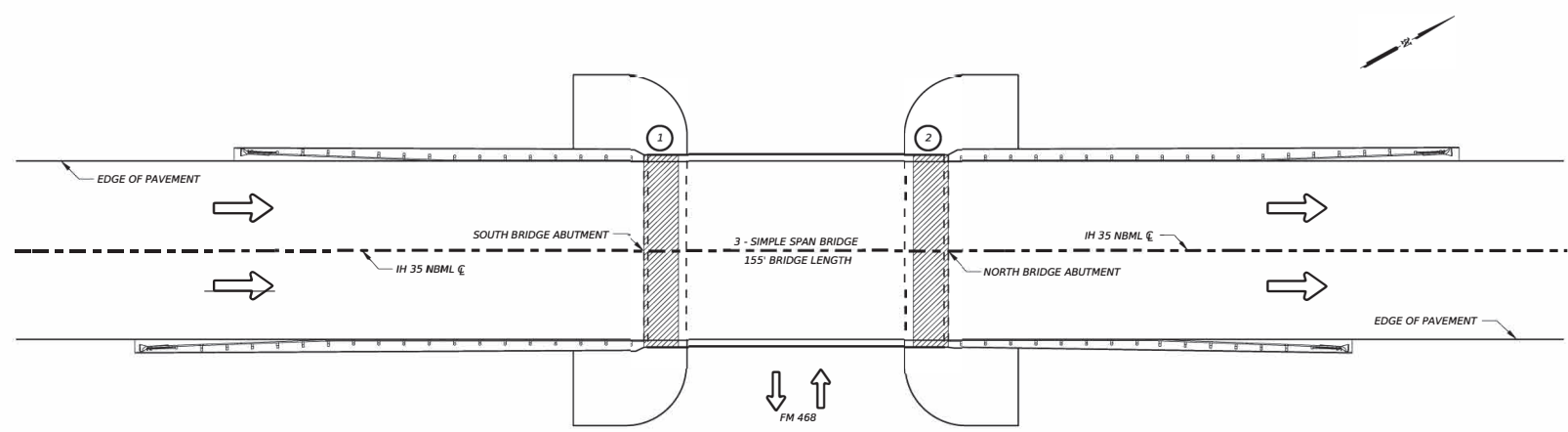
BRIDGE LAYOUT
LOCATION 13

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	45	

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 1" = 100'
 1" = 100'



LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



- ① REMOVE DEBRIS FROM SOUTH ABUTMENT
- ② REMOVE DEBRIS FROM NORTH ABUTMENT

SUMMARY OF BRIDGE ITEMS	
PSN #	7212 6002
	CLEANING SUBSTRUCTURE (ABUT)
	EA
22-142-00017-08-245	2
PROJECT TOTALS	2

NOTES

1. REMOVE ALL DEBRIS MATERIAL FROM ABUTMENT BY METHODS THAT WILL NOT DAMAGE CONCRETE OR BEARING DEVICES. ANY DAMAGE TO THE SUBSTRUCTURE WILL RESULT AT CONTRACTOR'S EXPENSE AND WILL NOT BE COMPENSATED UNDER SPECIAL SPECIFICATION "7212".



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US 277, etc.
**BRIDGE LAYOUT
LOCATION 15**




SHEET 1 OF 1

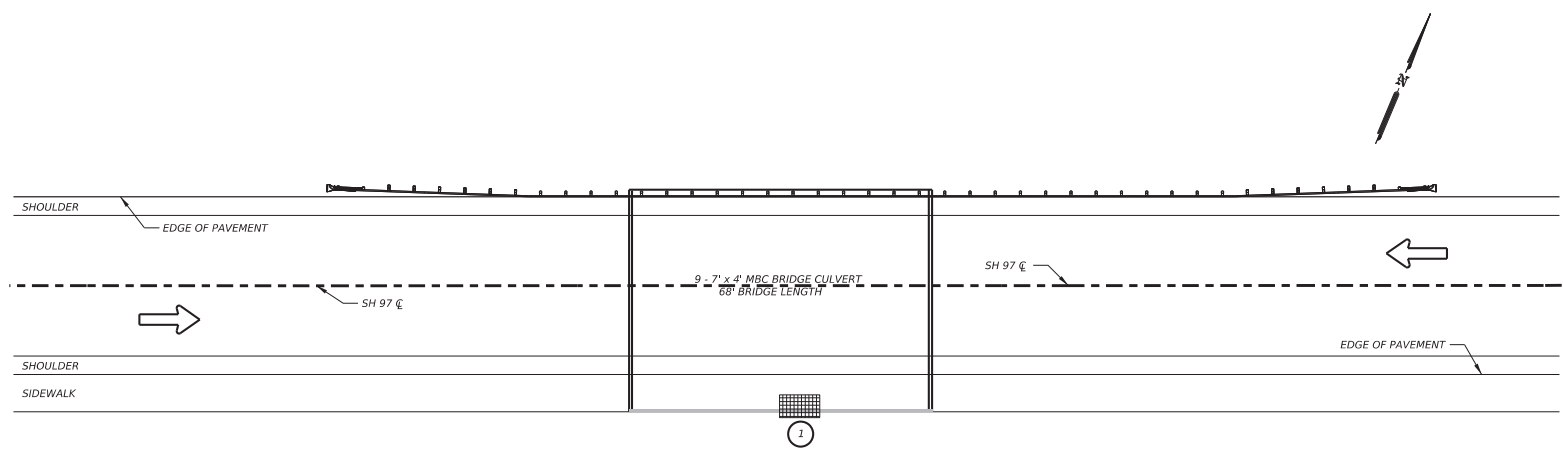
CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	46	

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LEGEND

-  WORK AREA TO BE REPAIRED
-  CALLOUT TO BE WORKED ON
-  FLOW OF TRAFFIC



1 BARREL No. 5
14 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
PSN #	429 6002	480 6001
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEAN EXIST CULVERTS
	SF	EA
22-142-00483-01-030	14	1
PROJECT TOTALS	14	1

NOTES

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BRIDGE LAYOUT
LOCATION 15

SHEET 1 OF 1




CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	47	

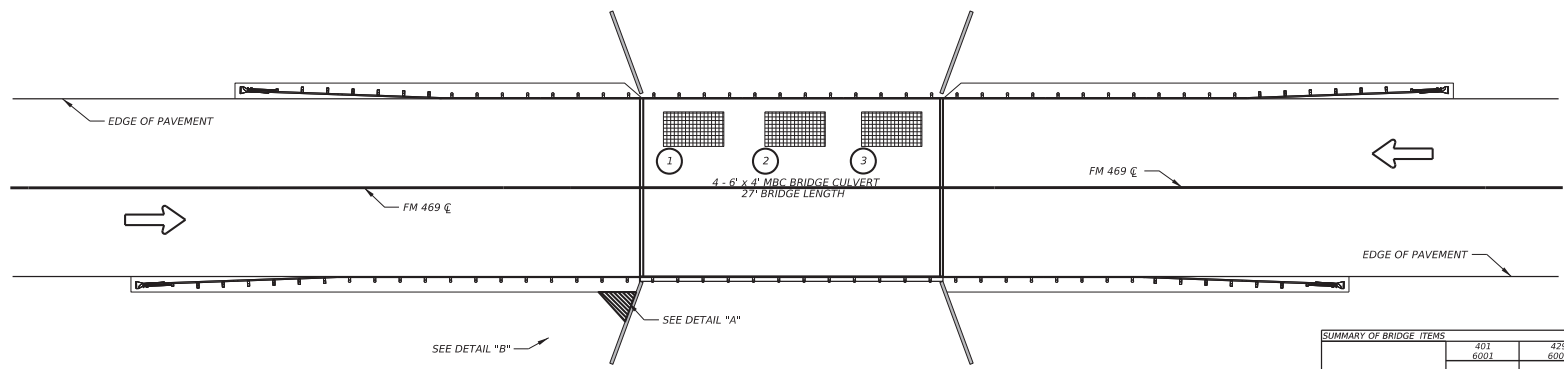
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LEGEND

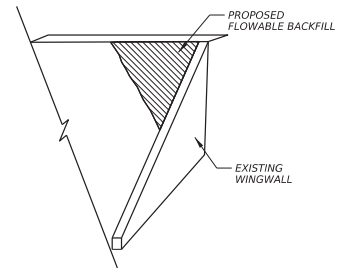
-  WORK AREA TO BE REPAIRED
-  CALLOUT TO BE WORKED ON
-  FLOW OF TRAFFIC



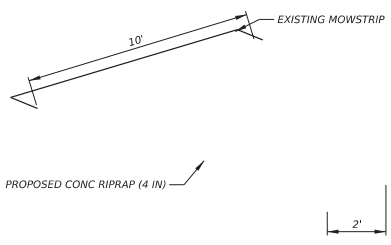
PSN #	SUMMARY OF BRIDGE ITEMS			
	401 6001	429 6007	432 6001	480 6001
	FLOWABLE BACKFILL	CONC STR REPAIR (VERTICAL & OVERHEAD)	RIPRAP (CONC)(4 IN)	CLEAN EXIST CULVERTS
	CY	SF	CY	EA
22-142-01435-01-002	1	124	10	1
PROJECT TOTALS	1	124	10	1



SOUTHEAST WINGWALL
FLOWABLE BACKFILL 1 CY



DETAIL "A"



DETAIL "B"

NOTES

- 1 SIDEWALL BARREL No. 1
40 SOFT INTERMEDIATE SPALL REPAIR
- 2 SIDEWALL BARREL No. 2
40 SOFT INTERMEDIATE SPALL REPAIR
- 3 SIDEWALL BARREL No. 3
40 SOFT INTERMEDIATE SPALL REPAIR
BOTTOM TOP SLAB BARREL No. 3
4 SOFT INTERMEDIATE SPALL REPAIR

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
3. ALL LABOR, MATERIALS AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY TO PERTINENT ITEMS.
4. CONCRETE REPAIR DIMENSIONS ARE APPROXIMATE, ACTUAL REPAIR DIMENSIONS WILL VARY. PAYMENT FOR EXTRA WORK DIRECTED, PERFORMED AND ACCEPTED WILL BE MADE IN ACCORDANCE TO ARTICLE 4.4. "CHANGES IN WORK" FROM TXDOT'S STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTAINANCE OF HIGHWAYS, STREETS AND BRIDGES.

5. ALL LABOR, MATERIALS, AND INCIDENTALS, INCLUDING ANY NECESSARY FORMING REQUIRED TO BACKFILL THE EXISTING VOIDS AND ASSURE THAT CONCRETE IS NOT UNNECESSARILY SPILLED, WILL BE SUBSIDIARY AND PAID FOR UNDER ITEM 401.
6. PROVIDE ALL MATERIALS AND PERFORM ALL RIPRAP AND BACKFILL CONCRETE WORK IN ACCORDANCE WITH ITEM 420. CONCRETE SHALL BE CLASS "B", AND ALL REINFORCEMENT STEEL SHALL BE GRADE 60.

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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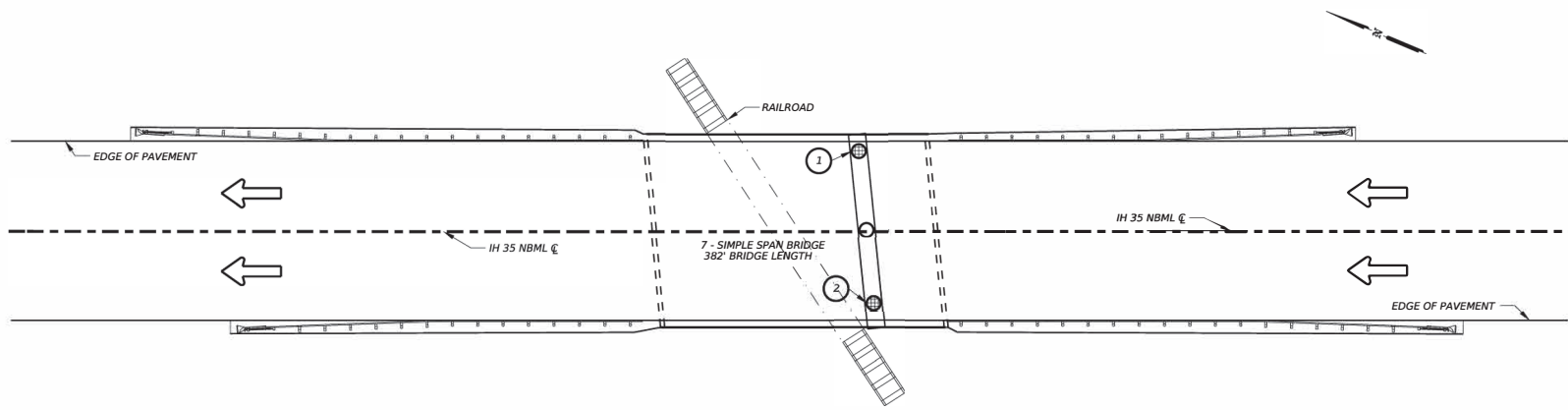
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10/26/2022



US 277, etc.
BRIDGE LAYOUT
LOCATION 16

SHEET 1 OF 1			
CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	48	

1
2
3
4
5
6



1 BENT 5 COLUMN
2 SQFT INTERMEDIATE SPALL REPAIR



2 BENT 5 COLUMN
4 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS	
	229 6007
PSN #	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
22-142-00018-01-107	6
PROJECT TOTALS	6

- NOTES**
1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
 2. LOCATE AND MARK VISUAL EXISTING CONCRETE CRACKING AND GET APPROVAL FROM THE ENGINEER BEFORE COMMENCING CONSTRUCTION FOR THIS ITEM UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
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LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



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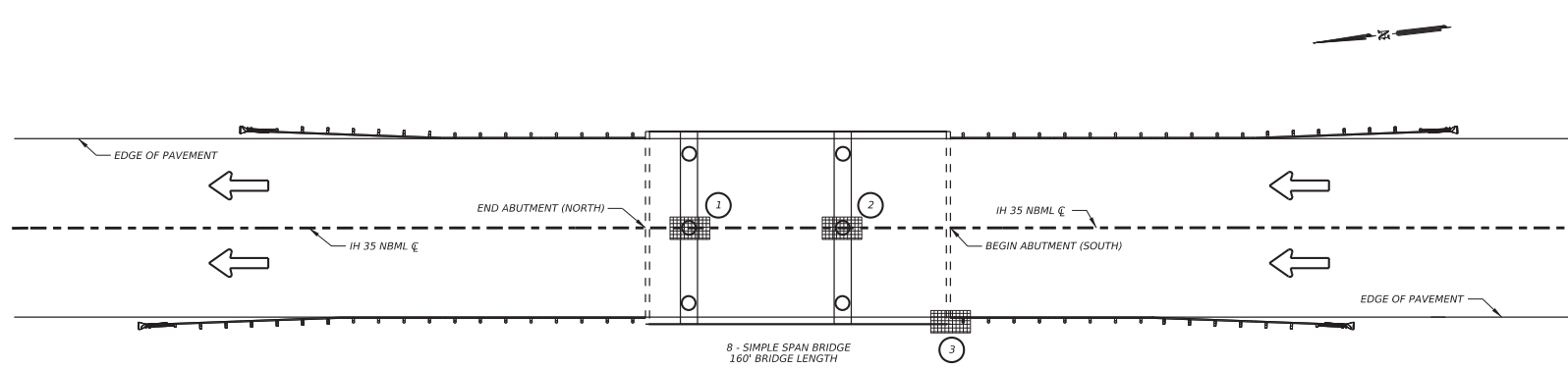
IH 35 NBML
BRIDGE LAYOUT
LOCATION 17

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	49	

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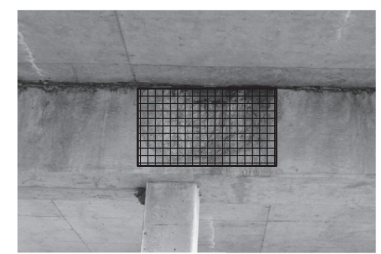
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

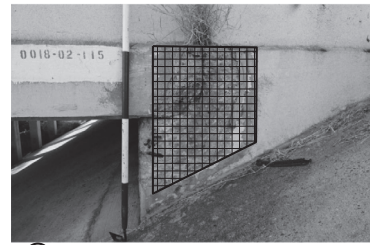
FLOW OF TRAFFIC



1 BENT 2 FROM NORTH ABUTMENT
14 SOFT INTERMEDIATE SPALL REPAIR



2 BENT 6 FROM NORTH ABUTMENT
10 SOFT INTERMEDIATE SPALL REPAIR



3 WEST FASCIA OF SOUTH ABUTMENT
4 SOFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS	
	429 6007
PSN #	CONC STR REPAIR (VERTICAL & OVERHEAD)
22-142-00018-02-115	SF 28
PROJECT TOTALS	28

NOTES

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US 277, etc.

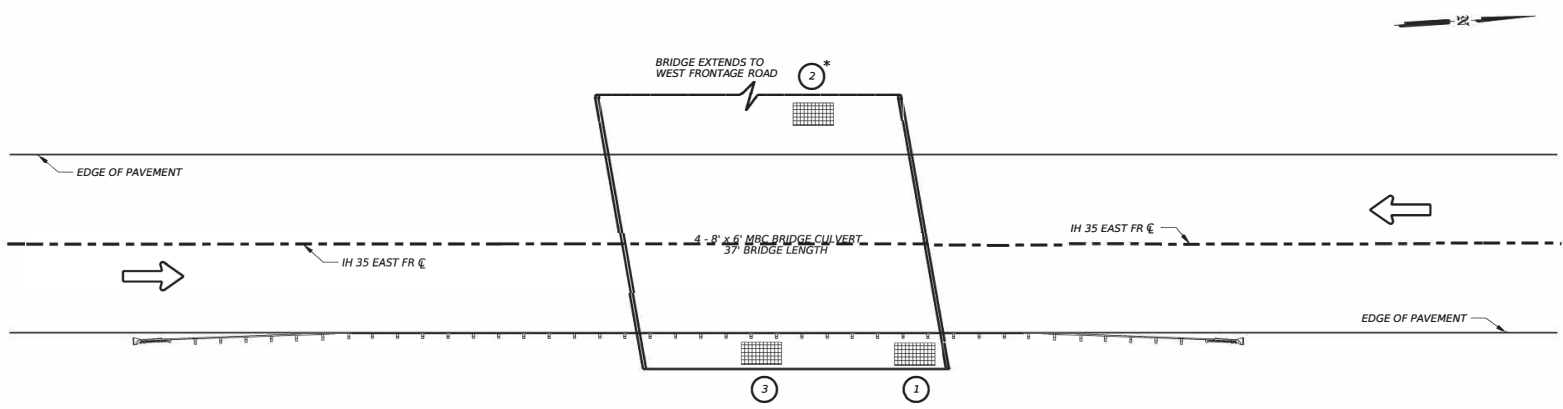
BRIDGE LAYOUT
LOCATION 21

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	50	

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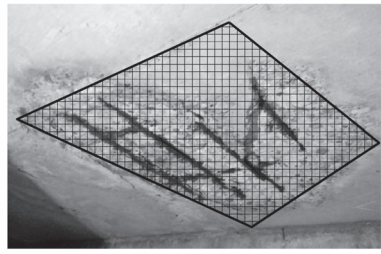
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



3 BOTTOM TOP SLAB BARREL No. 3
12 SQFT INTERMEDIATE SPALL REPAIR



2 BOTTOM TOP SLAB BARREL No. 2 (WEST FR)
40 SQFT INTERMEDIATE SPALL REPAIR
SIDEWALL BARREL No. 2 (WEST FR)
10 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
PSN #	429	480
	6007	6001
	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEAN EXIST CULVERTS
	SF	EA
22-142-00018-02-008	78	1
PROJECT TOTALS	78	1

* SPALL REPAIR LOCATED ON IH35 WEST FRONTAGE ROAD SIDE. PLAN VIEW OF BRIDGE CULVERT IS NOT DRAWN TO SCALE BUT TO BE USED AS REFERENCE.

NOTES

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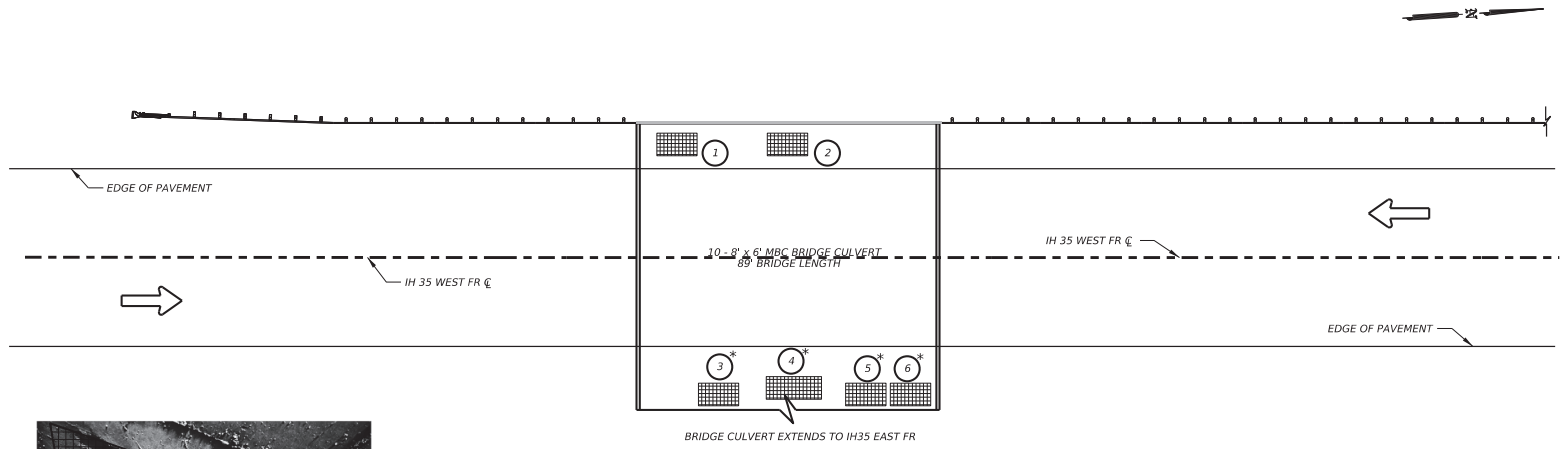


IH 35 EAST FR
BRIDGE LAYOUT
LOCATION 19

SHEET 1 OF 1

CDMT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	51	

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DIM
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LEGEND

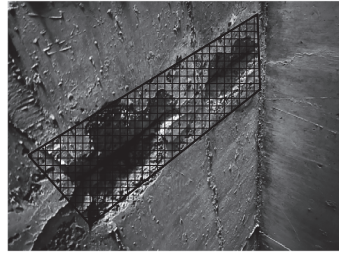
WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BOTTOM SLAB BARREL No. 9
64 SQFT INTERMEDIATE SPALL REPAIR



2 BOTTOM SLAB BARREL No. 5
32 SQFT INTERMEDIATE SPALL REPAIR

- 3* BOTTOM SLAB BARREL No. 6
20 SQFT INTERMEDIATE SPALL REPAIR
- 4* EAST HEADWALL
28 SQFT INTERMEDIATE SPALL REPAIR
- 5* BOTTOM SLAB BARREL No. 2
6 SQFT INTERMEDIATE SPALL REPAIR
- 6* BOTTOM SLAB BARREL No. 1
2 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS		
	429 6007	480 6001
LOCATION 20	CONC STR REPAIR (VERTICAL & OVERHEAD)	CLEAN EXIST CULVERTS
	SF	EA
22-142-00018-02-009	154	1
PROJECT TOTALS	154	1

NOTES

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US 277, etc.

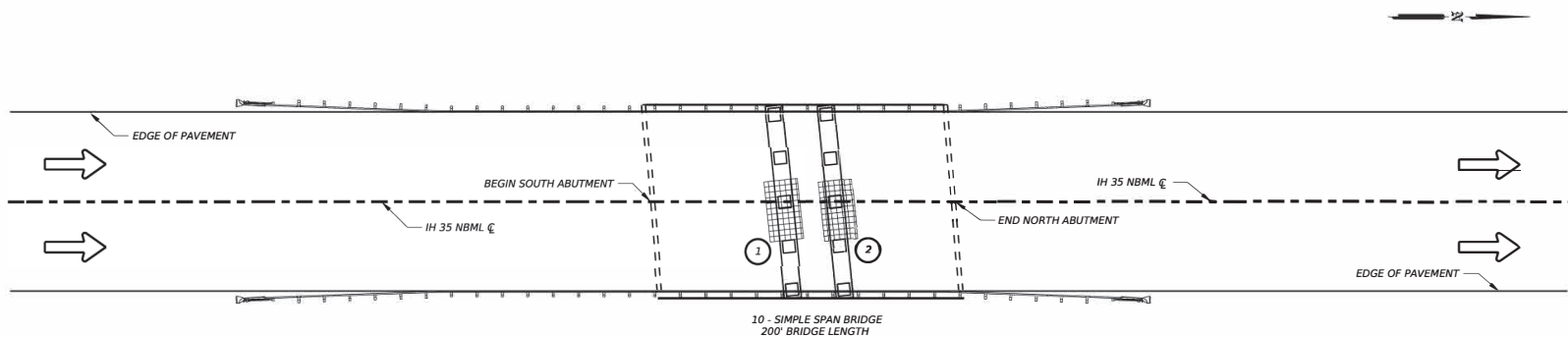
BRIDGE LAYOUT
LOCATION 20

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	52	

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 1/16" = 1' - 0"
 1/32" = 1' - 0"
 1/64" = 1' - 0"

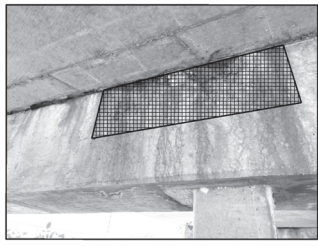


LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BENT CAP No. 5
12 SQFT INTERMEDIATE SPALL REPAIR



2 BENT CAP No. 6
12 SQFT INTERMEDIATE SPALL REPAIR

SUMMARY OF BRIDGE ITEMS	
PSN #	429 6007
	CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF
22-142-00018-02-121	24
PROJECT TOTALS	24

NOTES

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH, AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
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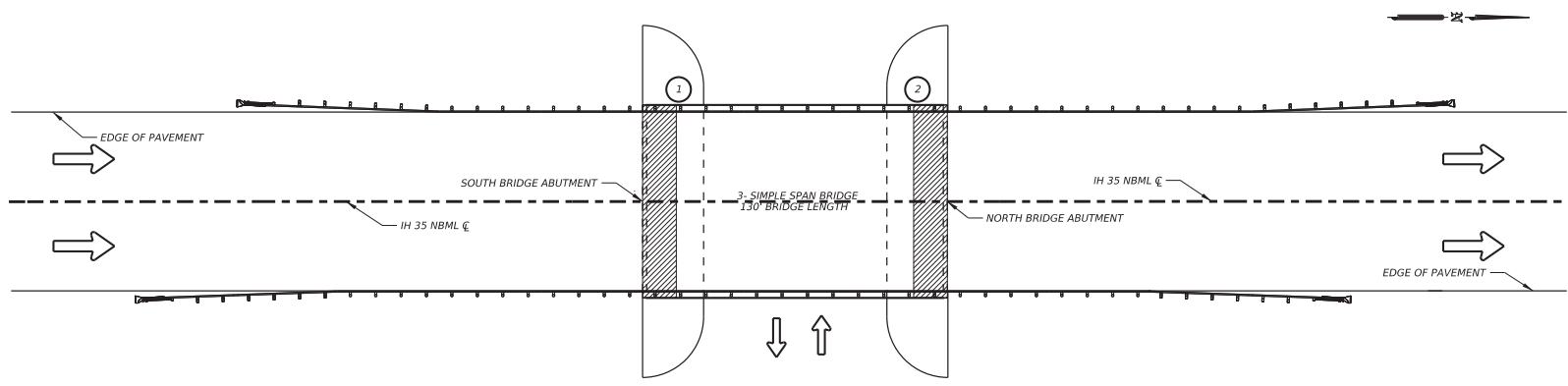
US 277, etc.

BRIDGE LAYOUT
LOCATION 21

SHEET 1 OF 1

CDIST	SECT	JOB	HSRWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	53	

DWG
 LOC
 DATE
 OK



LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



- 1 REMOVE DEBRIS FROM SOUTH ABUTMENT
- 2 REMOVE DEBRIS FROM NORTH ABUTMENT

SUMMARY OF BRIDGE ITEMS	
	7212 6002
PSN #	CLEANING SUBSTRUCTURE (ABUT)
	EA
223142-00018-023130	2
PROJECT TOTALS	2

NOTES

1. REMOVE ALL DEBRIS MATERIAL FROM ABUTMENT BY METHODS THAT WILL NOT DAMAGE CONCRETE OR BEARING DEVICES. ANY DAMAGE TO THE SUBSTRUCTURE WILL RESULT AT CONTRACTOR'S EXPENSE AND WILL NOT BE COMPENSATED UNDER SPECIAL SPECIFICATION **7212**.



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10/26/2022



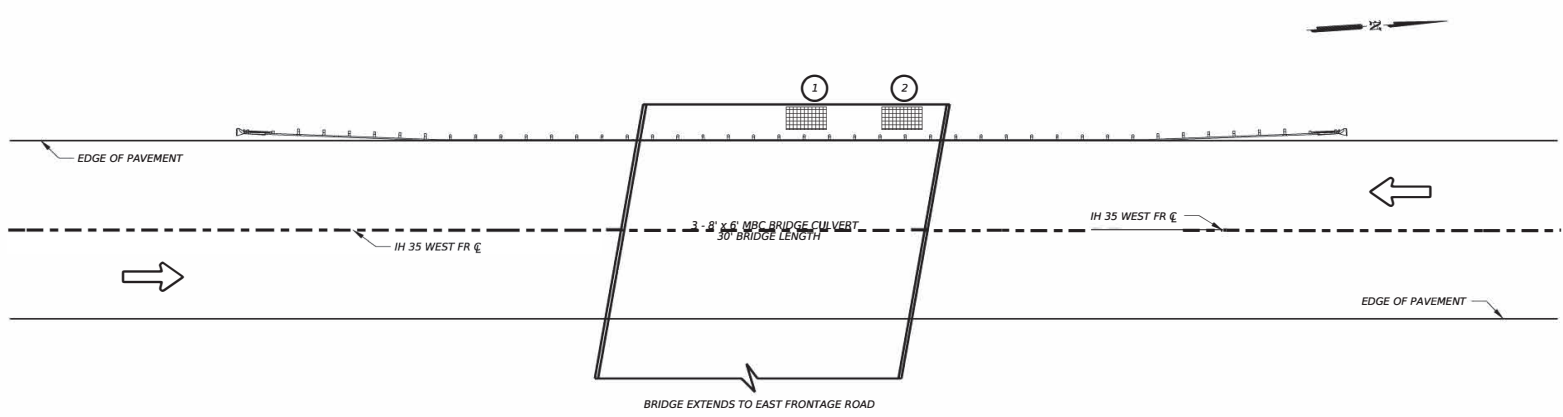
US 277, etc.
**BRIDGE LAYOUT
LOCATION 22**

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	54	

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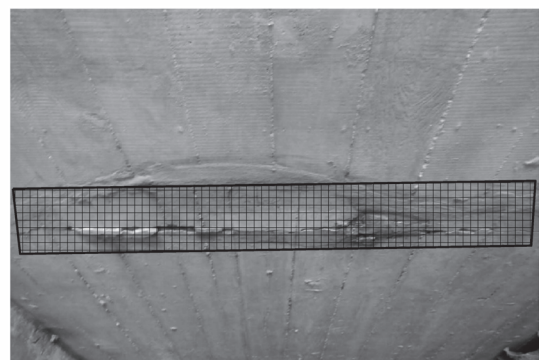


LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



SUMMARY OF BRIDGE ITEMS		
PSN#	429 6007	480 6001
	CONC STR REPAIR (VERTICALS & OVERHEAD)	CLEAN EXIST CULVERTS
	SF	EA
22-142-00018-02-011	28	1
PROJECT TOTALS	28	1

NOTES

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- ① BOTTOM TOP SLAB BARREL No. 2
8 SOFT INTERMEDIATE SPALL REPAIR
SIDEWALL BARREL No. 2
6 SOFT INTERMEDIATE SPALL REPAIR
- ② BOTTOM TOP SLAB BARREL No. 1
8 SOFT INTERMEDIATE SPALL REPAIR
SIDEWALL BARREL No. 1
6 SOFT INTERMEDIATE SPALL REPAIR



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10/26/2022

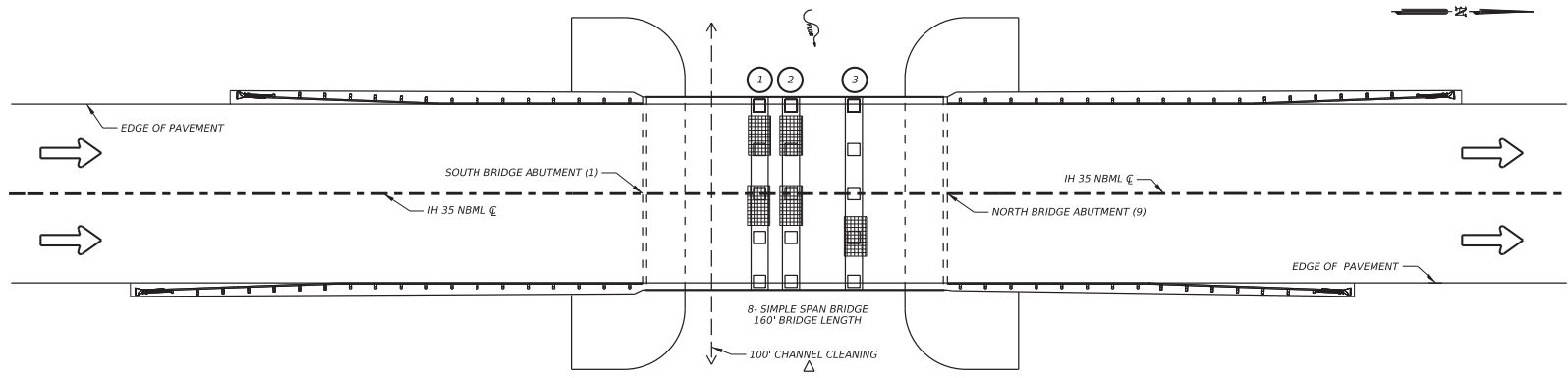


IH 35 WEST FR
BRIDGE LAYOUT
LOCATION 23

SHEET 1 OF 1

CDIST	SECT	JOB	HSRWAY
6407	39	001	US 277, etc.
CDIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	55	

OK
 DWG
 LOC
 DIM



LEGEND

WORK AREA TO BE REPAIRED

CALLOUT TO BE WORKED ON

FLOW OF TRAFFIC



1 BENT CAP No. 3
 8 SOFT INTERMEDIATE SPALL REPAIR
 4 SOFT INTERMEDIATE SPALL REPAIR



2 BENT CAP No. 4
 12 SOFT INTERMEDIATE SPALL REPAIR
 2 SOFT INTERMEDIATE SPALL REPAIR



3 BENT CAP No. 6
 6 SOFT INTERMEDIATE SPALL REPAIR

PSN #	425 6007	760 6003
		CONC STR REPAIR (VERTICAL & OVERHEAD)
	SF	LF
22-142-00018-02-137	32	100
PROJECT TOTALS	32	100

NOTES

1. THE CONTRACTOR IS TO CONFIRM THE DAMAGED AREA FOR LOCATION, SIZE, LENGTH AND AREA. REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE BEGINNING THE REPAIR.
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5. CLEANING AND RESHAPING OF CHANNEL WILL BE PERFORMED TO REMOVE EXCESS MATERIAL ALONG THE FULL SPAN BRIDGE LENGTH. CONTRACTOR IS TO MAINTAIN CHANNEL DRAINAGE DURING CLEANING AND RESHAPING WORK.

* FOLLOW PROCEDURES AS PER THE TXDOT CONCRETE REPAIR MANUAL FOR DETAILS AND INSTRUCTIONS FOR THE REMOVAL, CLEANING, FORMS, POURING AND MIXING NEW MATERIAL, CURING AND FINISH FOR THE CONCRETE REPAIR.



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IH 35 NBML
 BRIDGE LAYOUT
 LOCATION 24

SHEET 1 OF 1

CONT	SECT	JOB	HIGHWAY
6407	39	001	US 277, etc.
DIST	COUNTY	SHEET NO.	
22	KINNEY, etc.	56	

DATE: 10/26/2022 8:11:27 AM
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Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard ④	Applicable Wingwall or End Treatment Standard	Skew Angle (0°, 15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw ① Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (CY)	Class "C" Conc (Wingwall) (CY)	Total Wingwall Area (SF)
PSN: 22-136-00023-04-024 (Rt)	5 ~ 4' X 4'	3'	Non-Stndrd	SETB-FW-0	0	4:1	6"	6"	1.000	5.250	19.667	11.355	22.709	23.000	44.709	0.0	0.9	12.1	N/A

NOTES:
 Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
 30° maximum for safety end treatment.

SL:1 = Horizontal : 1 Vertical
 • Side slope at culvert for flared or straight wingwalls.
 • Channel slope for parallel wingwalls.
 • Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
 Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
 Area for four wingwalls (two structure ends) if Both.

- ① Round the wall heights shown to the nearest foot for bidding purposes.
- ② Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class 5 concrete is required for the top slab of the culvert, also provide Class 5 concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.
- ③ Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.
- ④ Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:
 This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.
 An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.



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Texas Department of Transportation				Bridge Division Standard			
<h2>BOX CULVERT SUPPLEMENT</h2> <h2>WINGS AND END TREATMENTS</h2>							
<h3>BCS</h3>							
FILE:	bcsstd1-20.dgn	REV:	TxDOT	CHK:	TxDOT	DRW:	TxDOT
	February 2020	EDMT:	SECT	JOB:	HSEHWAY		
		6407 39		001		US 277, etc.	
		DIST: 22		COUNTY: KINNEY, etc.		SHEET NO: 57	

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TABLE OF DIMENSIONS AND REINFORCING STEEL (Wings for One Structure End)

Maximum Wingwall Height Hw (9)	Dimensions				Variable Reinforcing				Estimated Quantities (3)		
	W	X	Y	Z	Bars J1		Bars J2		Reinf (Lb/Ft)	Conc (CY/Ft)	
					Size	Spa	Size	Spa			
2'-6"	2'-5"	1'-0"	0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	#4	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	#4	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	#4	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	#4	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	#4	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	#4	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#4	6"	#4	6"	#4	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	#4	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	#6	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	#6	162.29	0.721

TABLE OF WING WALL REINFORCING (Two-Wings)

Bar	Size	No.	Spa
D	#5	~	1'-0"
E	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	4	~
M	#4	4	~
P	#4	~	1'-0"
R	#5	6	~
V	#4	~	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	~	1'-6"
O	#4	1	~

Reinf (Lb/Ft) 2.45
Conc (CY/Ft) 0.037

TABLE OF ESTIMATED ANCHOR TOEWALL QUANTITIES

Bar	Size	No.	Spa
K	#4	~	1'-0"
N	#5	6	~
OL	#4	6	~

Reinf (Lb/Ft) 9.82
Conc (CY/Ft) 0.074

TABLE OF MAXIMUM WING HEIGHTS (9)

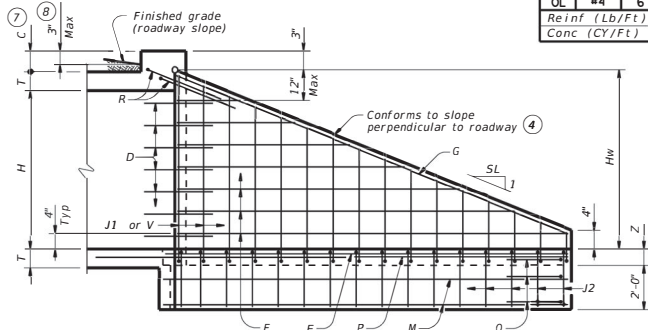
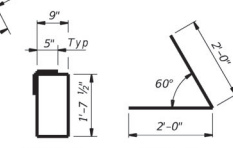
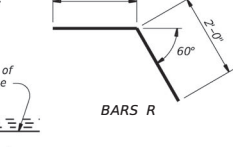
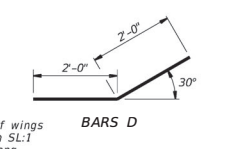
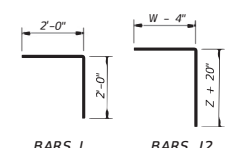
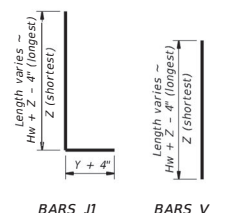
Side Slope	Hw Max
3:1	11'-5"
4:1	8'-10"
6:1	6'-1"

WING DIMENSION CALCULATIONS:

$$\begin{aligned}
 Hw &= H + T + C - 0.250 \quad (9) \\
 A &= (Hw - 0.333) (SL) \\
 B &= (A) (\tan 30^\circ) \\
 Lw &= (A) + \cos 30^\circ) \\
 \\
 \text{For cast-in-place culverts:} \\
 Lt &= (N) (S) + (N + 1) (U) \\
 \text{For precast culverts:} \\
 Lt &= (N) (2U + S) + (N - 1) (0.500') \\
 \\
 Lc &= (Ltw) - (2U) \\
 Aw &= (Lc) + (2B) \\
 \text{Total Wingwall Area (two wings - SF)} \\
 &= (Hw + 0.333') (Lw)
 \end{aligned}$$

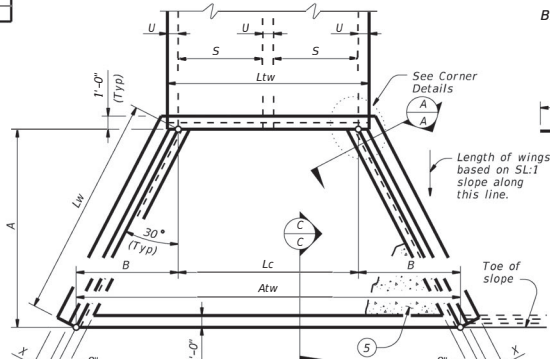
Hw = Height of wingwall (feet)
 Aw = Anchor toewall length (feet)
 Lw = Length of wingwall (feet)
 N = Number of culvert barrels
 SL = Side slope ratio (horizontal : 1 vertical)
 Lt = Culvert toewall length (feet)
 Lc = Culvert curb between wings (feet)

- Extend Bars P 3'-0" Min into bottom slab of box culvert.
- Adjust to fit as necessary to maintain 1 #2" clear cover and 4" Min between bars.
- Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings multiply the tabulated values by 1w.
- Recommended values of slope are: 3:1, 4:1, and 6:1. Provide 3:1 or flatter slope.
- When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap". Unless otherwise shown on the plans or directed by the Engineer, extend construction joints or grooved joints, oriented in the direction of flow, across the full distance of the riprap, at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B is not required.
- At Contractor's option, end the culvert toewall flush with wingwall toewall. Adjust reinforcing as needed.
- 3" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'-0", refer to the Extend Curb Details (ECD) standard sheet.
- For vehicle safety, reduce curb heights, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.
- See Table of Maximum Wing Heights for various slopes. Height is limited based on a 33'-6" maximum safety pipe runner length.



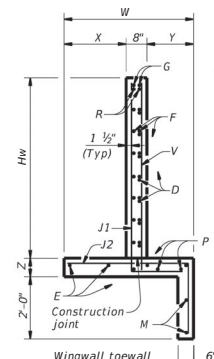
INSIDE ELEVATION OF WINGWALL

(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

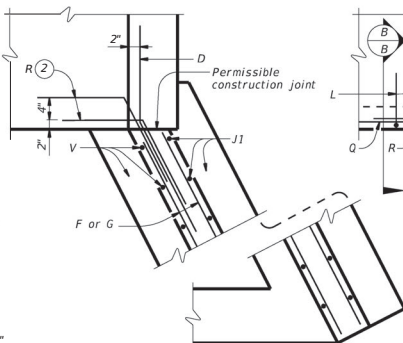


STRUCTURAL PLAN

(Showing dimensions.)

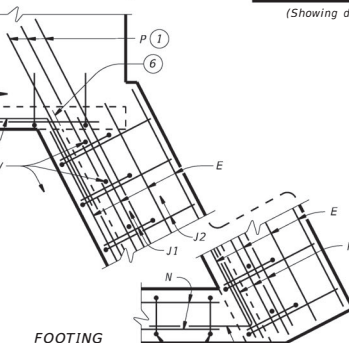


SECTION A-A

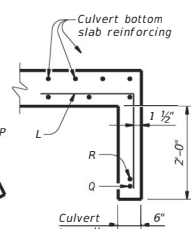


CORNER DETAILS

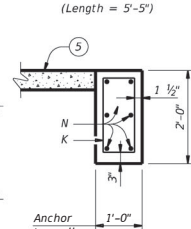
(Culvert and culvert toewall reinforcing not shown for clarity.)



FOOTING AND TOEWALL



SECTION B-B



SECTION C-C

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.



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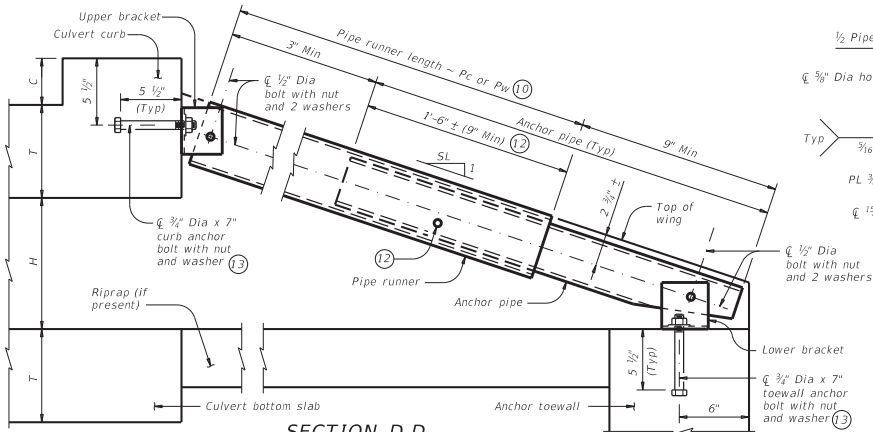
SAFETY END TREATMENT WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS TYPE I - CROSS DRAINAGE

SETB-FW-0

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REVISIONS:		6407	39	001	US 277, etc.				
DIST:		22			KINNEY, etc.				58

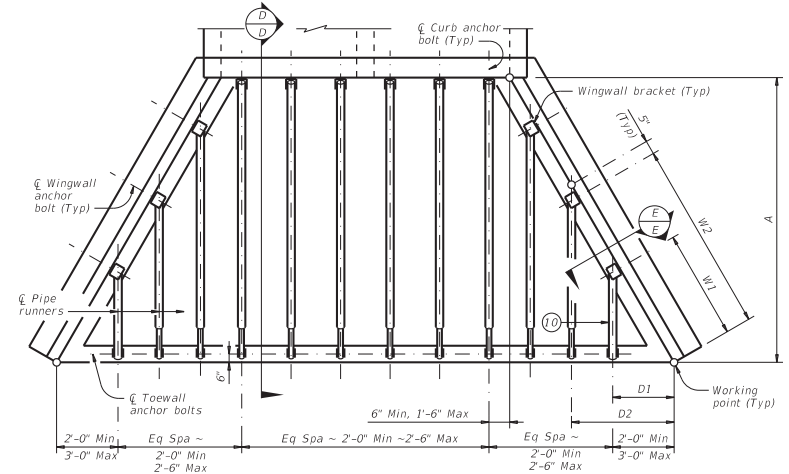
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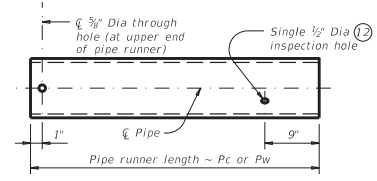


SECTION D-D

(Showing curb pipe runner. Except for upper bracket, wingwall pipe runners are similar.)

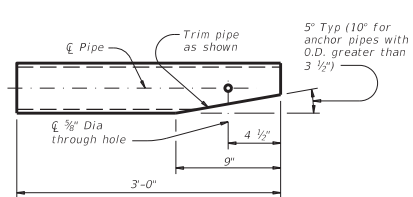


PIPE RUNNER PLAN

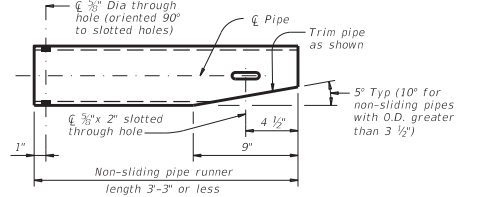


Note: Pipe diameter required for curb pipe runner is also used for wingwall pipe runner.

PIPE RUNNER DETAILS

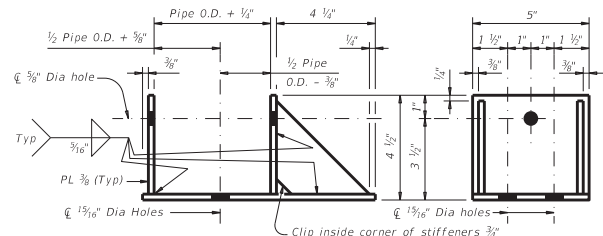


ANCHOR PIPE DETAILS

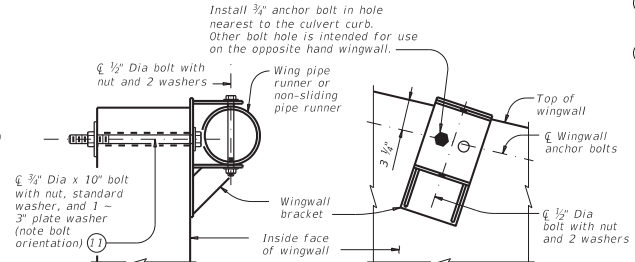


Note: Pipe size is the same as required for curb pipe runner. Adjust the corresponding lower bracket accordingly.

NON-SLIDING PIPE RUNNER DETAILS



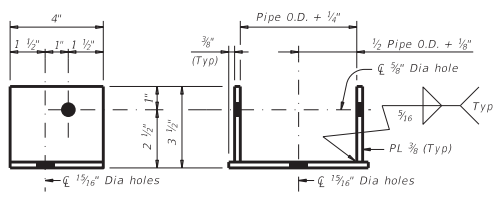
ELEVATION SIDE VIEW



SECTION E-E ELEVATION

Note: Match wingwall bracket to the upper curb bracket size.

WINGWALL BRACKET DETAILS



SIDE VIEW ELEVATION

Note: Match upper and lower brackets, except for the brackets used with non-sliding pipe runners, to the required pipe diameters as shown in the table.

UPPER AND LOWER BRACKET DETAILS

Maximum Pipe Runner Length (Pc or Pw)	Required Pipe Runner Size			Required Anchor Pipe Size		
	Pipe Size	Pipe O.D.	Pipe I.D.	Pipe Size	Pipe O.D.	Pipe I.D.
9'-4"	3" STD	3.500"	3.068"	2" STD	2.375"	2.067"
19'-0"	4" STD	4.500"	4.026"	3" STD	3.500"	3.068"
33'-6"	5" STD	5.563"	5.047"	4" STD	4.500"	4.026"

- 10 If pipe runner length (Pw) is 1'-9" or less replace the normal pipe runner and anchor pipe with a single non-sliding pipe runner. See Non-Sliding Pipe Runner Details for additional information.
- 11 At Contractor's option, 7/8" diameter hole may be formed or cored drilled. Percussion drilling is not permitted. Adjust placement of reinforcing steel as necessary to avoid bolt holes.
- 12 After installation of pipe runner, use the 1/2" inspection hole to ensure that the lap of the anchor pipe with the pipe runner is adequate.
- 13 At Contractor's option, an adhesive anchor may be used. Provide 3/4" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 5". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

PIPE RUNNER DIMENSION CALCULATIONS:

$Wn = (2.000)(Dn) - (0.416')$
 $Pwn = (Dn)(K2) - (2.063')$
 $Pw1 \text{ Non-Sliding Pipe Runner (if required)} = (D1)(K2) - (0.563')$
 $Pc = (A)(K1) - (1.688')$

Wn = Distance from working point to centerline anchor bolt measured along bottom inside face of wing (feet)
 Dn = Distance from working point to centerline pipe runner measured along outside face of anchor toewall (feet)
 Pw = Wingwall pipe runner length (feet)
 Pc = Curb pipe runner length (feet)
 K = Constant values for use in formulas
 Slope SL:1
 K1 ~ 1.054 ~ 1.826
 K2 ~ 1.031 ~ 1.785
 K3 ~ 1.014 ~ 1.756
 n = Wing pipe runner number



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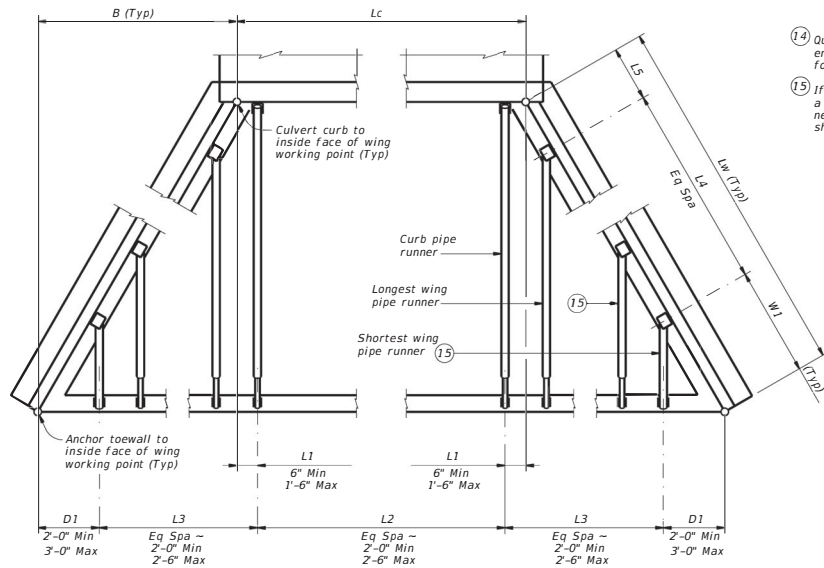
10/26/2022

		Bridge Division Standard	
SAFETY END TREATMENT WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE			
SETB-FW-0			
FILE: setb0se-20.dgn	REV: GAF	CHK: CAT	DATE: TxDOT
DATE: February 2020	6407	39	001
REVISIONS	DISC	COUNTY	US 277, etc.
22		KINNEY, etc.	59

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Culvert Station and/or Creek name followed by applicable end (Lt, Rt or Both) (14)	Lc (Ft)	L1 (Ft)	L2			D1 (Ft)	L3			W1 (Ft)	L4			L5 (Ft)	Curb Pipe Runner (Fc)		Longest Wing Pipe Runner (Pw) (Ft)	Shortest Wing Pipe Runner (Pw) (Ft)	Non-Sliding Wing Pipe Runner (if applicable) (Ft)	Curb, Wing, and/or Non-Sliding Pipe Runners		3'-0" Anchor Pipe	
			No. Spa	Spa at (Ft)	Overall Length (Ft)		No. Spa	Spa at (Ft)	Overall Length (Ft)		No. Spa	Spa at (Ft)	Overall Length (Ft)		No.	Length (Ft)				Size (3", 4" or 5") (14)	Total Length (Ft)	Size (2", 3" or 4")	Total Length (Ft) (14)
PSN: 22-136-00023-04-024 (RT)	22,000'	0,500'	9	2,333'	21,00'	3,000'	4	2,214'	8,555'	5,583'	3	4,427'	13,282'	3,844'	10	18,583'	15,146'	3,292'	N/A	4"	259,583'	3"	54,000'



PIPE RUNNER LAYOUT

- (14) Quantities shown are for one structure end if Lt or Rt. Quantities shown are for two structure ends if Both.
- (15) If the outermost wing pipe runner is a non-sliding pipe runner, consider the next outermost wing pipe runner as the shortest.

SPECIAL NOTE:
 This tabular sheet is to be filled out by the culvert specifier and provides information for the construction details and quantities of pipe runners.
 An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.
 Note that the tabular quantities are given for estimating purposes only. It is likely that these quantities will change due to field conditions. Therefore, all dimensions must be verified by the Contractor in the field prior to fabrication of the safety end treatment components.



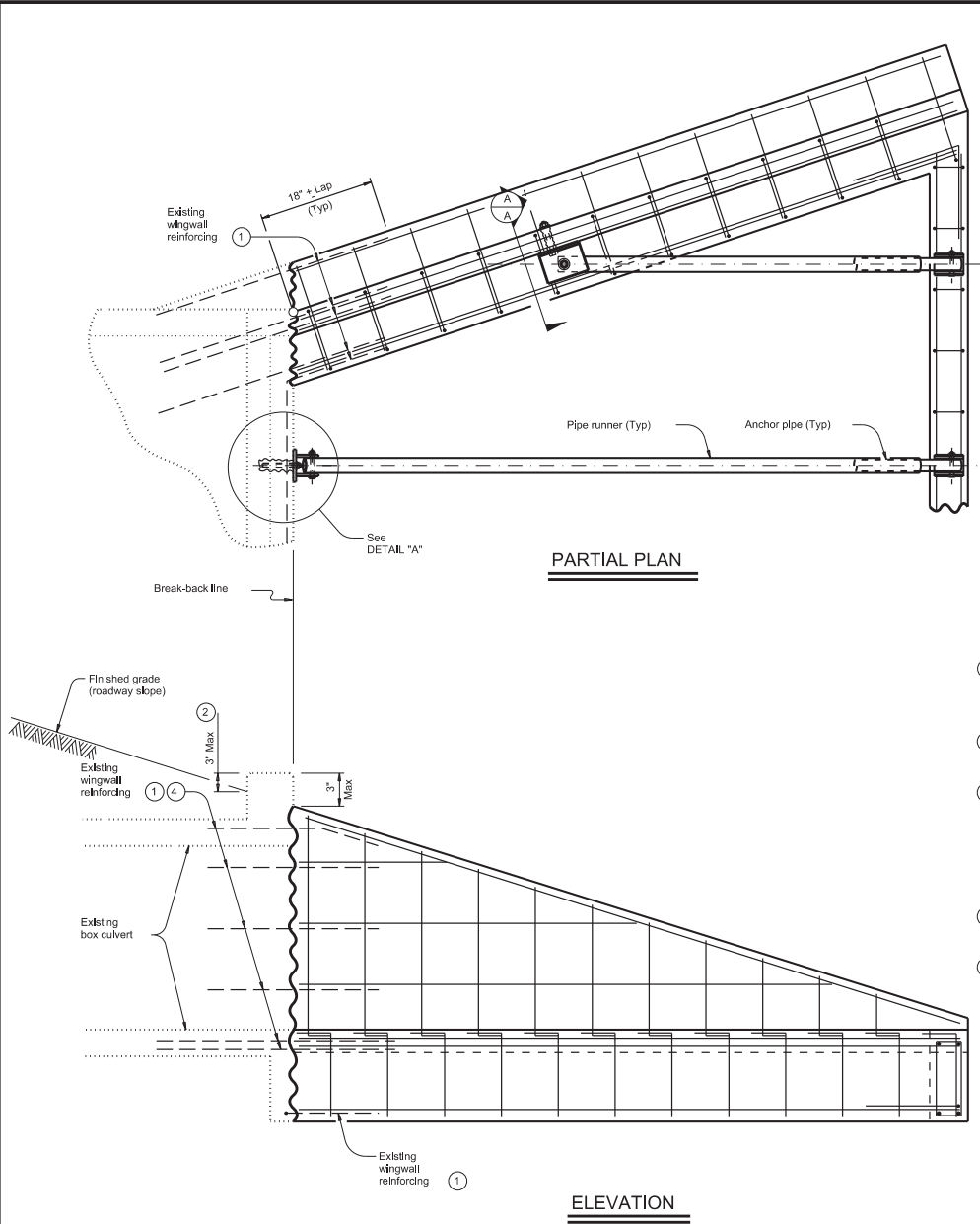
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SAFETY END TREATMENT WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS TYPE I ~ CROSS DRAINAGE			
SETB-FW-0			
FILE: setbf0se-20.dgn	DATE: TxDOT	DATE: TxDOT	DATE: TxDOT
COM: February 2020	SECT: 640739	JOB: 001	US 277, etc.
REVISIONS	DIS: 22	COUNTY: KINNEY, etc.	SHEET NO: 60

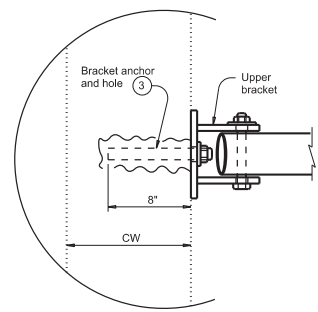
DNCR NOTES:
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DATE: 10/26/2022 8:13:00 AM
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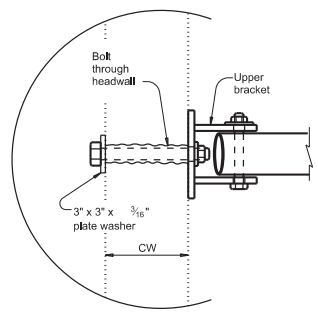


PARTIAL PLAN

ELEVATION

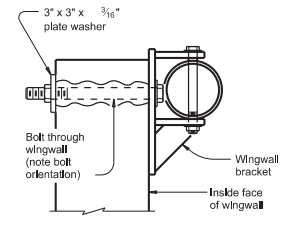


For CW greater than 8"

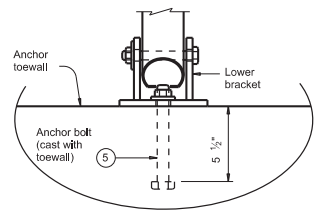


For CW 8" and less

DETAIL "A"



SECTION A-A



SECTION B-B

- 1 Clean and straighten existing reinforcing to lap with new reinforcing as shown. The Engineer may require additional dowels to lap with the new reinforcing if the existing reinforcing is damaged or is not suitably located to lap with new reinforcing. These additional dowels must be #5 x 2'-0".
- 2 For vehicle safety, reduce curb height. If necessary to provide a maximum 3" projection above finished grade. No quantity changes or additional compensation will be allowed for this work.
- 3 Provide 3/4" Dia adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rod with one hex head nut and one hardened steel washer. Embed threaded rods into curb, wingwall, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.
- 4 If required, embed wingwall anchor dowels into existing box culvert using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8".
- 5 At Contractor's option, adhesive anchors may be used. Provide adhesive anchors that meet the requirements of ASTM A307 Gr A fully threaded rods. Embed threaded rods into curb, wingwalls, and toewall using a Type III, Class C, D, E, or F anchor adhesive. Minimum embedment depth is 8". Provide anchor adhesive able to achieve a basic bond strength in tension, Nba, of 20 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use.

MATERIAL NOTES:

Install epoxy adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing epoxy, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Anchorage bars or bolts must be clean and free of grease, oil, or any other foreign material. Demonstrate hole cleaning method to the Engineer for approval and continue the approved process for all anchorage locations. Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

GENERAL NOTES:

Use these details in conjunction with the SETB standard sheets. Shorten reinforcing Bars D, M, P, and R when utilizing existing reinforcing, as shown. If required, add dowels to lap with new reinforcing, as shown. No increase or decrease to the pay quantities is permitted for these adjustments in the reinforcing steel or concrete quantities.

		Bridge Division Standard	
SAFETY END TREATMENT RETROFIT DETAILS FOR EXISTING BOX CULVERTS			
SETBR			
FILE:	setbrste-20.dgn	DNCR:	GAF
DATE:	February 2020	CHK:	TxDOT
REV:	REVISIONS	DES:	TxDOT
NO.	6407	JOB:	001
DATE:	22	COUNTY:	US 277, etc.
		COUNTY:	KINNEY, etc.
		SHEET NO.:	61

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DATE: FILE:

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.

- Prevent stormwater pollution by controlling erosion and sedimentation in accordance with TPDES Permit TXR 150000
- Comply with the SW3P and revise when necessary to control pollution or required by the Engineer.
- Post Construction Site Notice (CSN) with SW3P information on or near the site, accessible to the public and TCEQ, EPA or other inspectors.
- 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# 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.

- All Locations
-
-
-

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
<input type="checkbox"/> Temporary Vegetation	<input type="checkbox"/> Silt Fence	<input type="checkbox"/> Vegetative Filter Strips
<input type="checkbox"/> Blankets/Matting	<input type="checkbox"/> Rock Berm	<input type="checkbox"/> Retention/Irrigation Systems
<input type="checkbox"/> Mulch	<input type="checkbox"/> Triangular Filter Dike	<input type="checkbox"/> Extended Detention Basin
<input type="checkbox"/> Sodding	<input type="checkbox"/> Sand Bag Berm	<input type="checkbox"/> Constructed Wetlands
<input type="checkbox"/> Interceptor Swale	<input type="checkbox"/> Straw Bale Dike	<input type="checkbox"/> Wet Basin
<input type="checkbox"/> Diversion Dike	<input type="checkbox"/> Brush Berms	<input type="checkbox"/> Erosion Control Compost
<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Erosion Control Compost	<input type="checkbox"/> Mulch Filter Berm and Socks
<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Mulch Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks
<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Compost Filter Berm and Socks	<input type="checkbox"/> Vegetation Lined Ditches
	<input type="checkbox"/> Stone Outlet Sediment Traps	<input type="checkbox"/> Sand Filter Systems
	<input type="checkbox"/> Sediment Basins	<input type="checkbox"/> 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.

-
-

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.

-
-
-

V. FEDERAL LISTED, PROPOSED THREATENED, ENDANGERED SPECIES, CRITICAL HABITAT, STATE LISTED SPECIES, CANDIDATE SPECIES AND MIGRATORY BIRDS.

- No Action Required Required Action

Action No.

- Devil River Minnow - The Devil River minnow is a Federally Listed species that is found within Pinto Creek (Location # 2). No disturbance is allowed to take place within the waters of this creek. When performing work over the existing water, care shall be taken to prevent any materials from falling into the waters of Pinto Creek.
- Texas Horned Lizard - The Contractor will avoid harvester ant mound in the selection of PSLs where feasible
- Texas Tortoise -The Contractor should cover utility trenches overnight, and should visually inspect all trenches before filling.
- Reticulated Collared Lizard - This lizard may potentially occur in the project area. The Contractor shall avoid harming or handling this species.
- Texas Indigo Snake - This snake may potentially occur in the project area. The Contractor shall avoid harming or handling this species.

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	TQDES: 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.

-
-
-


VII. OTHER ENVIRONMENTAL ISSUES

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

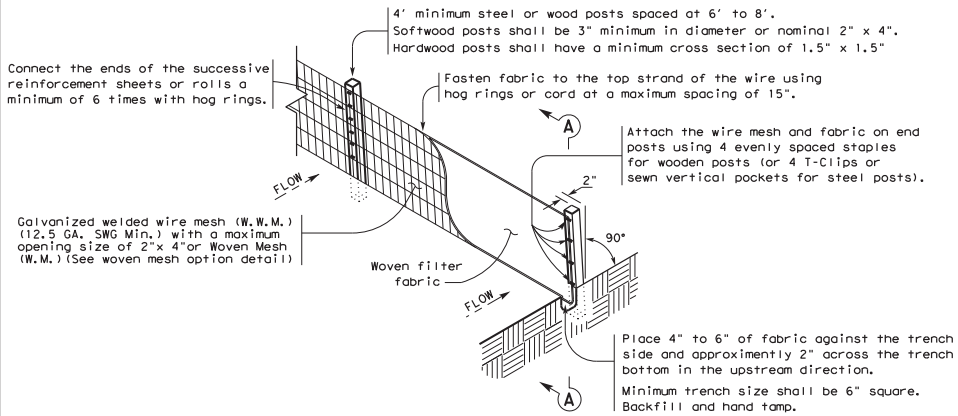
- No Action Required Required Action

Action No.

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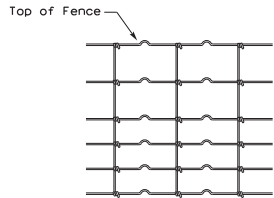
 Texas Department of Transportation		Design Division Standard	
ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS EPIC			
FILE: epic.dgn	DN: TxDOT	CR: RG	DN: VP CR: AR
© TxDOT: February 2015	CONT	SECT	JOB
12-12-2011 1051	6407	39	001
09-07-14 ADDD NOTE SECTION IV.	DIST	COUNTY	SHEET NO.
01-22-2015 SECTION I CHANGED ITEM 1122	22	KINNEY, etc.	58
TO ITEM 506, ADDED GRASSY SWALES.			

DATE: 2022
 FILE: ec116
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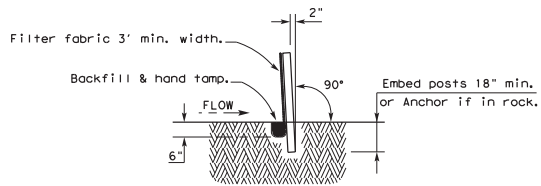
TEMPORARY SEDIMENT CONTROL FENCE

SCF



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.



SECTION A-A

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/FT². Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

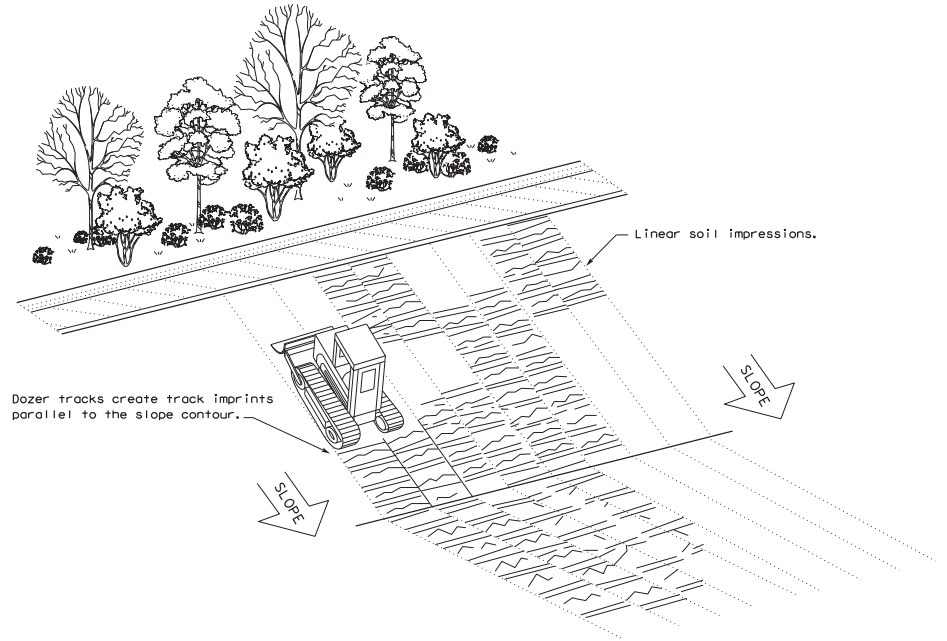
LEGEND

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 continuous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.

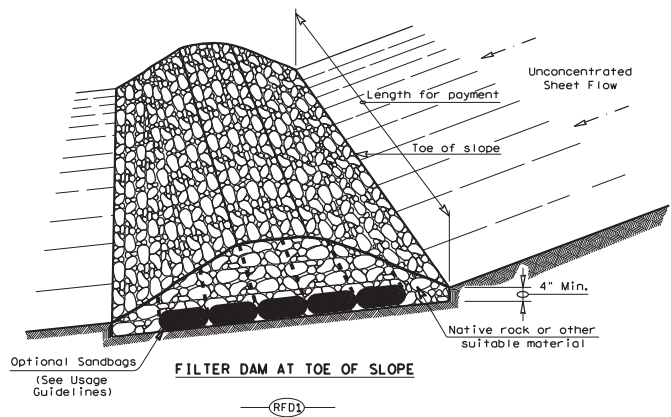


VERTICAL TRACKING

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES FENCE & VERTICAL TRACKING EC(1)-16					
FILE: ec116	DN: TxDOT	CR: KM	DN: VP	DN/CR: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6407	39	001	US 277, etc.	
	DIST	COUNTY	SHEET NO.		
	22	KINNEY, etc.	63		

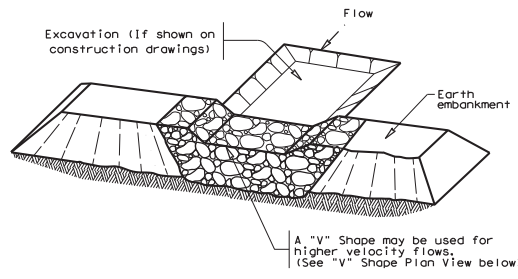
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DATE: 10/26/2022
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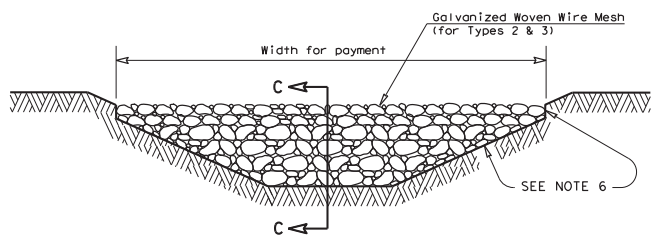
FILTER DAM AT TOE OF SLOPE

(RFD1)



FILTER DAM AT SEDIMENT TRAP

(RFD1) OR (RFD2)

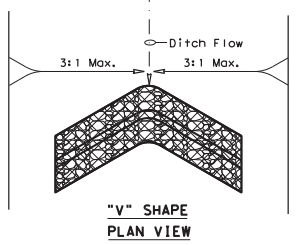


FILTER DAM AT CHANNEL SECTIONS

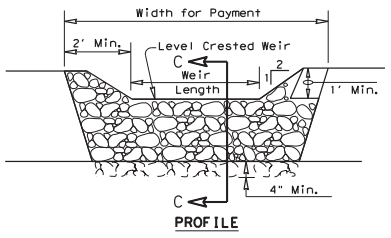
(RFD1) OR (RFD2) OR (RFD3)

GENERAL NOTES

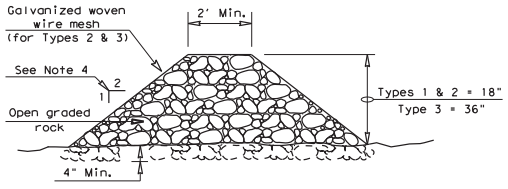
1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream of drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall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



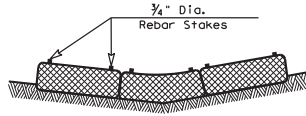
"V" SHAPE PLAN VIEW



PROFILE



SECTION C-C



SECTION B-B

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

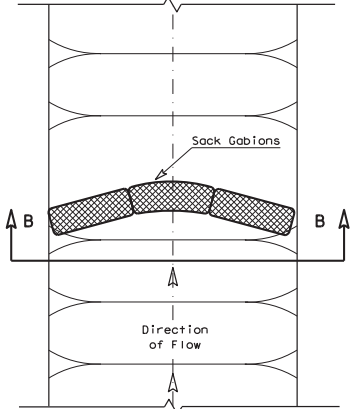
Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity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

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

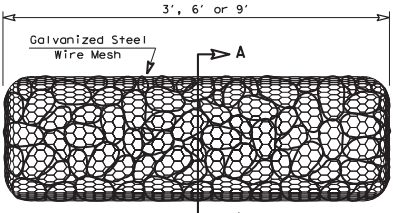
Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

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

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

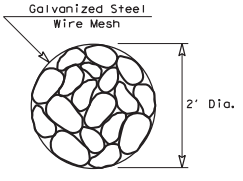


PLAN VIEW



TYPE 4 (SACK GABIONS)

(RFD4)



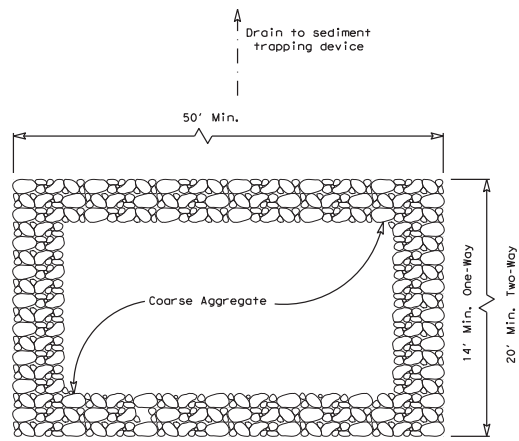
SECTION A-A

PLAN SHEET LEGEND

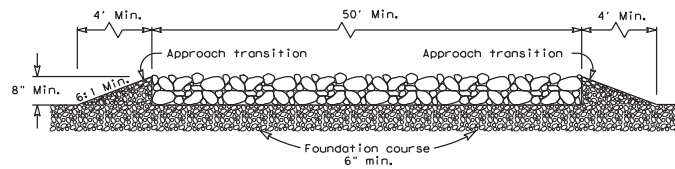
- Type 1 Rock Filter Dam (RFD1)
- Type 2 Rock Filter Dam (RFD2)
- Type 3 Rock Filter Dam (RFD3)
- Type 4 Rock Filter Dam (RFD4)

				Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES ROCK FILTER DAMS EC(2)-16					
FILE: ec216	DN: TxDOT	CR: KM	DN: VP	DN/CK: LS	
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY	
REVISIONS	6407	39	001	US 277, etc.	
	DIST	COUNTY		SHEET NO.	
	22	KINNEY, etc.		64	

DATE: 10/26/2022
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PLAN VIEW

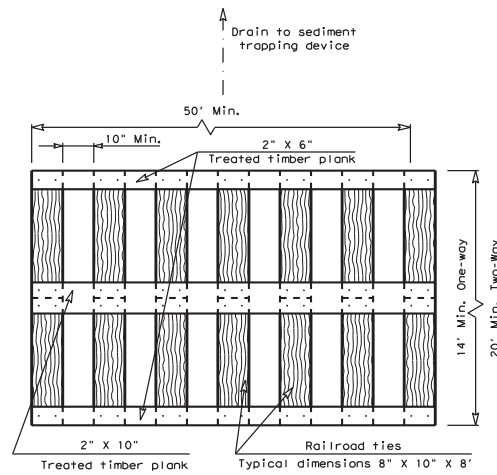


ELEVATION VIEW

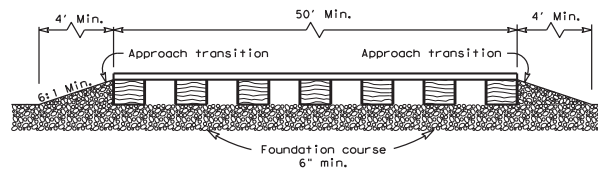
**CONSTRUCTION EXIT (TYPE 1)
ROCK CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 1)

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



PLAN VIEW

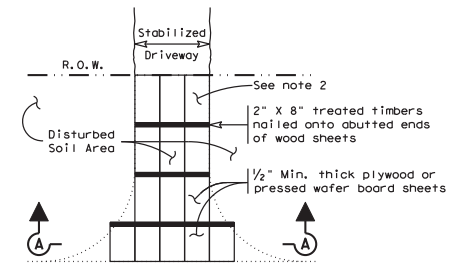


ELEVATION VIEW

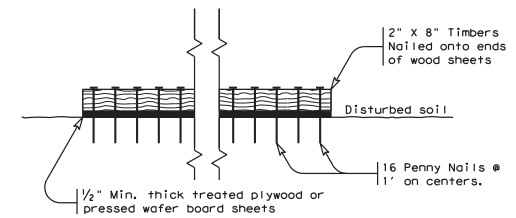
**CONSTRUCTION EXIT (TYPE 2)
TIMBER CONSTRUCTION (LONG TERM)**

GENERAL NOTES (TYPE 2)

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



PLAN VIEW



**SECTION A-A
CONSTRUCTION EXIT (TYPE 3)
SHORT TERM**

GENERAL NOTES (TYPE 3)

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

		Design Division Standard	
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES CONSTRUCTION EXITS EC (3) - 16			
FILE: ec316	DN: TXDOT	CR: KM	DN: VP
© TXDOT: JULY 2016	CONT SECT	JOB	HIGHWAY
REVISIONS	6407 39	001	US 277, etc.
	DIST	COUNTY	SHEET NO.
	22	KINNEY, etc.	65