FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6	STP 2022(493)HES		1
STATE	STATE DIST.NO.	COUNTY	
TEXAS	LBB	LAMB, Etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	U.S. 84
FILENAME	us84lt.dgn		

STATE OF TEXAS
DEPARTMENT OF TRANSPORTATION

PLANS OF PROPOSED
STATE HIGHWAY IMPROVEMENT

FEDERAL PROJECT

STP 2022(493)HES

CJS 52-05-047 Length: 14214.21 FT = 2.692 MI.
CSJ 52-06-026 Length: 18030.15 FT = 3.414 MI.
CSJ 52-06-027 Length: 23598.27 FT = 4.469 MI.
NET LENGTH OF PROJECT: 55842.63 FT. = 10.576 MI.

Design Speed = 70 MPH

2019 ADT: 8883

Functional Class: Principal Arterial

U.S. 84
LAMB AND HOCKLEY COUNTIES

LIMITS: FROM FM 1072 TO THE LUBBOCK COUNTY LINE

FOR THE CONSTRUCTION OF MEDIAN CABLE BARRIER

CONSISTING OF: MEDIAN CABLE BARRIER RUMBLE STRIPS, OBJECTS MARKERS, DELINEATION, AND THE REMOVAL OF VARIOUS CROSS-OVERS

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014 AND SPECIFICATION ITEMS LISTED AND DATED AS FOLLOWS, SHALL GOVERN ON THIS PROJECT; REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY, 2012).

BEGIN PROJECT
CONTROL 0052-05-047
REF MKR 288+1.149

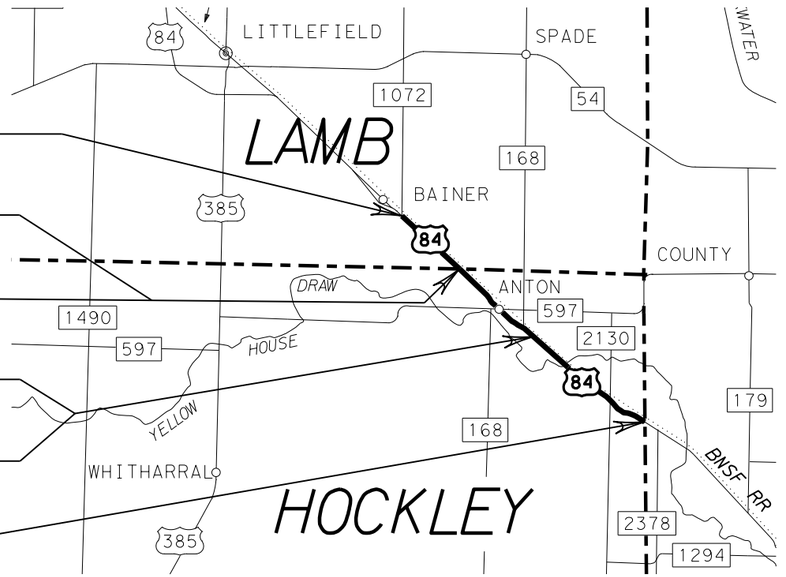
END CSJ
CONTROL 0052-05-047
REF MKR 292+0.00

BEGIN CSJ
CONTROL 0052-06-026
REF MKR 292+0.00

END CSJ
CONTROL 0052-06-026
REF MKR 294+1.404

BEGIN CSJ
CONTROL 0052-06-027
REF MKR 294+1.404

END PROJECT
CONTROL 0052-06-027
REF MKR 298+1.822



ONE EQUATION
STA. 1402+32.31 Back = 0+00 Forward
NO EXCEPTIONS
11 RAILROAD CROSSINGS: BNSF
014891K, 014892S, 014893Y, 014894F, 014895M, 014896U,
014898H, 014899P, 014900G, 014901N, 014902V

LAYOUT NO SCALE

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

SUBMITTED FOR LETTING: 3/3/2022

DocuSigned by:
Neil Welch
F73FB89E3214466...
AREA ENGINEER

RECOMMENDED FOR LETTING: 3/3/2022

DocuSigned by:
Shelley C. Harris P.E.
F9984108931347C...
DISTRICT DESIGN ENGINEER

APPROVED FOR LETTING: 3/3/2022

DocuSigned by:
Bobby P. Warren P.E.
642C665E4DDD46A...
DISTRICT ENGINEER

INDEX OF SHEETS

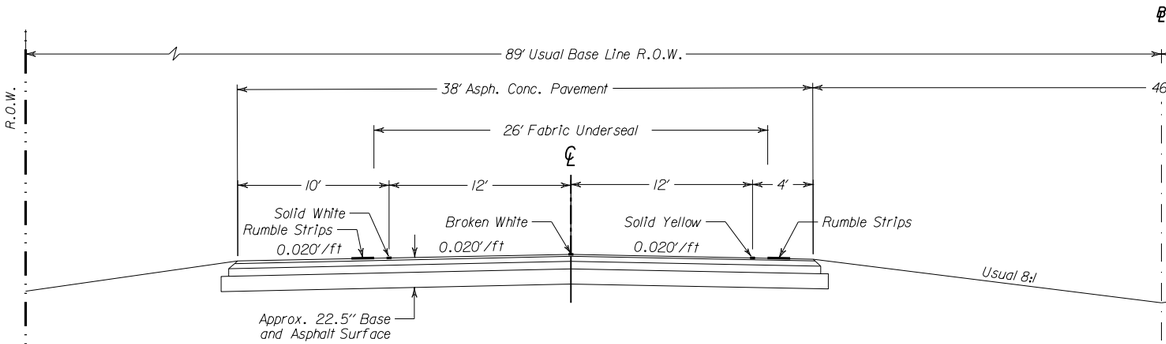
Neil Welch, P.E.
3/3/2022

THE "TXDOT" STANDARD SHEETS INCLUDED ABOVE HAVE BEEN SELECTED BY ME OR UNDER MY RESPONSIBLE SUPERVISION AS BEING APPLICABLE TO THIS PROJECT.

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			2
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84Index.dgn		

INDEX



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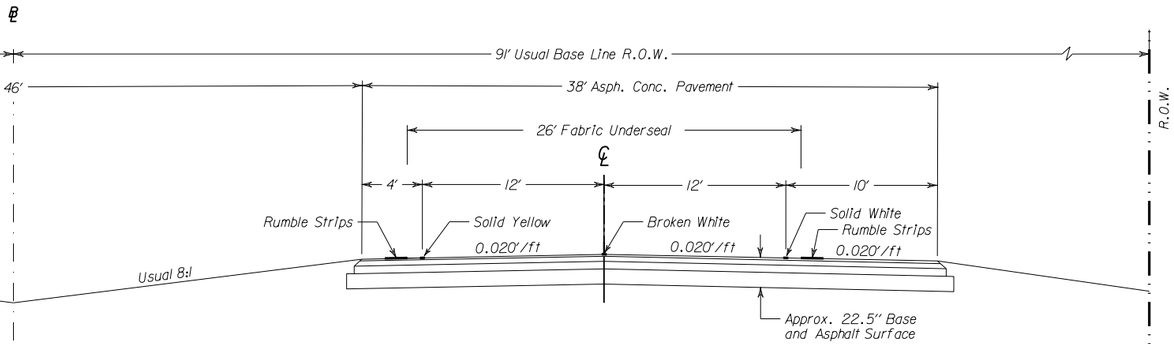
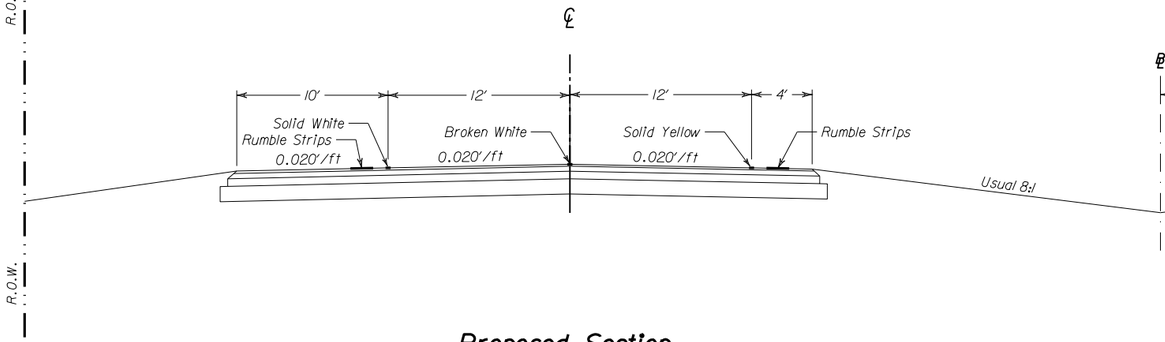
Sta. 1260+18.05 to Sta. 1402+32.31



Existing Section

Sta. 1260+18.05 to Sta. 1402+32.31



Proposed Section

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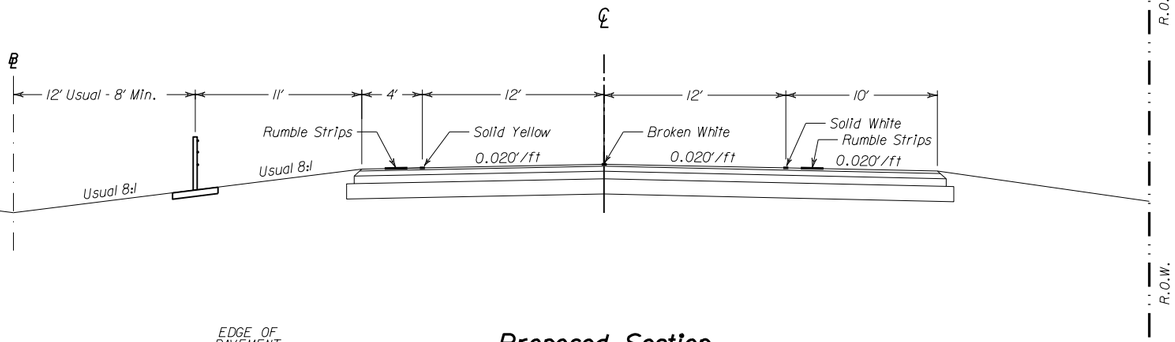
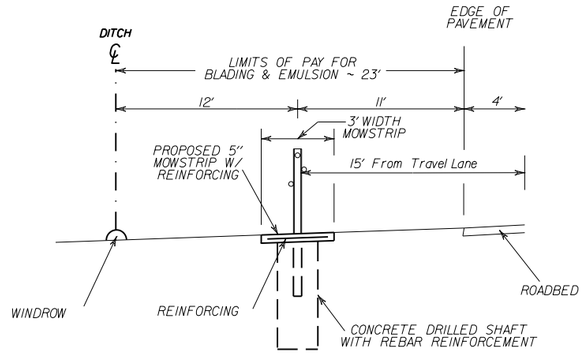


Proposed Section

Sta. 1260+18.05 to Sta. 1402+32.31



PROPOSED RT CABLE CROSS-SECTION

(LT SIDE SIMILAR)

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

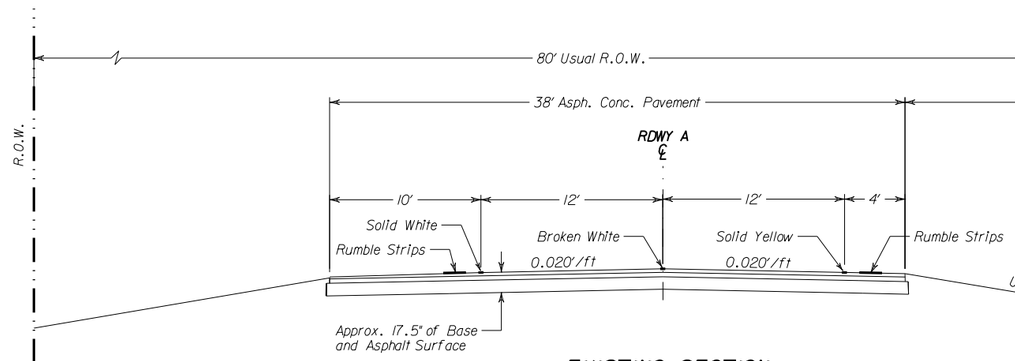
N. Welch, P.E.
3/3/2022

Texas Department of Transportation

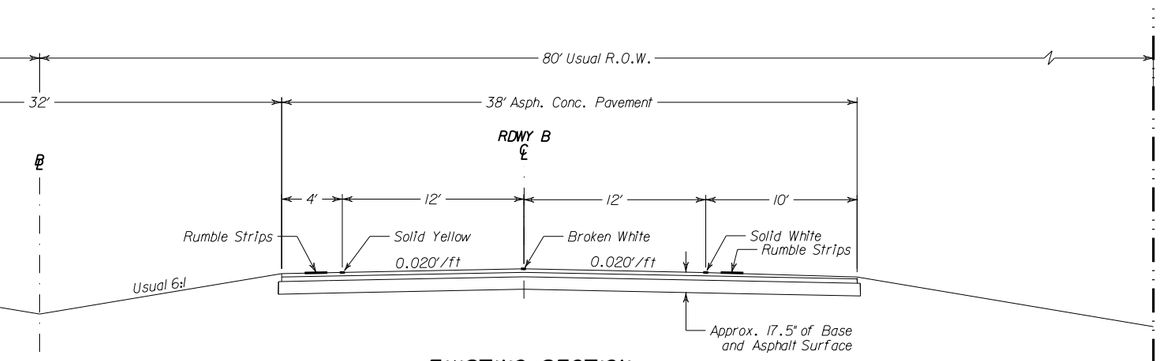
1" : 10' Scale

TYPICAL SECTIONS
Lamb County

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			3
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84Lambtyp.dgn		



EXISTING SECTION
STA. 0+00 TO STA. 416+28.45



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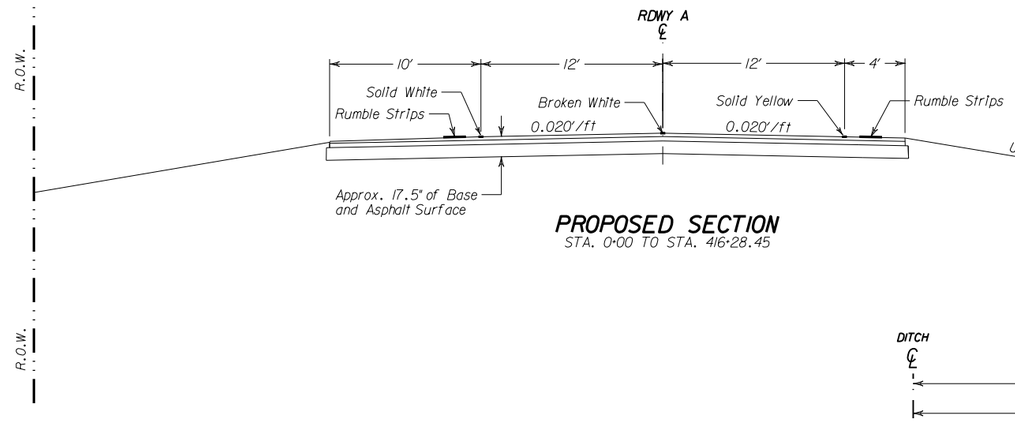

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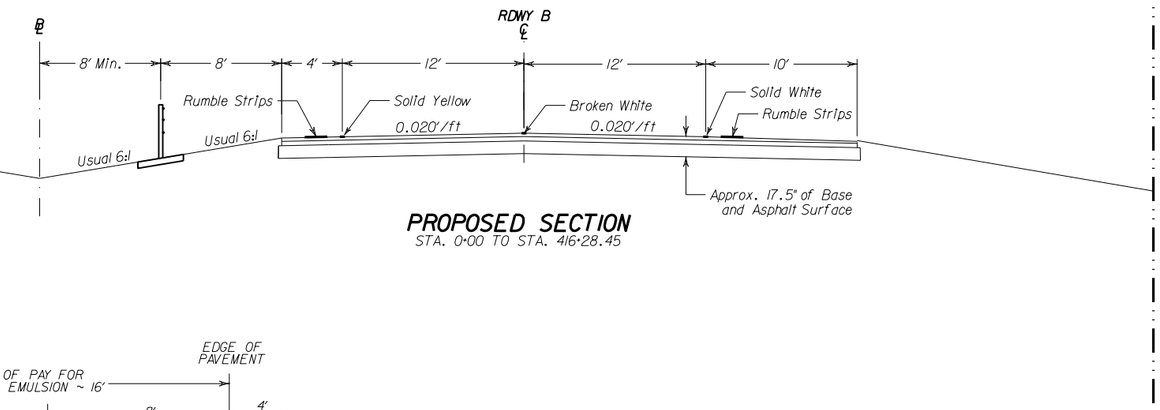
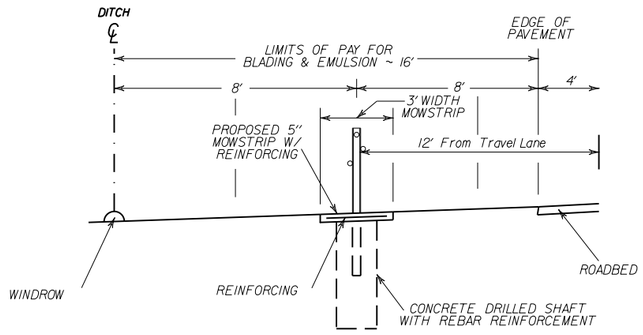
STA. 0+00 TO STA. 416+28.45



PROPOSED SECTION
STA. 0+00 TO STA. 416+28.45



PROPOSED RT CABLE CROSS-SECTION
(LT SIDE SIMILAR)

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED PROFESSIONAL ENGINEER

Neil Welch, P.E.
3/3/2022

Texas Department of Transportation

1" : 10' Scale

TYPICAL SECTIONS
Hockley County

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			4
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84Lambtyp.dgn		

GENERAL NOTES:

Surface Treatment Basis of Estimate

DESCRIPTION	EMUL (ERSN CONT)	FOG SEAL
ASPH TYPE & GRADE	CSS-1H	CSS-1H
ASPH RATE (GAL/SY)	*0.13 Asphalt Emulsion	**0.18 Asphalt Emulsion

*Est. shot rate is 0.26 GAL/SY (50% Asph. Emul./50% Water) or as directed.
**Est. shot rate is 0.36 GAL/SY (50% Asph. Emul./50% Water) or as directed.

Surface Treatment Area (SY)

CSJ	EMUL (ERSN CONT)	FOG SEAL
0052-05-047	34,397.78	911.11
0052-06-026	29,795.56	
0052-06-027	39,848.88	

General Requirements and Covenants - Items 1 thru 9

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

Neil Welch P.E. – Neil.Welch@txdot.gov , Phone # 806-385-3552

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the 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. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name. Check the FTP site regularly for any updates.

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5**

Item 1 – Abbreviations and Definitions

Contract Prosecution – Each contract awarded by the Department stands on its own and as such, is separate from other contracts. A contractor awarded multiple contracts, must be capable and sufficiently staffed to concurrently process any and all contracts at the same time.

Project Description – This project consists of adding median cable barrier in Lamb and Hockley counties.

Item 2 – Instructions to Bidders

The construction time determination schedule will be posted on the Contractor Q&A FTP site.

View the plans on-line or download from the web at:
http://www.dot.state.tx.us/business/plansonline/agreement.htm
Choose "I Agree" then, "Click here", then "State-Let-Construction", pick the letting month, then "Plans" and then choose the plans set.

Order plans from any of the plan reproduction companies shown on the web at:
http://www.dot.state.tx.us/business/contractors_consultants/repro_companies.htm

By signing this proposal, a bidder acknowledges that he/she has a copy of the "Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges", adopted by the Texas Department of Transportation, November 1, 2014. This specification book may be purchased from the Department or downloaded at:
http://www.txdot.gov/business/resources/txdot-specifications.html

Utilities

Overhead and underground utility installations exist within the project limits.

Call One Call to mark the locations of all utilities. Call the City and TxDOT separately to have their respective utilities marked.

Item 5 – Control of the Work

Perform construction surveying in accordance with Article 5.9.3, "Method C."

When deviation from the plans is requested by the Contractor, but not required for installation, the Contractor will bear any additional costs associated with the deviation.

Restore all disturbed areas due to trenching or any construction activity to a condition equivalent to the original condition within 14 working days from the time work began in the area including all necessary stabilization.

The construction, operation, and maintenance of the proposed project will be consistent with the state implementation plan as prepared by the Texas Commission on Environmental Quality.

At the end of each day remove from the ROW, inside or outside the project limits, any excess material and debris resulting from construction.

Correct any deficiencies identified during the final inspection including required paperwork.

Submit all required paperwork within 60 days of project acceptance.

Item 6 – Control of Materials

Use materials from pre-qualified producers. A list of material producers pre-qualified by the Construction Division (CST) of the Texas Department of Transportation (TxDOT) can be found at the following website:
http://www.txdot.gov/business/resources/producer-list.html

In addition to the requirements of the plans and specifications, make all material and equipment furnished, installed, modified, tested, or otherwise used on this contract, and becoming the property of TxDOT, fully functional within the manufacturer normal specifications, warranties, and guarantees. Make any additional functions of the material and equipment normally supplied by the manufacturer, but not specified by TxDOT, completely functional.

Store material off TxDOT property or Right of Way unless approved by the project supervisor.

Repair damage to the Right of Way to the satisfaction of the project supervisor.

Item 7 – Legal Relations and Responsibilities

Coordinate street closures with the local fire, police, and other emergency personnel.

Maintain access to adjacent property at all times.

Notify, in writing, each residence and business 10 days prior to beginning construction of the phase/phases that are expected to affect their ingress and egress. This notice may be hand delivered or mailed.

When applicable, comply with all requirements of the Environmental Permits Issues and Commitments (EPIC) sheets.

Provide a lidded dumpster to be used by Contractor's personnel on the job site. The lid or covering to the dumpsters needs to be able to stay closed in high winds for preventing trash from being blown out. This shall be considered subsidiary to the various bid items.

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5A**

Dispose of all waste materials in compliance with local, state, and federal regulations. Submit a list of all approved waste sites to the Engineer for review.

All vehicles in the work zone shall use flashing amber strobe lights visible 360 degrees.

No significant traffic generator events identified.

This project will not require an agreement, flagging, insurance, or right-of-entry.

Item 8 - Prosecution and Progress

This project is to be complete in 167 days and 11 months of barricades in accordance with the contract documents.

Time charges will begin 30 days after work authorization.

Monthly schedule updates are a very important aspect of managing the progress of this project. The Engineer may withhold the monthly estimate if the schedule update has not been received.

A bar chart will be required on this project.

Do not begin work before sunrise or end work after sunset unless authorized by the Engineer, and remove all equipment from the roadway before sundown.

Perform any erosion control measures such as seeding or sodding before beginning the next phase, or land, unless otherwise authorized by the Engineer.

Work around existing culverts, signs, mailboxes, object markers and delineators. Any damages resulting from the Contractor's operation shall be repaired by the Contractor to the satisfaction of the Engineer.

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

Shut down operations the working day before the following major traffic generating holidays: January 1st (New Year's); Last Monday in May (Memorial Day); July 4th (Independence Day); First Monday in September (Labor Day); Fourth Thursday in November (Thanksgiving); and December 24th (Christmas Eve).

The work zone shall not exceed 2 miles unless otherwise directed by the Engineer.

Payment for final 3% mobilization will be made according to Article 500.3. Timeliness for submittal of required paperwork and correction of deficiencies is a consideration in developing the final contractor evaluation score.

Item 9 - Measurement and Payment

Submit material-on-hand payment requests by the monthly estimate cutoff date.

Items 106 – Obliterating Abandoned Roadway

Contractor to retain possession of removed material.

Item 134 - Backfilling Pavement Edges & Items 150 – Blading

Salvage existing topsoil and grass in windrows along the edge of the grading operations, or as directed by the Engineer. As a land is finished, spread the adjacent topsoil and grass uniformly over the disturbed area. Perform this work in phases not to exceed three miles, unless otherwise authorized by the Engineer.

Blading shall set a nice, smooth profile of the ditch before mowstrip excavation.

Water will be required as directed by the Engineer to compact backfill the pavement edges.

Backfill and compact the mow strip within 2 weeks of placement.

Item 314 - Emulsified Asphalt Treatment

Apply the emulsified asphalt and water mixture, as directed by the Engineer.

Item 315 - Fog Seal

Apply the emulsified asphalt and water mixture, as directed by the Engineer.

Item 420 - Concrete Substructures

Furnish and place preformed fiber material, a minimum one-half (1/2)-inch thick, as shown on the plans or directed by the Engineer.

Furnish a temperature recorder with the minimum capabilities of a 7-day recording time, 2 degree F division, and 120 VAC with 9-volt backup, for each curing tank used on the project. Supply all charts, recording pins, and other equipment necessary for complete operation of the temperature recorder during the project. The temperature recorder and all associated equipment will not be paid directly, but will be subsidiary to the various bid items.

Use Grade 3 or Grade 4 coarse aggregate in all concrete structures.

Cold weather protection requirements within 72 hours of a concrete pour as per the following table:

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5B**

PROJECTED LOW TEMP	PROTECTION REQUIRED
< 20 degrees	DO NOT POUR
20-27 degrees	cover with plastic, then a insulating blanket, and plastic on top
28-35 degrees	cover with plastic, then a insulating blanket
> 35 degrees	no protection required

All projected temperatures will be based on the NOAA website. None of the above actions releases the Contractor from the responsibility for freeze damaged concrete for whatever reason.

Coring of structural classes of concrete will not be allowed. All coring of miscellaneous concrete shall be at the Contractor's expense including all prep work. Coring must be completed within 3 days of notice of failing 28-day samples; otherwise pay deductions apply using 28-day compressive strength.

Provide TY II curing compound for all curb and gutter, sidewalks, driveways, curb ramps, riprap, and cast-in-place SET's.

When doweling into concrete, clean out the hole, fill completely with epoxy, then place the dowel. Do not dip the dowel into epoxy first and shove it into the hole.

Do not place concrete when the wind gusts get to over 25 miles per hour.

Vibrate all concrete.

Item 421 - Hydraulic Cement Concrete

Class C Fly Ash without silica fume will be allowed in Class A, B, S, and P concrete mix designs as directed by the Engineer.

If Class C fly ash is used, a maximum of 35% will be allowed.

Provide air entrainment in all concrete except for concrete used in drilled shafts and precast concrete members. Target an entrained air content of 4.0% for concrete pavement and 5.5% for all other concrete requiring air entrainment. Ensure the minimum entrained air content is at least 3.0% for all classes of concrete.

The Engineer will perform all concrete job control testing.

Supply 2 – 4' x 8' x ¾" sheets of plywood, in order to perform required testing procedures at the location of concrete placements.

Use 4-inch by 8-inch cylinder molds for concrete with Grade 3 or smaller coarse aggregate. Supply new cylinder molds and lids subsidiary to the various bid items.

The Engineer will inspect concrete batch plants and trucks for approval.

Concrete plant must be capable of providing automated moisture content control for both coarse and fine aggregate.

Item 427 - Surface Finishes For Concrete

Provide surface area I concrete surfaces with a rub finish as soon as forms are removed.

This work will not be paid for directly, but will be considered subsidiary to Item 432.

Item 432 - Riprap

Provide 5-inch thick mowstrip riprap along entire length of the cable barrier, unless otherwise indicated in the plans.

Riprap shall be 3’ in width, as shown on the Typical Section sheet.

Use #3 reinforcing bars. Welded wire, wire mesh, and fiber-reinforced concrete will not be allowed.

Reinforcing steel shall be placed at 16” x 16” centers. The center piece of reinforcing steel that falls over an anchoring hole/shaft may be cut to allow placement of cable fence posts.

3 pieces of longitudinal steel shall be placed in all cable barrier mowstrip.

Transverse bars shall be 32” in length and placed every 16” longitudinally.

Provide one-half (1/2)-inch thick expansion joint material at approximately 100-foot intervals, or as determined by the Engineer.

Except where expansion joints are located, place tool joints every 20’ for the length of the mowstrip.

Place asphalt expansion joint material between proposed riprap and utility poles, guy wires, vent pipes, stand pipes and as directed.

Excavate trench for mow strip after blading.

Backfill mowstrip after forms are removed. This will be considered subsidiary.

Follow cold weather protection requirements listed under Item 420.

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5C**

Item 502 - Barricades, Signs And Traffic Handling

Prior to beginning construction, the Engineer shall approve the routing of traffic and sequence of work.

Additional signs and barricades as directed by the Engineer shall be considered subsidiary to Item 502.

Provide flashing portable arrow panels for all lane closures.

Wash the channelizing devices and barricades following each rainfall or snowfall event and at times deemed necessary by the Engineer.

To ensure the safety and convenience of traffic, flaggers may be required when construction machinery is being operated along, across, or adjacent to lanes carrying traffic. If considered necessary by the Engineer, supplemental signs and barricades may be required.

Fill any holes left by barricade or sign supports and restore the area to its original condition.

Barricades, Signs and Traffic Handling is a plan quantity item. If time is suspended, no additional compensation will be made.

Traffic switches will not be permitted on Fridays or any working day preceding a holiday unless authorized by the Engineer.

Cones or chevrons may be used in lieu of vertical panels at the discretion of the Engineer. Cones cannot be used to separate opposing traffic.

The Contractor shall bid the traffic control plan shown in the plans. Any proposed alterations to the TCP (combining work areas / phasing / etc.) shall be submitted to the Engineer at least 10 days prior to anticipated changes.

Even when not explicitly shown in the project TCP, vertical panels shall be used with an opposing lane divider every 5th panel in accordance with BC(9) for all opposing traffic conditions without a positive barrier.

Square tubing sign supports may be used for temporary construction signs. Aluminum and wood signs may be mounted if the vertical supports are embedded into the ground. Square tubing supports on skids which are typically held in place with sandbags can only support signs made of light weight flutted plastic.

Any trench or drop off over 2” and less than 10” will require a safety slope of at least 1:1 if drop off is going to be existing for more than 2 nights. For drop-offs greater than 10”, a safety slope will be required at the end of operations for that day. This safety slope may be constructed with RAP, embankment, or other material approved by the Engineer. The placement, maintenance, and

removal of this safety slope is the responsibility of the Contractor and will be considered subsidiary to the various bid items.

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

Correct all noted deficiencies within 7 calendar days, otherwise, cease all operations until the noted deficiencies are corrected.

Stockpiles that meet the barricade requirements as shown on the BC(10) Standard are required to be erected at the time of material delivery in the Right-of-Way and maintained as long as the stockpile exists. Payment for Material-on-Hand will be withheld from the estimate for inadequate barricades or the failure to maintain barricades on a per stockpile basis as determined by the Engineer.

Like new traffic control devices will be required at the initial setup for all projects or as approved by the Engineer.

Provide flags and a CW8-15P “MOTORCYCLE WARNING” plaque on all CW20-1D “ROAD WORK AHEAD” signs except on side roads.

Use only the work zone speed limit and TCP signs that are relevant to the active work area and as directed. Reset signs for subsequent work phases as work progresses and approved by the Engineer. Reset normal speed limit signs at the ends of work zones.

All bid items and work requiring traffic control is the responsibility of the contractor, even when not explicitly detailed in the plans. Consider this work subsidiary to Item 502.

TMAs and Portable Changeable Message Boards will not be used as Arrow Boards.

No lane closures shall be left in place overnight.

Provide the requisite number of TMAs as required by the pertinent TCPs.

Item 506 - Temporary Erosion, Sedimentation, and Environmental Controls

Place a weatherproof bulletin board containing the TCEQ required information on the project at a site directed by the Engineer. Post the following documents: (1) "TCEQ TPDES Storm Water Program" Construction Site Notice and (2) TCEQ "TPDES Permit." Place rain gauge(s) at locations designated by the Engineer. At the completion of the contract, the bulletin board will

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5D**

become the property of the State and will remain in place until 70 percent vegetation coverage has been obtained.

Provide long-term, Type 1 construction exits, located at the Contractor's equipment storage area.

Silt fence, sandbags and other BMPs will be placed and relocated as directed by the Engineer in order to comply fully with the SW3P requirements.

The soil area disturbed by this project, including all disturbed areas within the limits of this project as described in the Contract and at Contractor project specific locations (PSLs) within one mile of the project limits, contributes to the establishment of the Texas Commission on Environmental Quality (TCEQ) Construction General Permit (CGP) requirements for storm water discharges. The Department will obtain an authorization from the TCEQ to discharge storm water for construction activities shown on the plans. The Contractor shall obtain the required authorization from the TCEQ for Contractor project specific locations (PSLs) for construction support activities off the right-of-way. As directed by the Engineer, the Contractor shall obtain any required authorization from the TCEQ for on-site PSLs. When the total area disturbed within the project limits and at PSLs within one mile of the project limits exceeds five acres, the Contractor shall provide a copy of the Contractor’s Notice of Intent (NOI) submission and Construction General Permit for PSLs on the right-of-way to the Engineer (and submit a copy of NOIs to appropriate MS4 operators).

Sediments removed from BMPs shall be paid for by force account. The Contractor shall submit an invoice for the work.

Correct all noted deficiencies within 7 calendar days, otherwise, cease all operations until the noted deficiencies are corrected.

Maintain 100 feet of silt fence, 100 feet of erosion control logs, and 50 sandbags on site at all times for repairs/replacement as needed.

Item 533 – Rumble Strips

Use Option 4 for edgeline rumble strips.

Place final edge striping before milling rumble strips. Use a spray bar shield or other means to protect final stripe from fog seal application.

Fog seal rumble strips within 14 days of milling.

Item 543 – Cable Barrier System

Reimbursable repair or replacement will be paid at contract bid prices.

All systems and requisite components shall be TL-4.

Only pre-stressed cables shall be used.

Follow manufacturer's installation and handling instructions and/or recommendations.

Cable post and anchor delineators will be considered subsidiary to Item 543, and shall be placed as near to 80' increments as practical.

The contractor shall contact the manufacturer to schedule a training for TxDOT Maintenance personnel, and all impacted first responders in the de-tensioning of the cable barrier system. Any costs to the contractor associated with this training will not be paid for directly, but will be considered subsidiary to the various bid items. Contact Jeremy Dearing, P.E., Lubbock District Director of Transportation Operations, to coordinate this effort. Email: Jeremy.Dearing@txdot.gov.

Delineators attached to the cable barrier as shown in D&OM(6)-20 shall be double-sided and are subsidiary to item 543.

Items 644 & 647

Perform the following work subsidiary to Items 644 and/or 647.
For all signs designated for removal:

- Salvage aluminum signs,
- Palletize and band salvaged aluminum signs,
- Stockpile signs at the following location as directed by the Engineer.

Contact Person: Curt Masters Phone # 806-385-3661
Address: 1600 W. Delano Ave. Littlefield Tx. 79339

Item 658 - Delineator and Object Marker Assemblies

Delineator and object marker assembly posts shall be driveable and composed of post-consumer recycled materials. Embedded stub shall be perforated square tubing.

Driveable posts shall be the three-piece Flexible Delineator Post System, utilizing a 2-3/8" round post with a square to round flexible joint. The Embedded Anchor shall be 2" x 12 gauge x 24" long steel perforated square tubing. The Posts shall be permanently sealed at the top and have a 3-1/2" wide x 13" flattened surface to accommodate up to a 3" x 12" reflective sheet on both sides.

Item 666 - Reflectorized Pavement Markings

Mark the location of standard pavement markings, including barrier lines, no passing zones, gores, and transitions adjusting to meet latest standards or as directed by the Engineer.

After completion of all work and removal of the barricades, time charges will be suspended. The performance period for the project will not begin until all the striping has been completed. Final

County: Lamb, Etc. **Control:** 0052-05-047, etc.

Highway: US 84 **Sheet 5E**

acceptance will not be granted until the performance period for pavement markings is complete. If replacement markings are needed, traffic control for moving operations will be required. No payment will be made for traffic control during replacement striping work. All traffic control work shall be considered subsidiary to the project's replacement striping work.

The yellow or white long-line striping for re-striping operations will not lag one another by more than four (4) working days. The performance period for a roadway will not begin for a section of roadway or a project until all required striping for that section or project has been completed.

Provide a schedule and notify the District Traffic Office a minimum of 3 days prior to any striping operation. Contact via email at LBB-TRFOPS@TxDOT.GOV. If not notified, the time frame for testing and meeting the Retroreflectivity requirements in article 4.4 will start the day the department is made aware of that the markings have been applied.

Item 677 - Eliminating Existing Pavement Markings and Markers

Eliminate existing pavement markings by the Water Blasting Method.

Item 730 - Roadside Mowing

Mow from ROW line to ROW line 2 times. The Engineer shall dictate the times to mow and the areas in the project to mow.

Each mowing cycle is for the entire project. Approximately 115 acres per cycle.

Notify the Engineer by 9:00 am each day for work completed the previous day, including hand trimming and cleanup. The Engineer will then inspect the section(s) of roadway for acceptance, not more than two (2) working days after notification.

Mobile TMA will be required where median cable is present, and the mower deck extends into the roadway.

Item 734 – Litter Removal

Perform litter as directed by the Engineer.

Item 6001 - Portable Changeable Message Sign

Provide messages as directed by the Engineer.

Provide 2 solar powered changeable message signs for the duration of this project.

Inform the public 2 weeks before construction begins.

Item 6185 – Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

Provide 2 TMAs for stationary use for the duration of the project. Stationary TMAs will be used during the various phases of work required for this project. Payment will be made by the day for each TMA used in stationary operations.

Provide 3 TMAs for mobile use. Mobile TMAs will be used for moving operations such as striping and RPM placement. Payment will be made by the day for each TMA used in mobile operations.

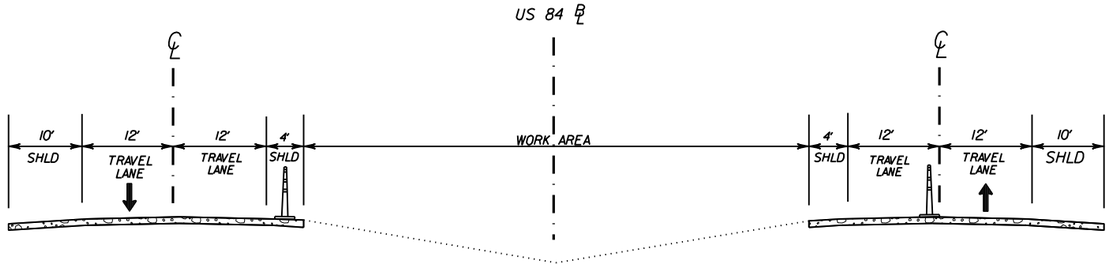
ESTIMATE SUMMARY

PROJECT STP 2022(493)HES		PROJECT STP 2022(493)HES		PROJECT STP 2022(493)HES		ALT.	ITEM-CODE			DESCRIPTION	UNIT	TOTAL	
CONTROL 0052-05-047		CONTROL 0052-06-026		CONTROL 0052-06-027									
US 84 ROADWAY ITEMS		US 84 ROADWAY ITEMS		US 84 ROADWAY ITEMS									
EST.	FINAL	EST.	FINAL	EST.	FINAL		ITEM NO	DESC CODE	SP NO			EST.	FINAL
15.000							106	6001		OBLITERATING ABANDONED ROAD	STA	15.000	
134.600		167.600		224.150			134	6001		BACKFILL (TY B)	STA	526.350	
134.600		167.600		224.150			150	6001		BLADING	STA	526.350	
164.000							315	6004		FOG SEAL (CSS-1H)	GAL	164.000	
0.680		0.590		1.040			432	6005		RIPRAP (CONC)(CL A)	CY	2.310	
623.140		775.920		1037.740			432	6046		RIPRAP (MOW STRIP)(5IN)	CY	2436.800	
1.000							500	6001		MOBILIZATION	LS	1.000	
3.000		4.000		4.000			502	6001		BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	11.000	
111.000							506	6020		CONSTRUCTION EXITS (INSTALL)(TY 1)	SY	111.000	
111.000							506	6024		CONSTRUCTION EXITS (REMOVE)	SY	111.000	
70.000							506	6035		SANDBAGS FOR EROSION CONTROL	EA	70.000	
750.000		600.000		910.000			506	6042		BIODEG EROSN CONT LOGS (INSTL)(18")	LF	2260.000	
375.000		300.000		460.000			506	6043		BIODEG EROSN CONT LOGS (REMOVE)	LF	1135.000	
4100.000							533	6003		RUMBLE STRIPS (SHOULDER) ASPHALT	LF	4100.000	
13240.000		16320.000		22030.000			543	6002		CABLE BARRIER SYSTEM (TL-4)	LF	51590.000	
8.000		16.000		14.000			543	6020		CABLE BARRIER TERMINAL SECTION (TL-4)	EA	38.000	
8.000							644	6076		REMOVE SM RD SN SUP&AM	EA	8.000	
8.000		16.000		14.000			658	6095		INSTL DEL ASSM (D-DY)SZ (1Y)FLX)GND	EA	38.000	
4100.000							666	6315		RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	4100.000	
550.000							677	6003		ELIM EXT PAV MRK & MARKS (8")	LF	550.000	
211.000		211.000		212.000			6001	6001		PORTABLE CHANGEABLE MESSAGE SIGN	DAY	634.000	
111.000		111.000		112.000			6185	6002		TMA (STATIONARY)	DAY	334.000	
15.000		15.000		15.000			6185	6005		TMA (MOBILE OPERATION)	DAY	45.000	
										FEDERAL NON-PARTICIPATING ITEMS			
				2.000			730	6107		FULL-WIDTH MOWING	CYC	2.000	
				1.000			734	6002		LITTER REMOVAL	CYC	1.000	
										18 CONTRACTOR FORCE ACOUNT WORK (PART)			
				1.000						SAFETY CONTINGENCY	LS	1.000	
				1.000						EROSION CONTROL MAINTENANCE	LS	1.000	

Texas Department of Transportation

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			6
STATE	STATE DIST.NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84E&Qsheet.dgn		

ESTIMATE & QUANTITY



DAILY CLOSURE TYPICAL SECTION
(LT SIDE SIMILAR)
ONLY CLOSE LANE ON SIDE NEAREST TO WORK
TRAFFIC CONTROL DEVICES TO BE MOVED TO INSIDE SHOULDER
AT THE END OF THE WORK DAY OR WHEN NO WORK IS BEING DONE.

Notes:

Sequence of work will be approved by the Engineer before implementation.

Standard regulatory and warning signs not shown on the TCP sheets shall be installed in accordance with the current Texas Manual on Uniform Traffic Control Devices (TMUTCD) and TxDOT standards BC(1) - BC(12).

The contractor may be required to furnish additional barricades, signs, and/or other types of devices as deemed necessary by the Engineer, or as indicated in the TMUTCD, BC, WZ, and/or TCP sheets.

Pavement markings conforming to the TMUTCD and sheets BC(1)-(12) will be in place before any overnight traffic is allowed on any construction surface.

At areas where a crossover has been removed, 42" cones shall be placed at 40' spacing until permanent striping is placed.

All pavement markings and signs that conflict with new traffic movements shall be removed, or covered to the Engineer's satisfaction until they are able to be removed.

Refer to "TREATMENT FOR VARIOUS EDGE CONDITIONS" sheet for required edge dropoff treatments.

CW8-17 and CW8-11 signs shall be places as directed by the engineer.

Advisory speed limits signs shall be placed as directed by the Engineer; these signs will not be paid for directly, but will be considered subsidiary to Item 502.

TMA quantities provided for in the plans are assumed using one lane closure per day. Closure of additional work areas separated by a distance greater than 2 miles will require additional TMAs. Multiple work areas (workers located at multiple locations simultaneously) in a single lane closure will require the requisite number of TMAs as called for the in pertinent TCP, BC, and/or WZ sheets.

Barricades shall not be used as sign supports.

On any series of traffic control devices where reflectors may be used, lights will be required at the beginning and end of each series.

Signs, barricades, and cones not in use for 3 consecutive working days shall be removed from the R.O.W.

All roadways in this contract shall be considered high-speed roadways.

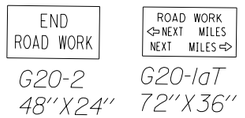
Unless otherwise shown in the plans, flags attached to signs are required.

Traffic control for this project is 24 hours per day. A contractor's representative shall be available at all times to correct any deficiencies.

Signs G20-2 and G20-1aT, or CW20-1D shall be placed at each intersecting highway and county road. These signs shall be mounted on two separate mounts.

Sequence of Work:

1. Set project signs and barricades, and SW3P BMP's.
2. Use repeatable and accurate means to sawcut pavement along the inside shoulder where a crossover is to be removed.
3. Remove all crossovers, including removal of any pipe and/or SETs, signs, and delineators.
4. Place new stripe, rumble strips, and fog seal.
5. Cut ditches to match existing front slopes of both roadbeds.
6. Backfill pavement existing and new pavement edges.
7. Blade back grass into windrow(s).
8. Perform any necessary grading, excavating, earth work, and/or removal of riprap.
9. Install drill shafts, socket assemblies, and mowstrip.
10. Install cable barrier.
11. Blade back windrow(s) and backfill pavement edges.
12. Shoot emulsion on top of bladed areas.
13. Final clean up and punch list items.
14. Remove project signs and barricades.



G20-2
48"X24"

G20-1aT
72"X36"

CW8-17
48"X48"

CW20-1D
48"X48"

CW8-11
48"x48"

Neil Nelon, P.E.
3/3/2022

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			7
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84tcp.dgn		

TRAFFIC CONTROL PLAN

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

WORKER SAFETY NOTES:

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

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

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

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

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

SHEET 1 OF 12

Texas Department of Transportation

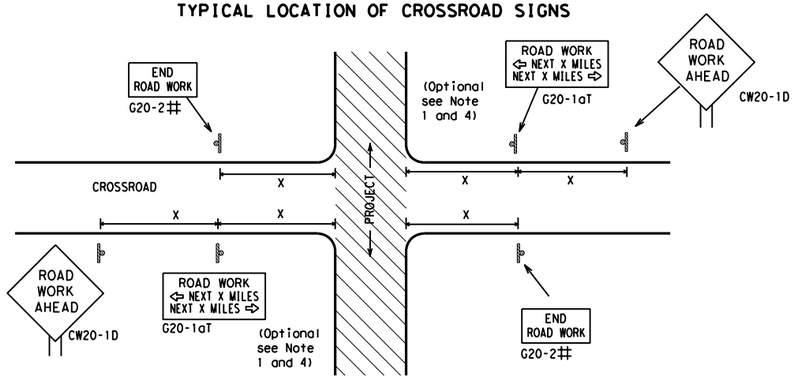
Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		8

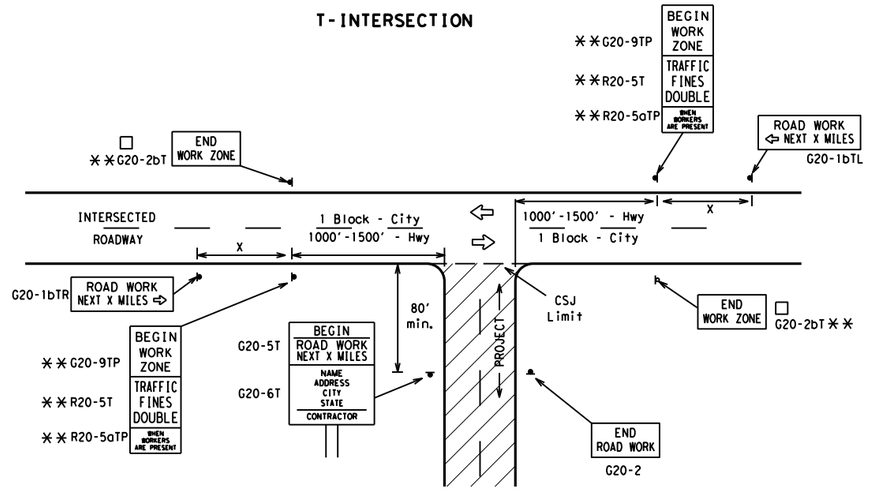
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

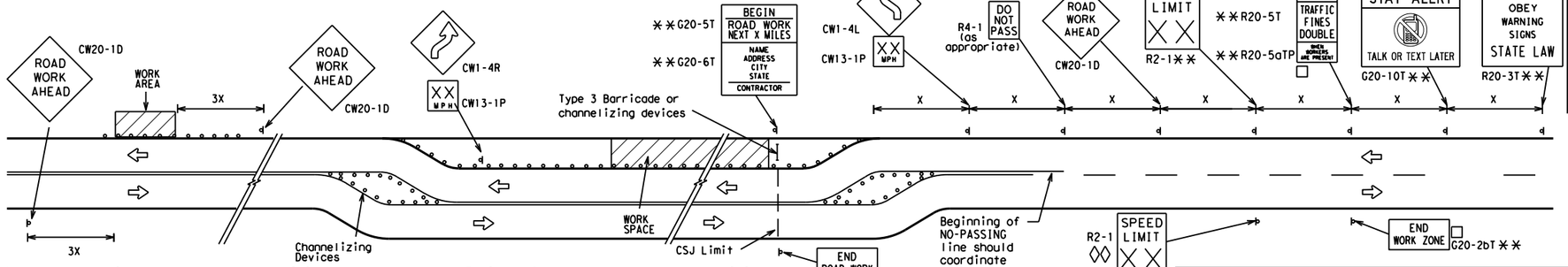
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

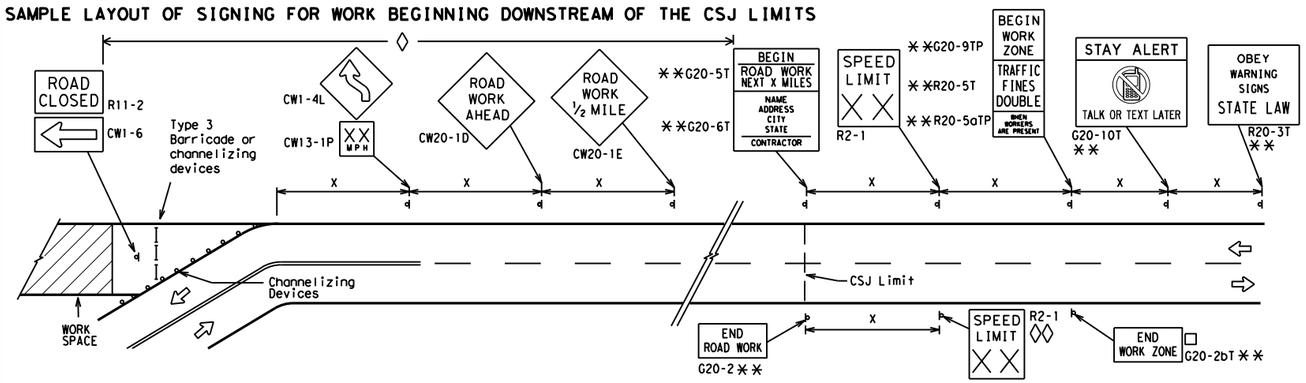
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		9

DATE:
FILE:

DATE:
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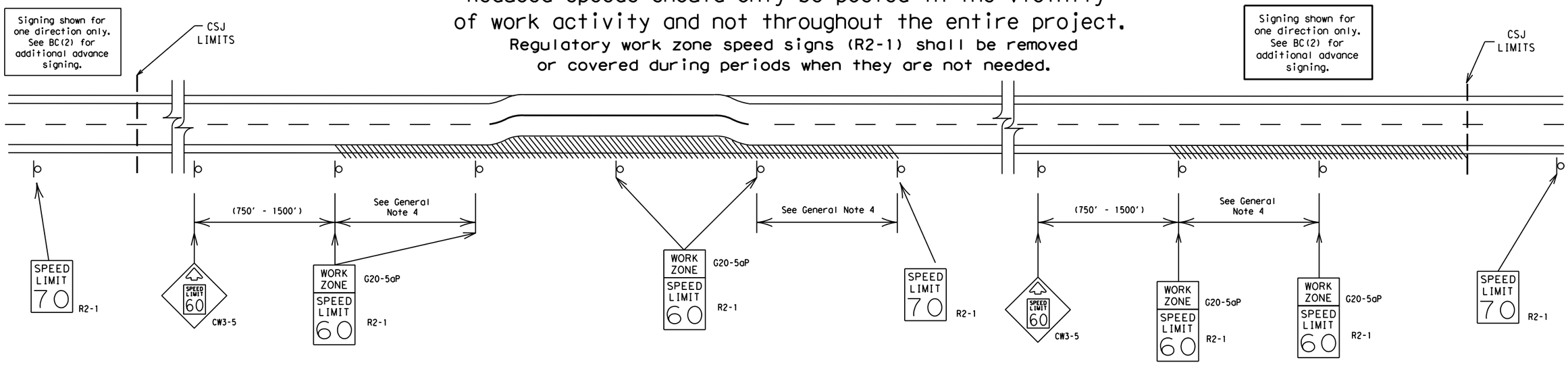
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Safety Division Standard

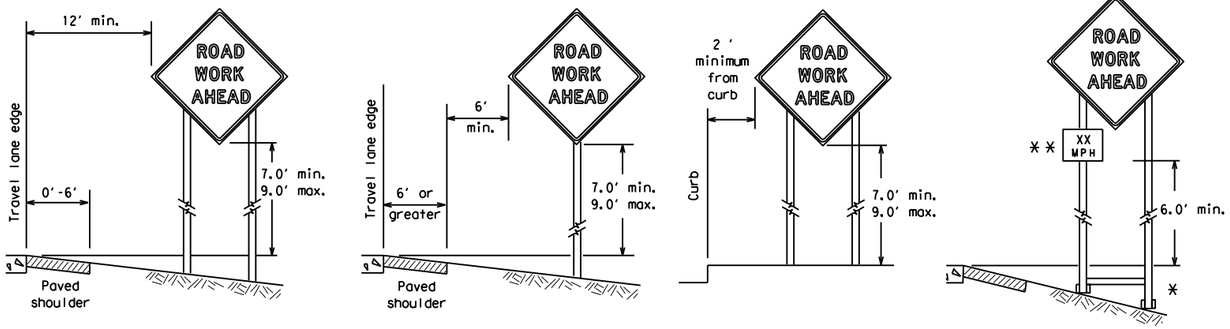
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		10

DATE:
FILE:

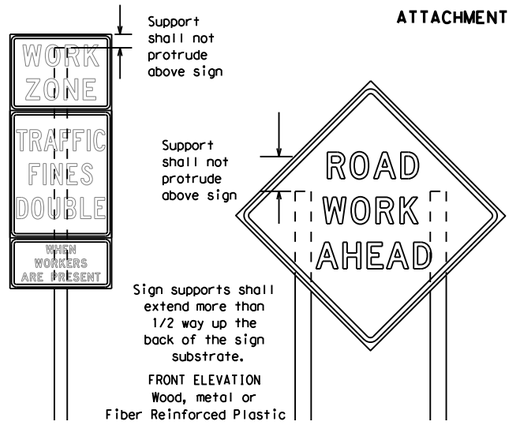
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

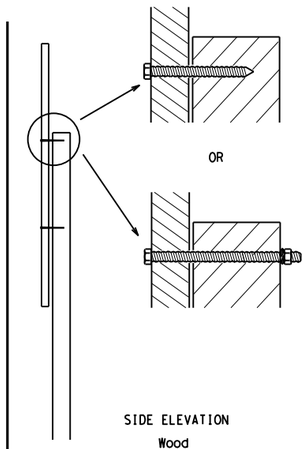


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS





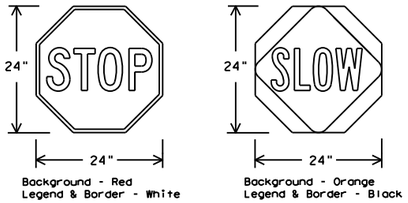
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		11

DATE:
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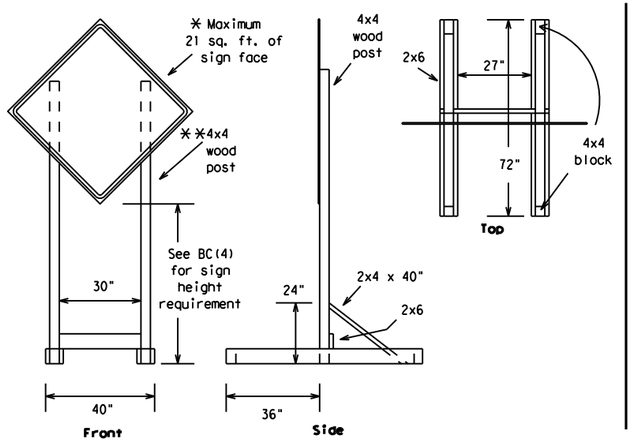
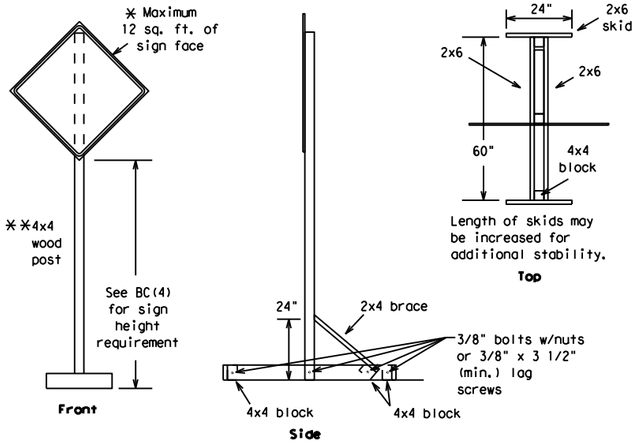
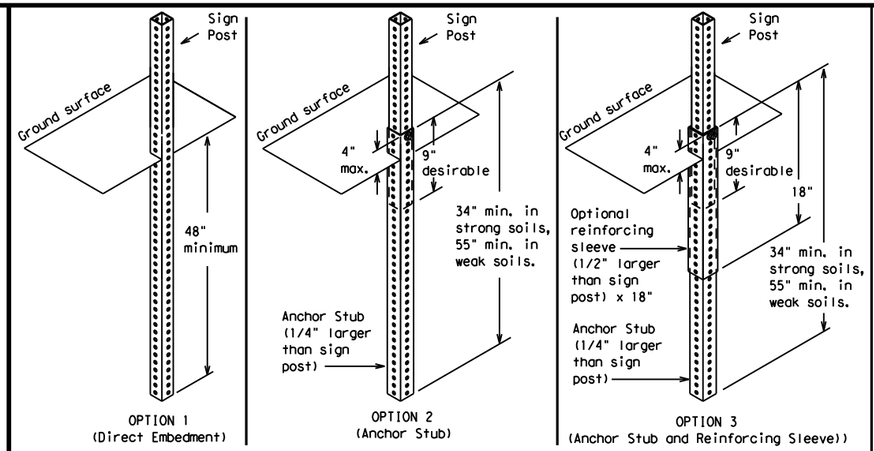




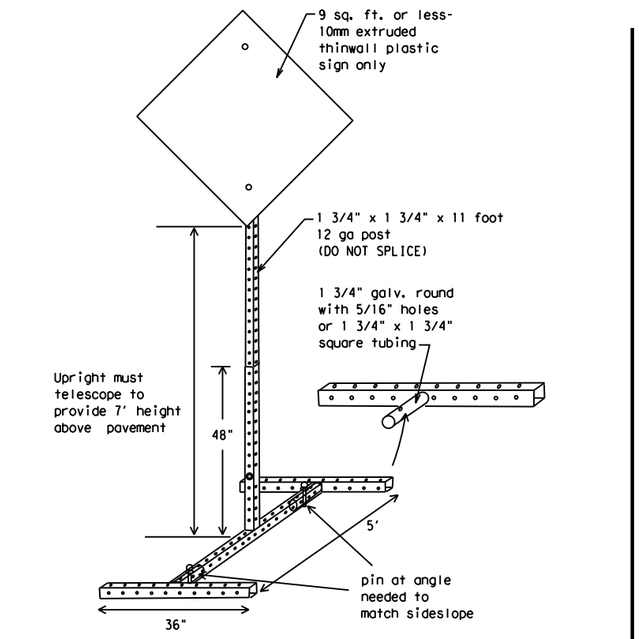
SKID MOUNTED WOOD SIGN SUPPORTS

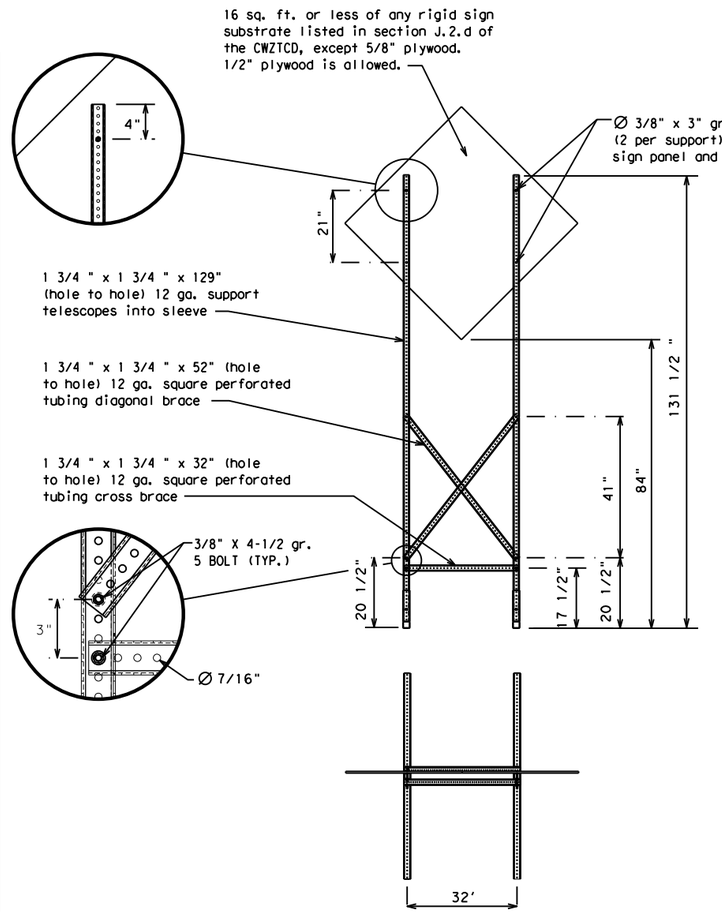
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

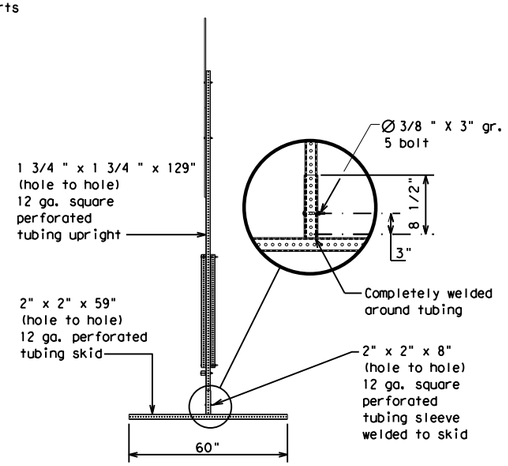


GROUND MOUNTED SIGN SUPPORTS

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







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

SHEET 5 OF 12

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		12

DATE:
FILE:

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

PORTABLE CHANGEABLE MESSAGE SIGNS

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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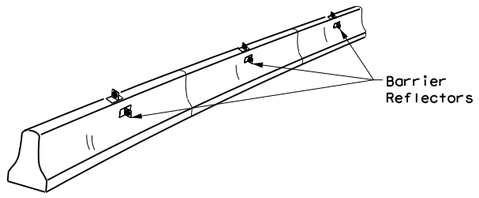
REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		13

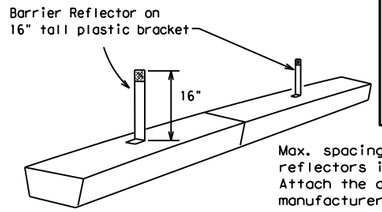
100

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



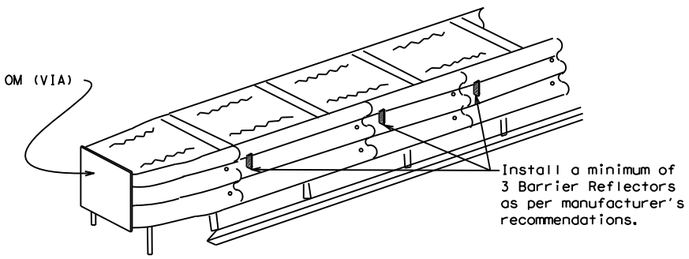
CONCRETE TRAFFIC BARRIER (CTB)

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



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

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS

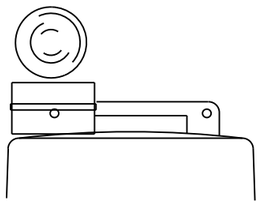
LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

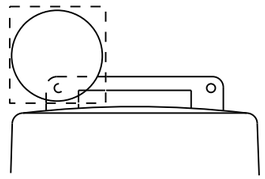
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

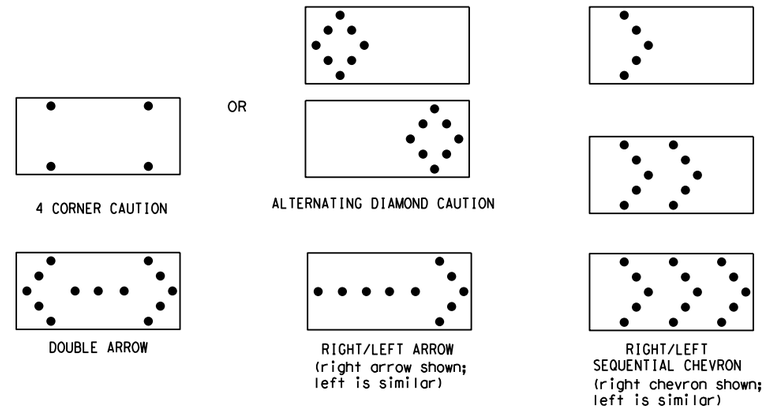
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

SHEET 7 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

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

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	05	LAMB, ETC.		14

DATE:
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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

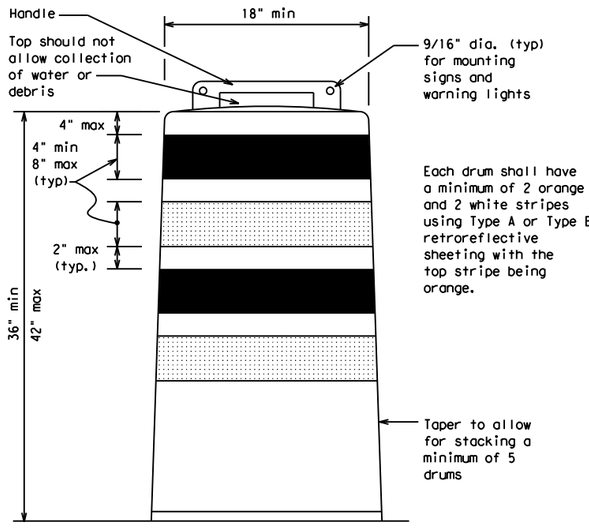
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

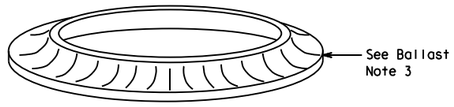
RETROREFLECTIVE SHEETING

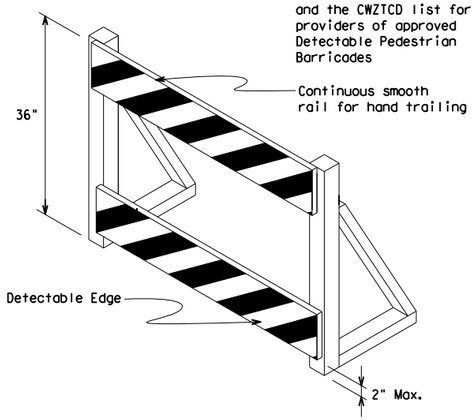
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials," Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall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

BALLAST

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



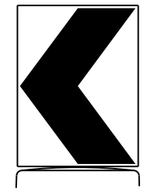




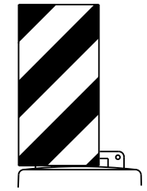
This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades

DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
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9-07 5-21	05	LAMB, ETC.		15
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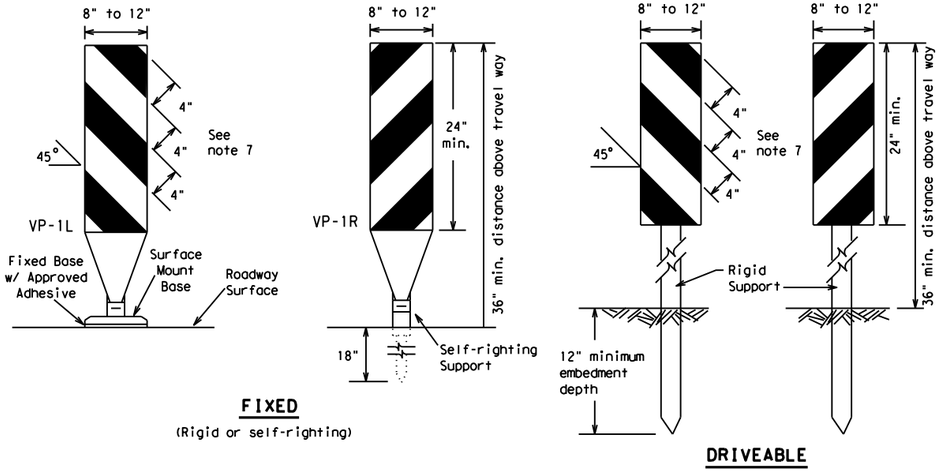
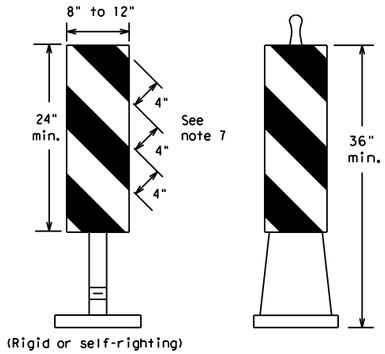


FIXED
(Rigid or self-righting)

DRIVEABLE

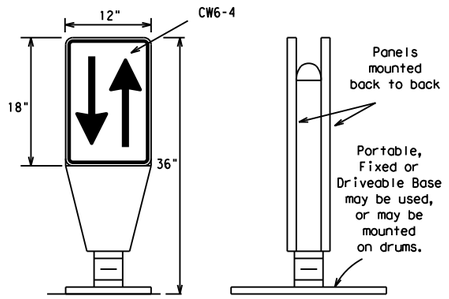


(Rigid or self-righting)

PORTABLE

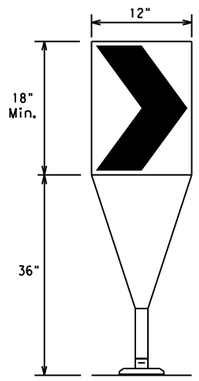
VERTICAL PANELS (VPs)

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



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



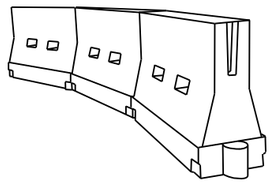
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

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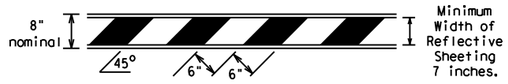
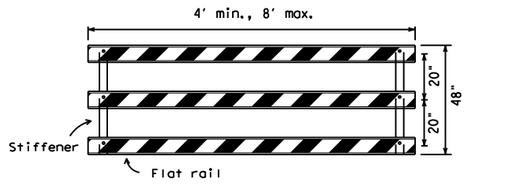
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



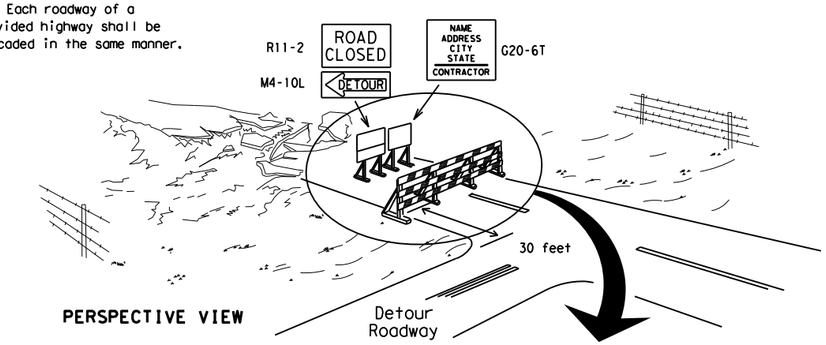
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

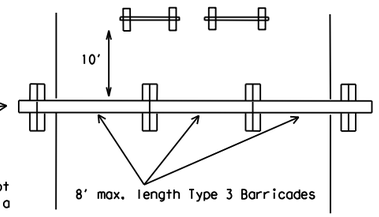
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

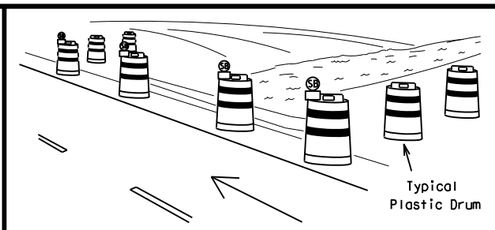
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

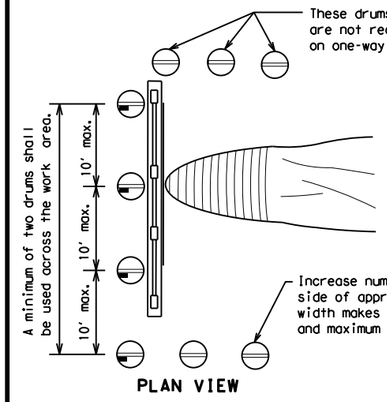
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

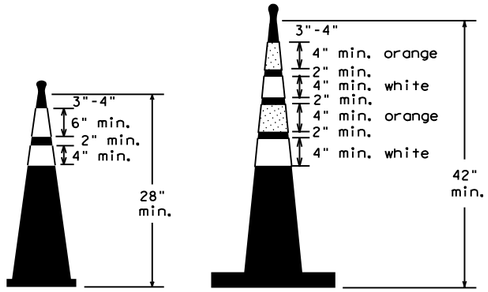
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



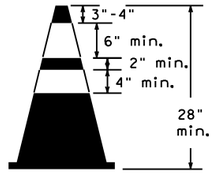
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

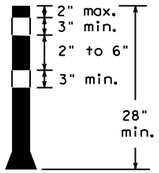
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

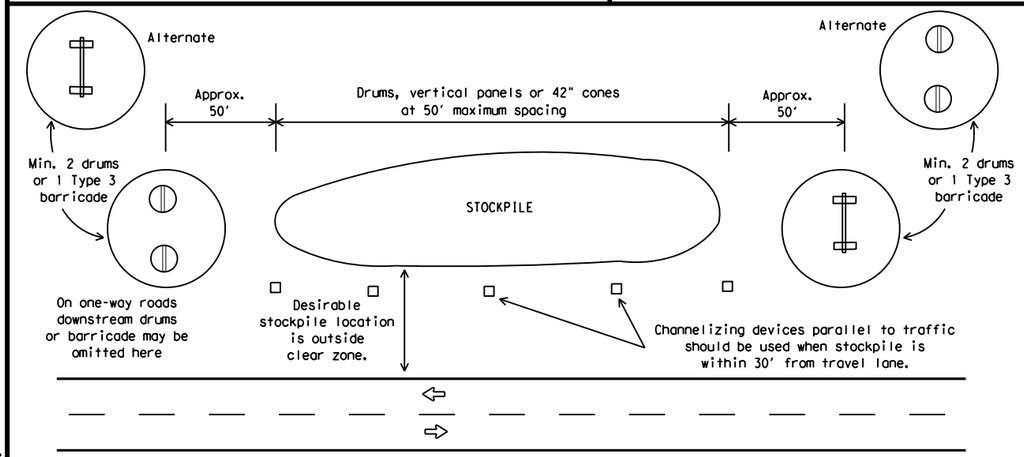


Tubular Marker

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

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

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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SHEET 10 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

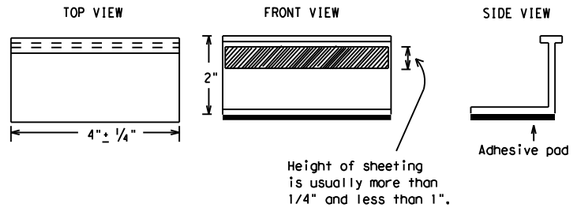
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

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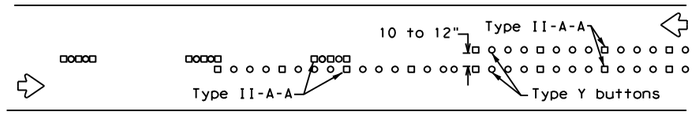
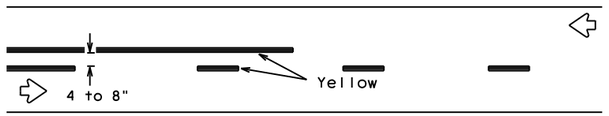
PAVEMENT MARKING PATTERNS

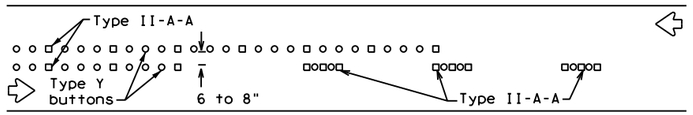
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



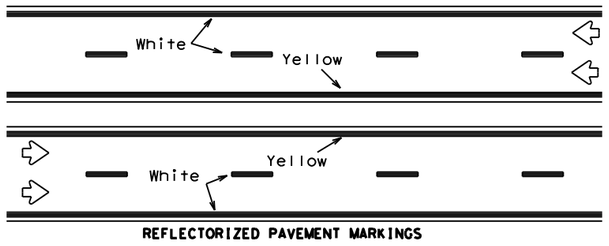
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



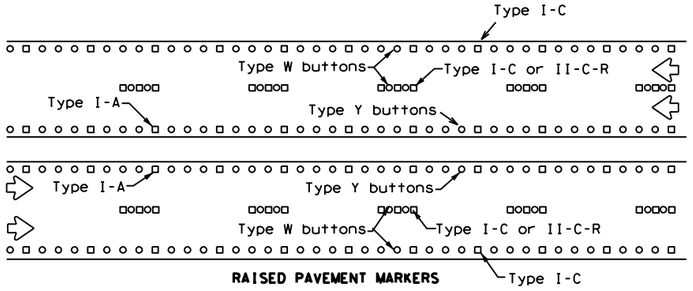
RAISED PAVEMENT MARKERS - PATTERN B

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

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



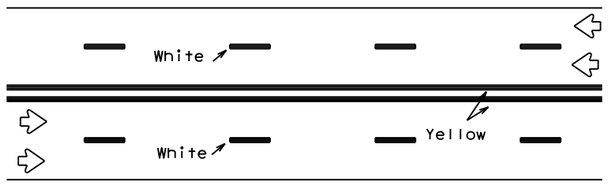
REFLECTORIZED PAVEMENT MARKINGS



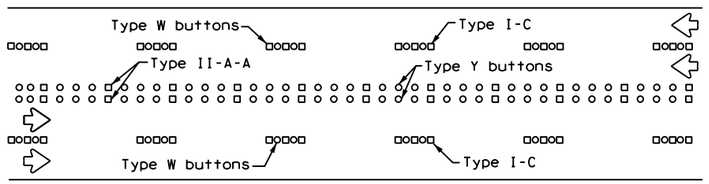
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



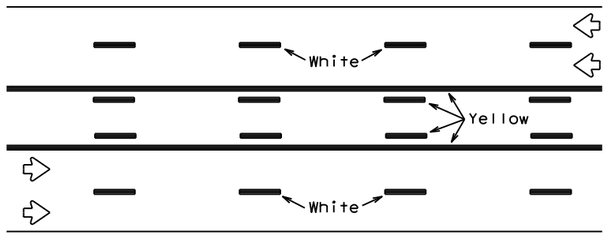
REFLECTORIZED PAVEMENT MARKINGS



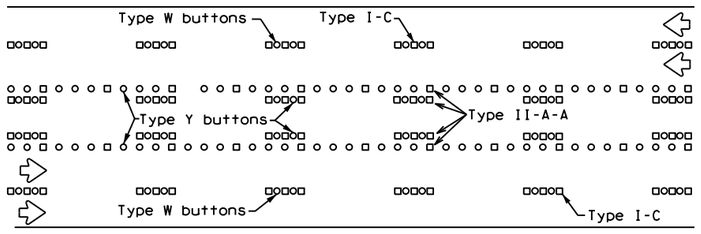
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

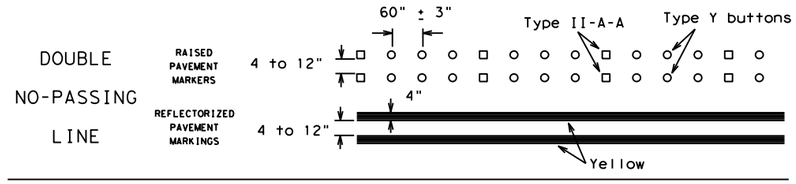
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

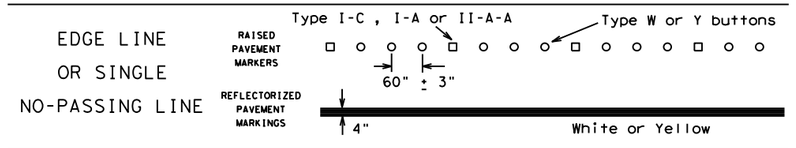
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

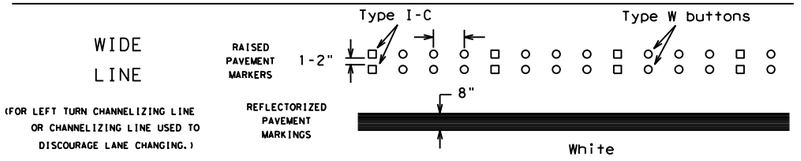


EDGE LINE OR SINGLE NO-PASSING LINE



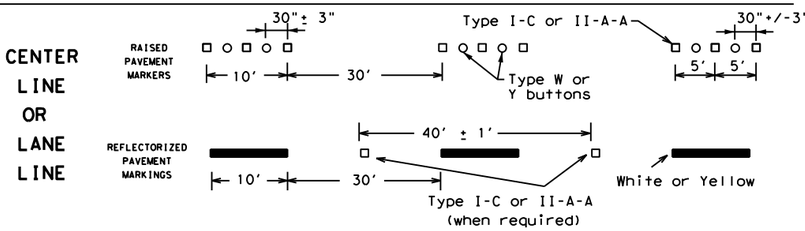
WIDE LINE

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

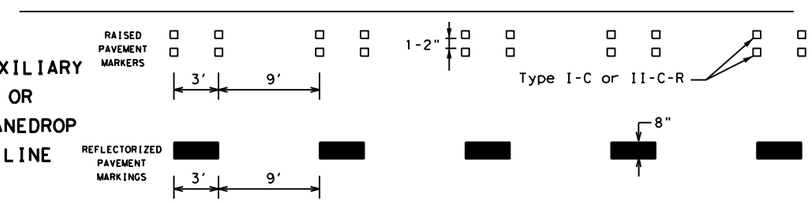


BROKEN LINES

CENTER LINE OR LANE LINE

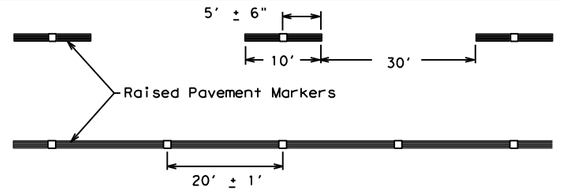


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

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BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

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FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS 1-97 9-07 5-21	0052	05	047	US 84
2-98 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	05	LAMB, ETC.		19

106

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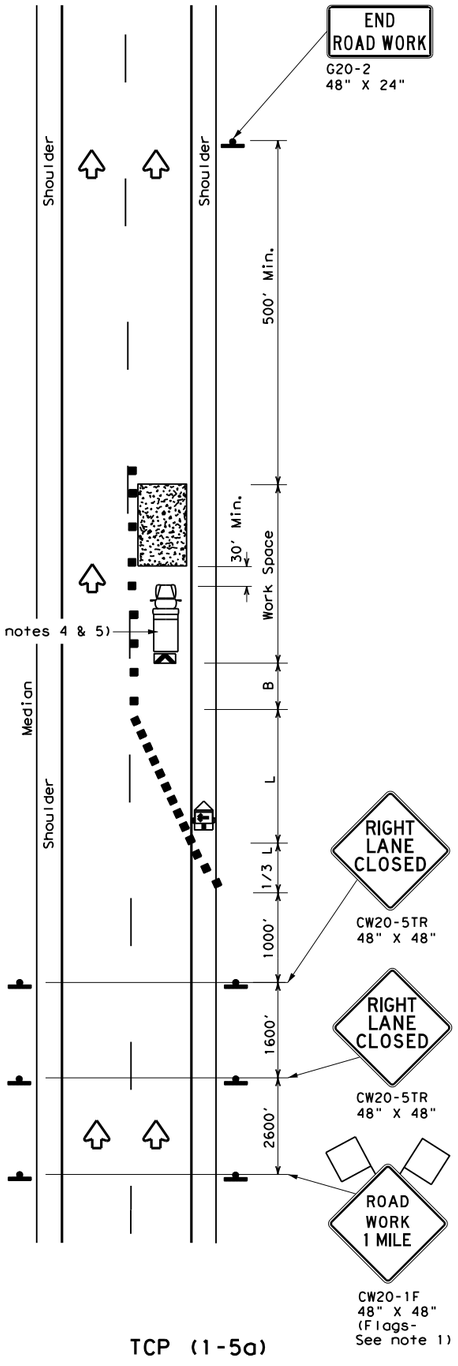
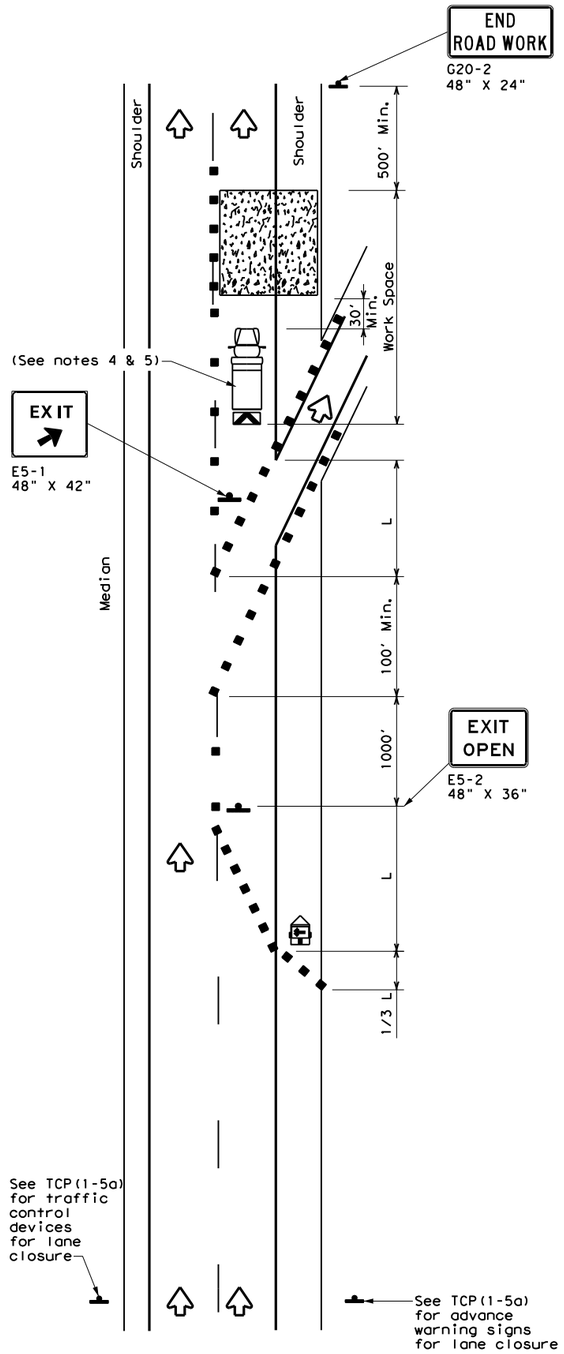
DATE:
FILE:



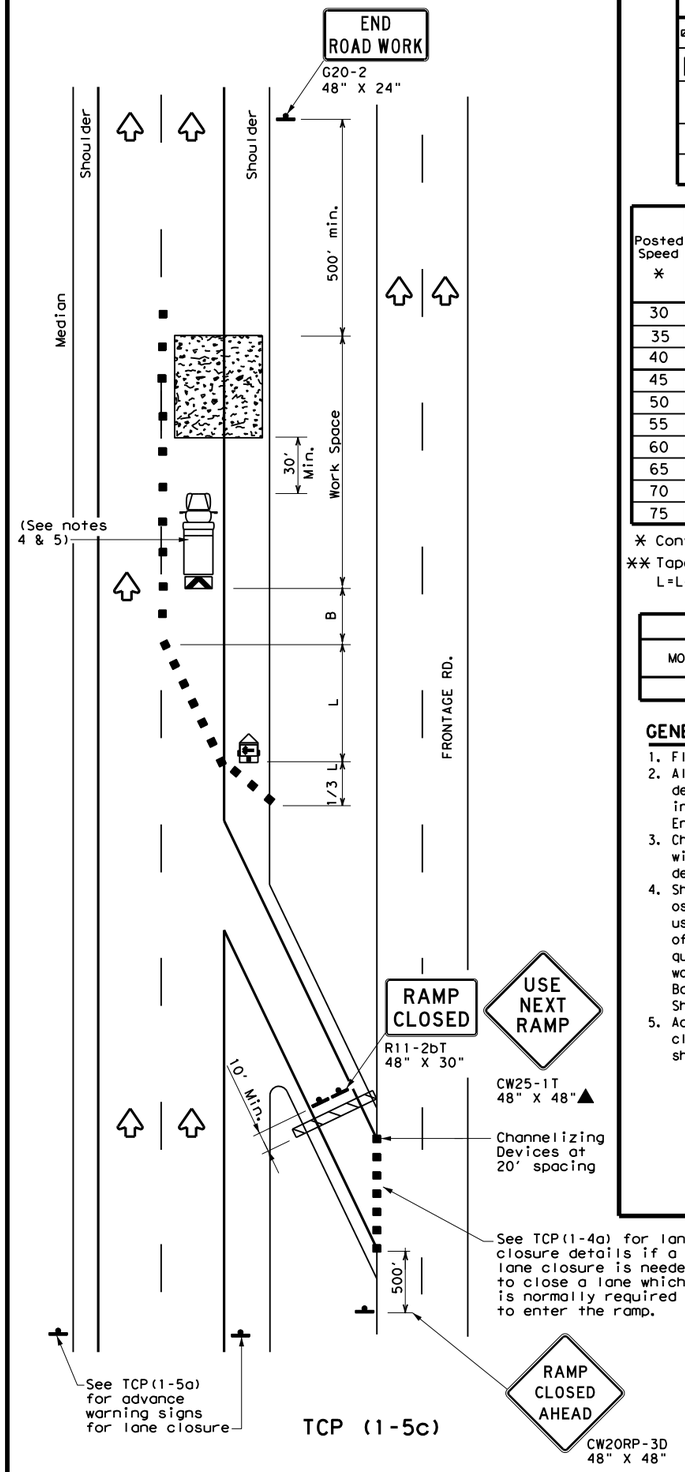
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

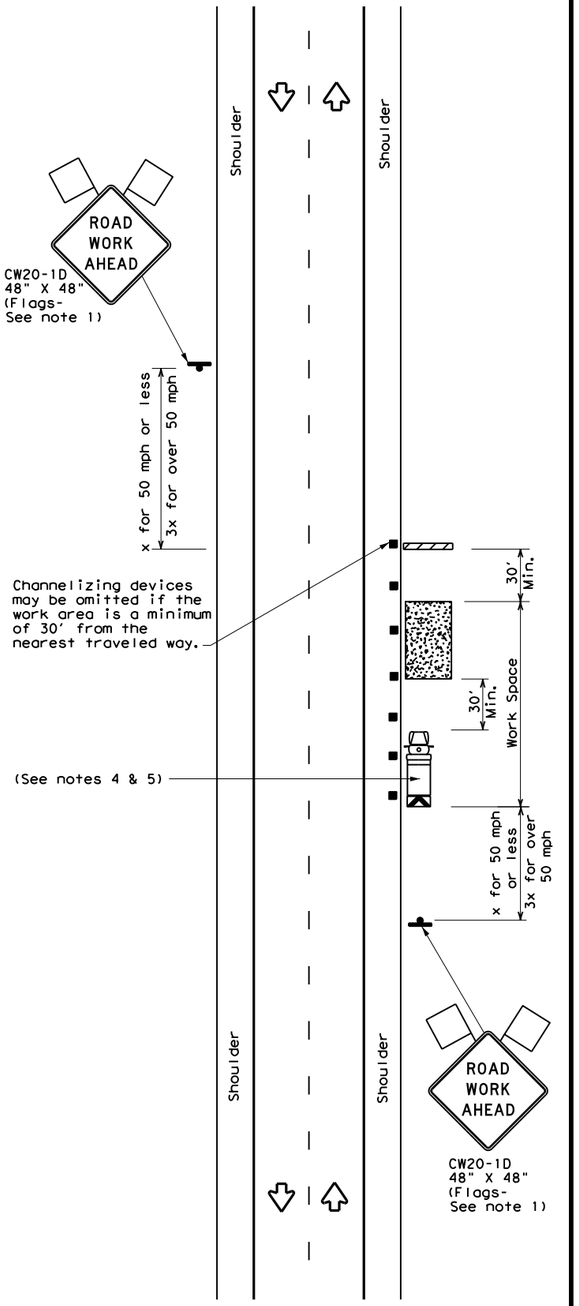
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

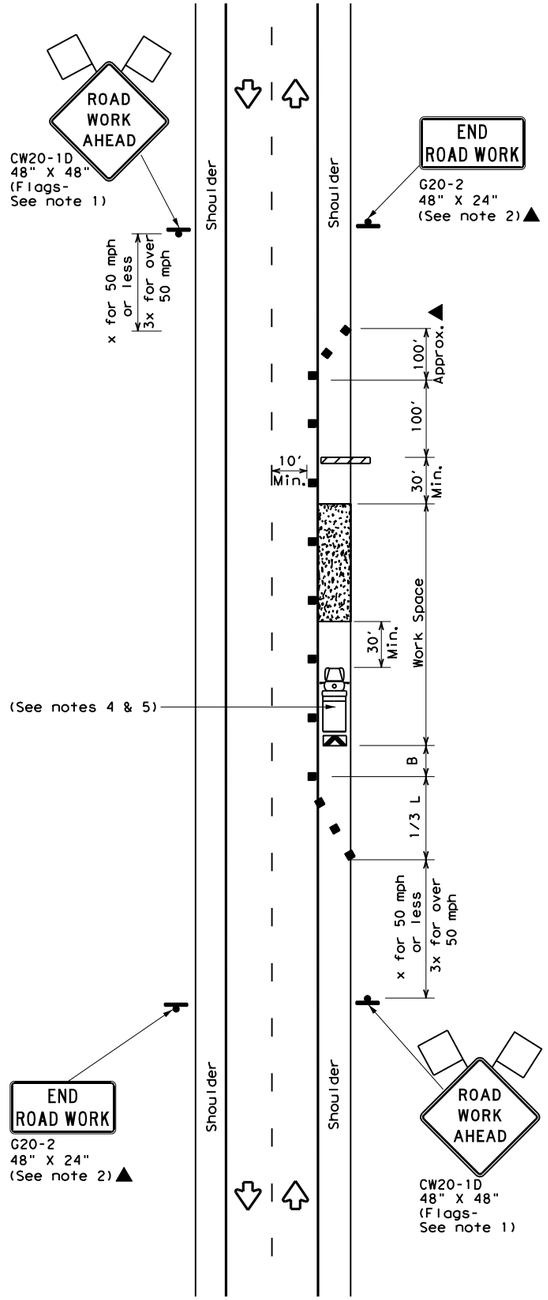
FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		20

DATE:
FILE:



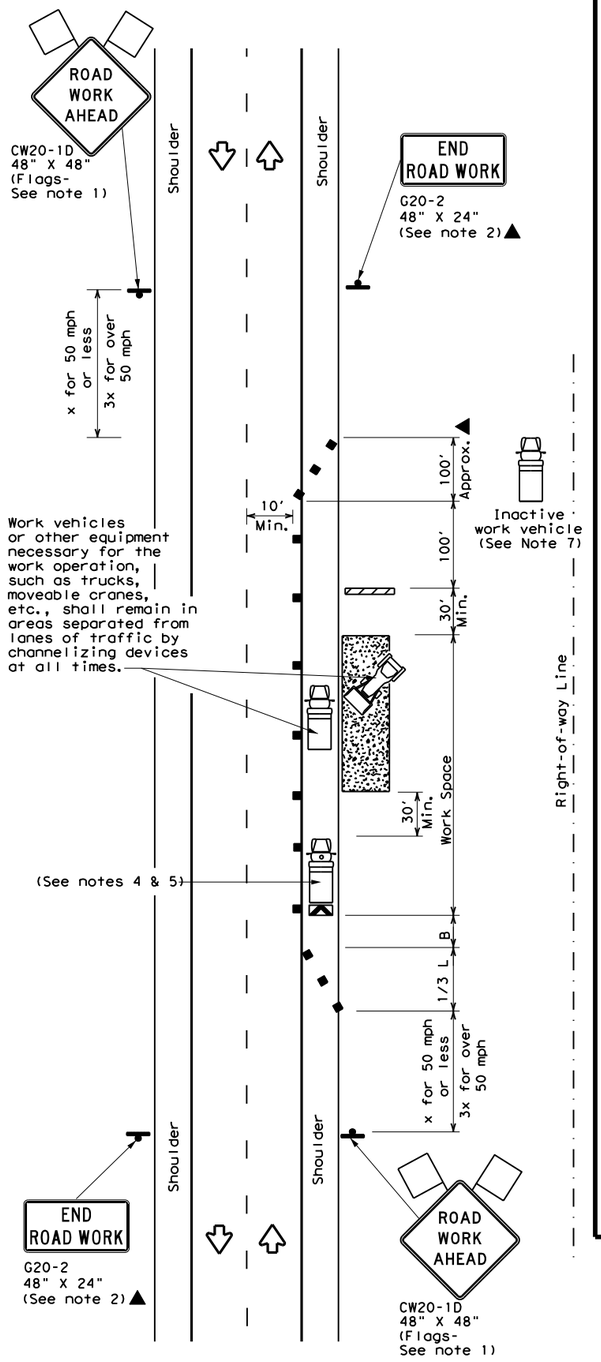
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	05	LAMB, ETC.		21
1-97 2-18				

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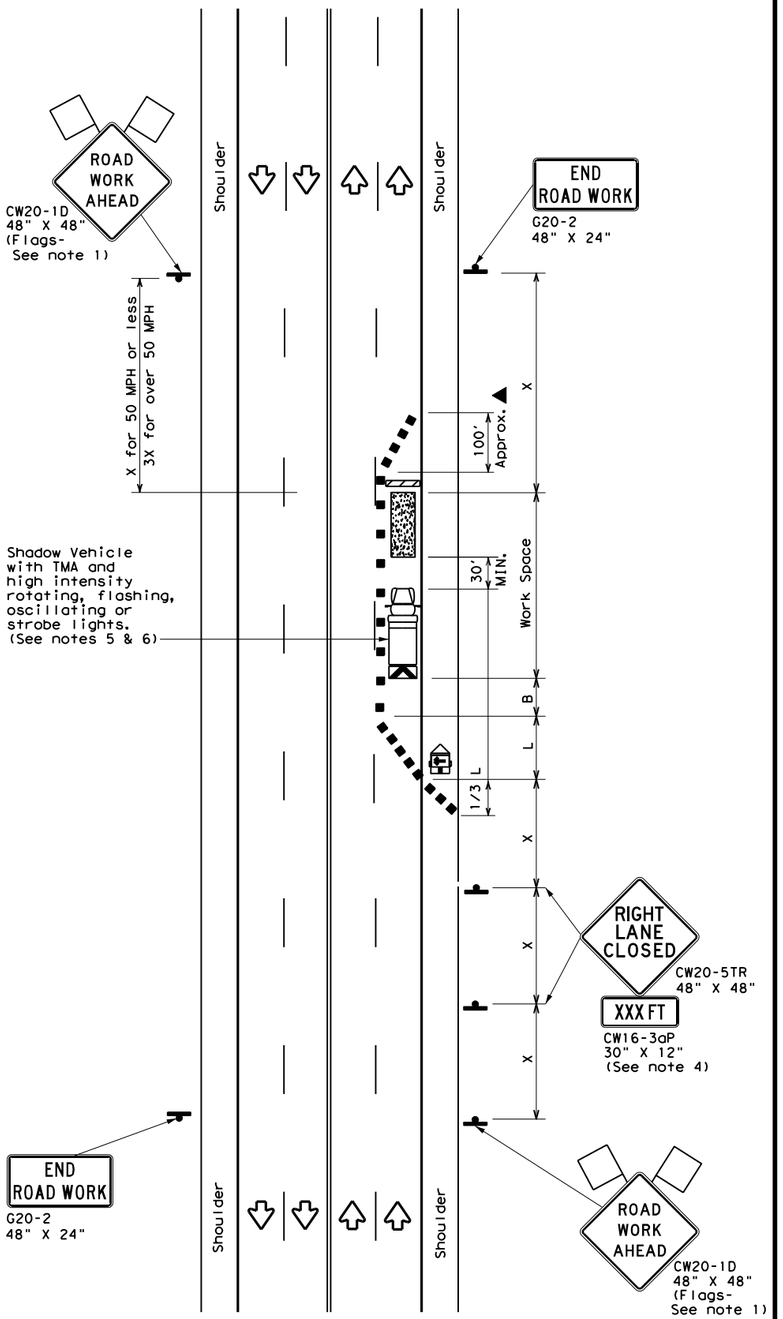
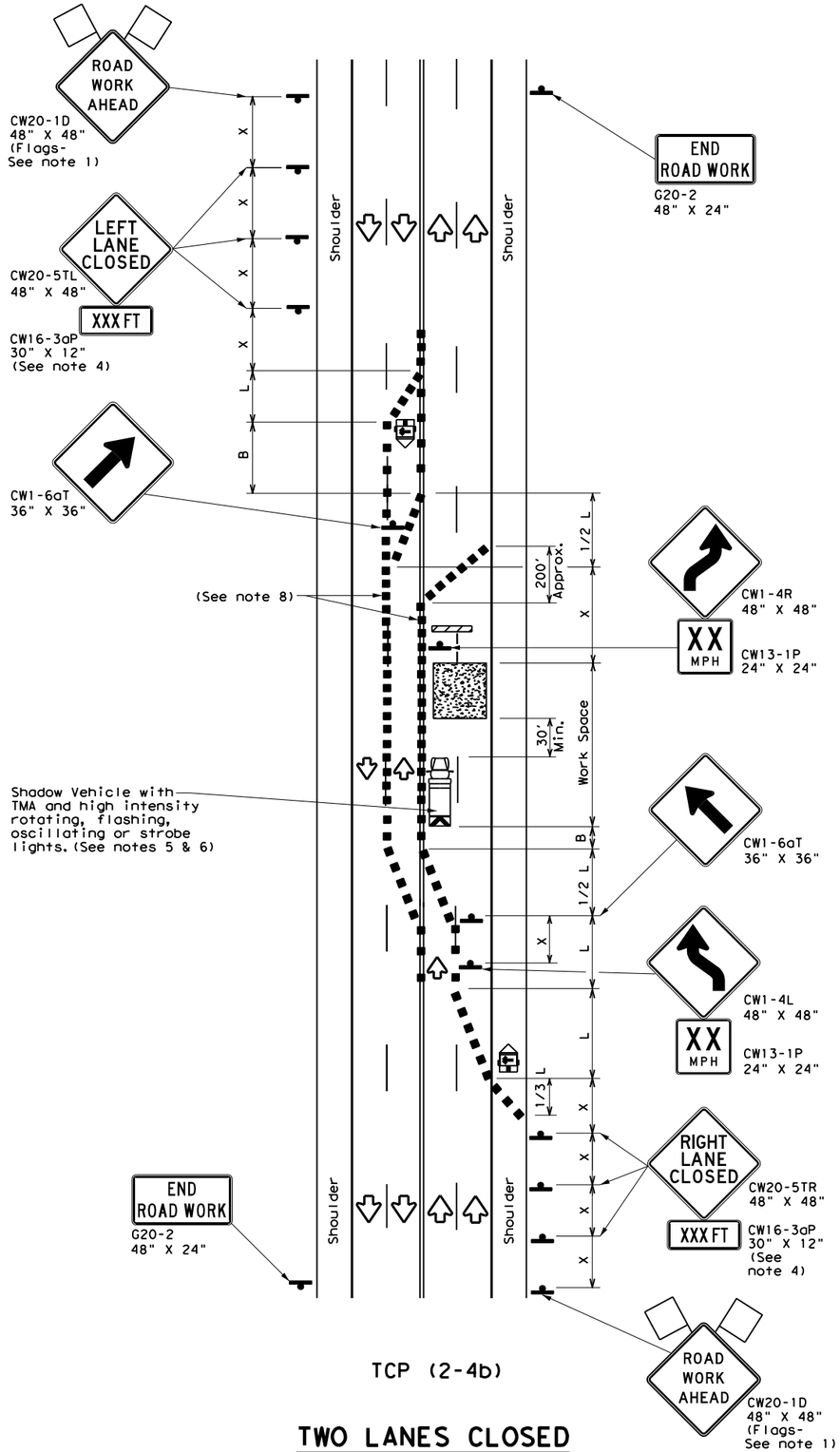
DATE:
FILE:



TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

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

Texas Department of Transportation

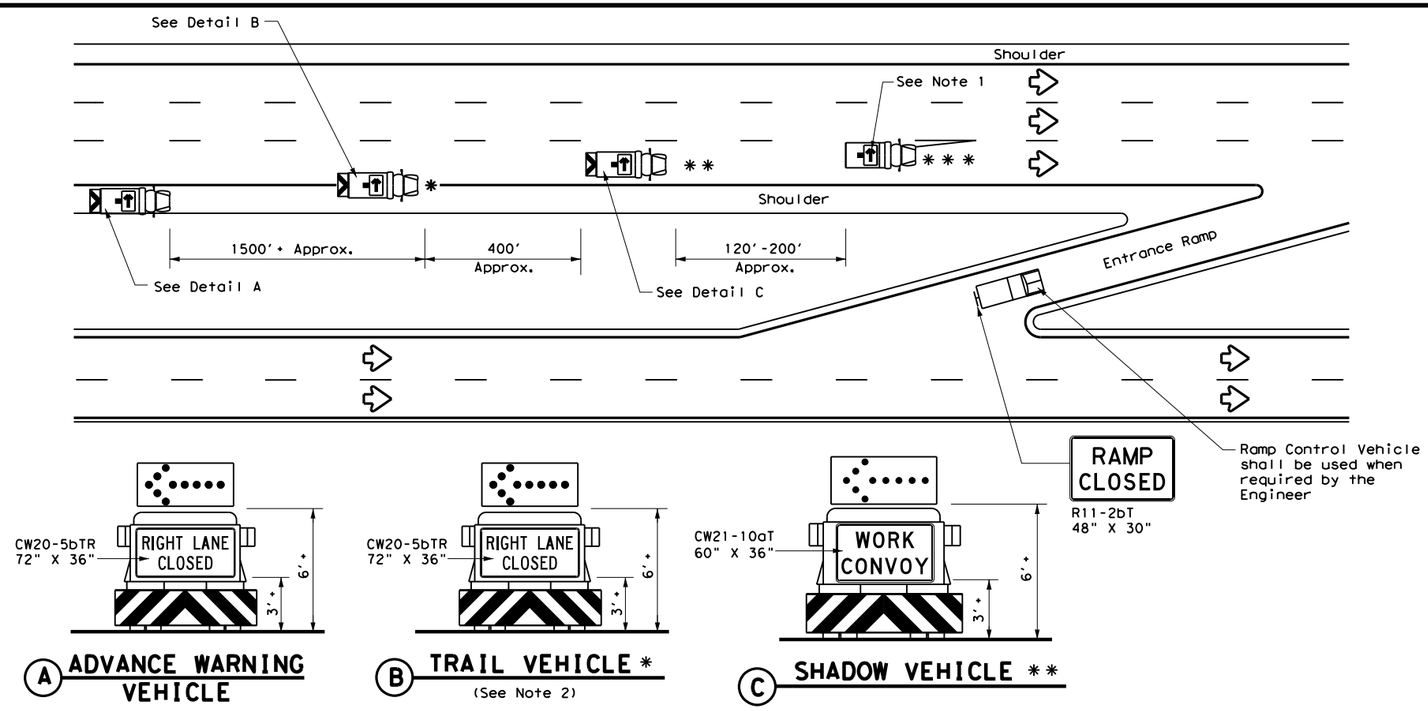
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

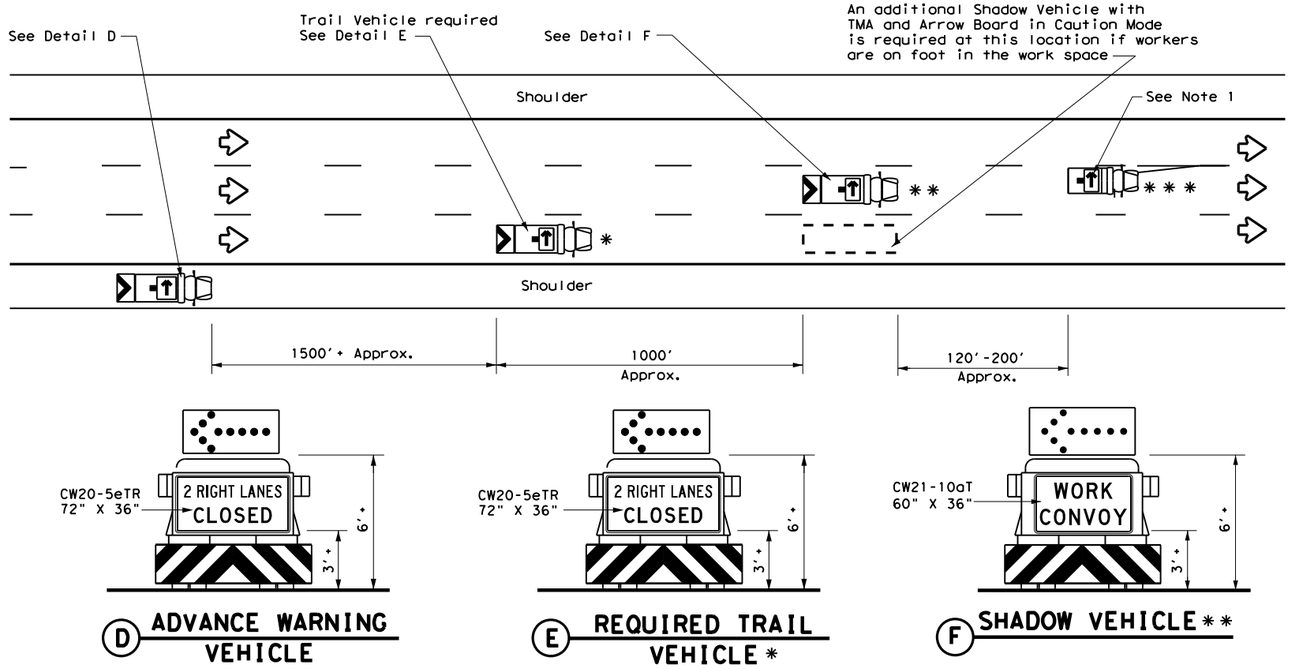
TCP(2-4)-18

FILE: tcp2-4-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03	0052	05	047	US 84
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	05	LAMB, ETC.		22

DATE:
FILE:



RIGHT LANE CLOSURE ON DIVIDED HIGHWAY - TCP(3-2a)



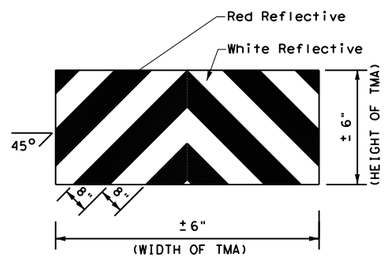
INTERIOR LANE CLOSURE ON MULTI-LANE DIVIDED HIGHWAY - TCP(3-2b)

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

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

GENERAL NOTES

1. ADVANCE WARNING, TRAIL and SHADOW vehicles shall be equipped with Type B or Type C flashing arrow boards as per the Barricade and Construction (BC) standards. Arrow boards on WORK vehicles will be optional based on the type of work being performed. The arrow boards shall be operated from inside the vehicle.
2. For TCP(3-2a) the Engineer will determine if the TRAIL VEHICLE is required based on prevailing roadway conditions, traffic volume, and sight distance restrictions. All other vehicles shown for both TCP(3-2a) and TCP(3-2b) are required.
3. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
4. The use of truck mounted attenuators (TMA) on the ADVANCE WARNING, SHADOW, and TRAIL vehicles are required.
5. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DMS 8300, Type A.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE may vary according to terrain, work activity and other factors.
9. Standard 48" X 48" diamond shaped warning signs with the same message as those shown may be used where adequate mounting space exists.
10. The signs shown should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or a truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board, must be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
12. The principles on this sheet may be used to close lanes from the left side of the roadway considering the number of lanes, shoulder width, sight distance, and ramp frequency.
13. Signs and flashing arrow board modes shall be appropriately altered when implementing left lane closures or interior closures which close the left lanes.
14. The Advance Warning Vehicle may straddle the edgeline when shoulder width makes it necessary.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

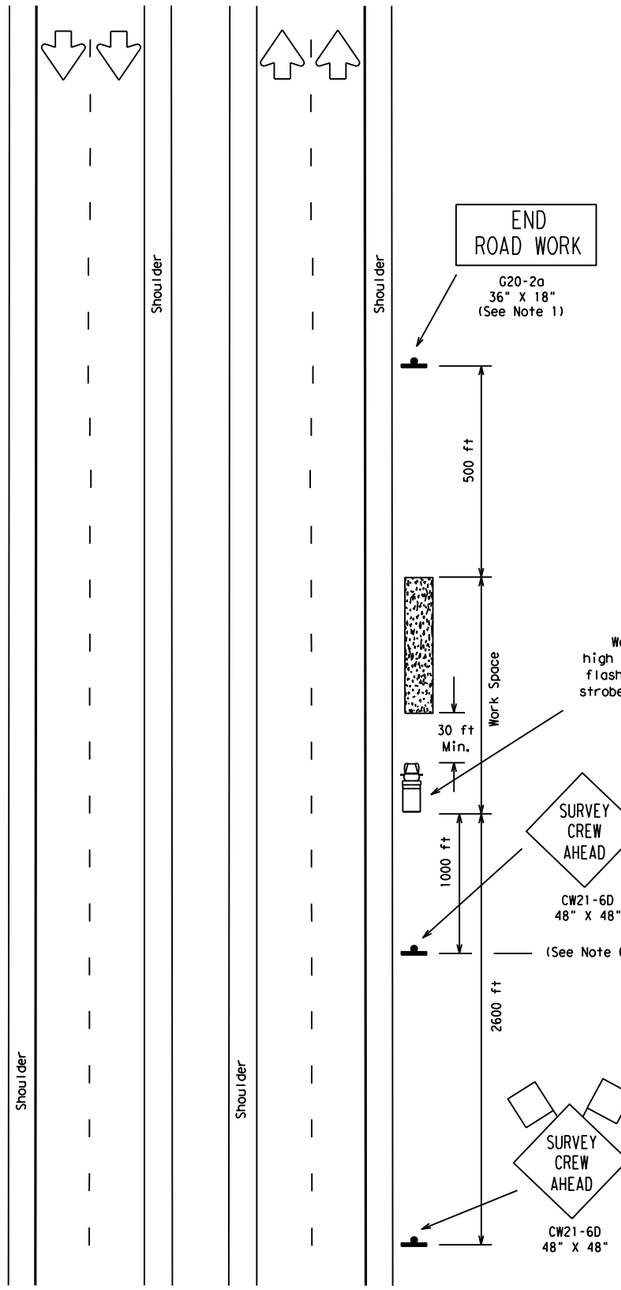
TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-13

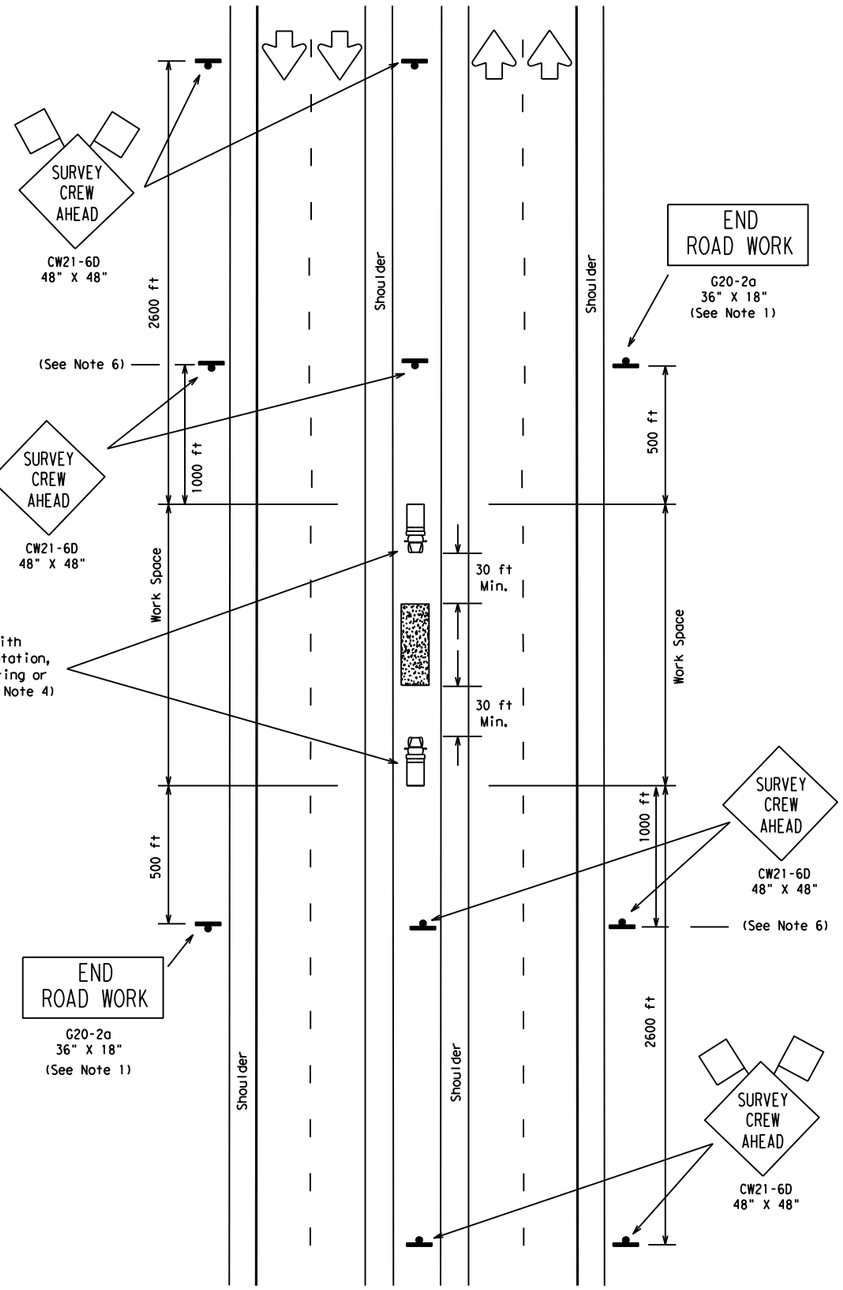
FILE: tcp3-2.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 7-13 1-97	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		23

176

DATE:
FILE:



TCP (S-4a)
WORK OFF RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-4b)
WORK IN MEDIAN
OF DIVIDED ROADWAYS

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

8-18-08 Revision

1 Corrected misspelling.

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel
Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed*	Formula	Minimum Desirable Taper Lengths** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	900'	540'

* Conventional Roads Only

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

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

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. When median work is protected on one side by existing median barriers, signing and protection vehicle may be omitted for the protected direction only.
3. CW20-1D "ROAD WORK AHEAD" signs may be substituted for "SURVEY CREW AHEAD" signs.
1 4. A Shadow Vehicle with a TMA and flashing warning lights/arrow panel in caution mode may be used in lieu of the Work Vehicle to protect the work space.
5. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.
6. The CW21-6D "SURVEY CREW AHEAD" sign placed at 1000' ahead of the work space is optional, at the discretion of the Engineer. The signs shown at 2600' from the work space are required.
7. Cones may be placed at edge of pavement adjacent to the work space to enhance safety.

Texas Department of Transportation
Traffic Operations Division

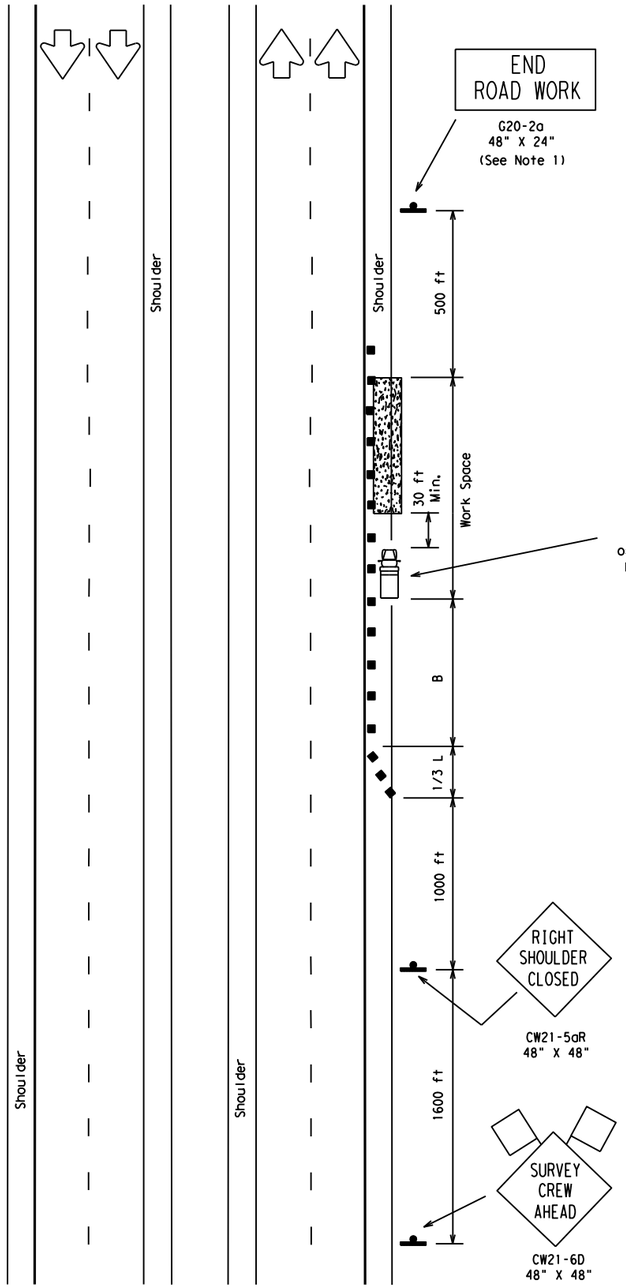
TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-4)-08A

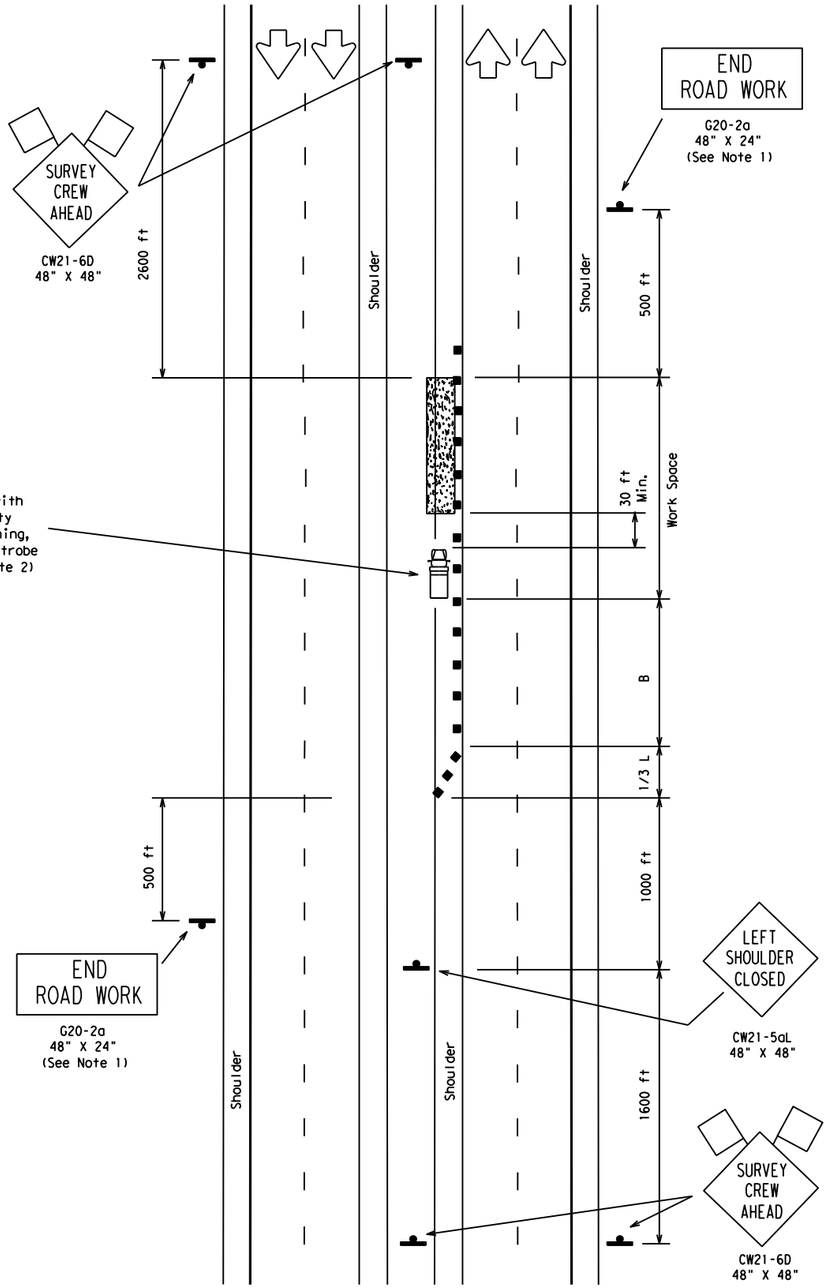
REVISIONS
8-08

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
0052	05	047	US 84
DIST	COUNTY		SHEET NO.
05	LAMB, ETC.		24

DATE:
FILE:



TCP (S-5a)
WORK ON RIGHT SHOULDER
OF DIVIDED ROADWAYS



TCP (S-5b)
WORK ON MEDIAN SHOULDER
OF DIVIDED ROADWAYS

WHENEVER POSSIBLE, SURVEY PARTIES SHOULD AVOID, BY THE USE OF OFFSET LINES, ANY UNNECCESSARY PERIODS OF TIME ON THE ROAD SURFACE.

LEGEND

Type III Barricade ■ ■ Channelizing Devices Flag
Heavy Work Vehicle Truck Mounted Attenuator (TMA)
Trailer Mounted Flashing Arrow Panel
Portable Changeable Message Sign (PCMS)
Flagger Sign Post

Posted Speed ✳	Formula	Minimum Desirable Taper Lengths ✳✳ 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Min. Sign Spacing "X" Distance	Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'	90'
35		205'	225'	245'	35'	70'-90'	160'	120'
40		265'	295'	320'	40'	80'-100'	240'	155'
45	L=WS	450'	495'	540'	45'	90'-110'	320'	195'
50		500'	550'	600'	50'	100'-125'	400'	240'
55		550'	605'	660'	55'	110'-140'	500'	295'
60		600'	660'	720'	60'	120'-150'	600'	350'
65		650'	715'	780'	65'	130'-165'	700'	410'
70		700'	770'	840'	70'	140'-175'	800'	475'
75		750'	825'	900'	75'	150'-185'	900'	540'

✳ Conventional Roads Only

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

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

DEFINITIONS:
SHORT DURATION - work that occupies a location up to 1 hour.
SHORT TERM STATIONARY - daytime work that occupies a location for more than 1 hour within a single daylight period.

GENERAL NOTES:

1. The G20-2a "END ROAD WORK" sign may be omitted for short duration (less than 1 hour) work.
2. For short duration work, the Shadow Vehicle with TMA may be replaced by another Work Vehicle with high intensity rotating, flashing or strobe lights.
3. Shadow Vehicles with a TMA are desirable when workers or equipment are in the work space. When approved by the engineer, Type III barricades or other channelizing devices may be substituted for the Shadow Vehicle.
4. If shoulders are not present, the 1/3L shoulder taper is to be omitted and four channelizing devices shall be placed in front of the arrow panel, perpendicular to traffic.
5. CW20-1D "ROAD WORK AHEAD" signs may be substituted for CW21-6D "SURVEY CREW AHEAD" signs.
6. The CW21-6D "SURVEY CREW AHEAD" sign for low volume intersecting side roads is desirable, but is not required when working less than 15 minutes in area of the side road, as determined by the Engineer.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN FOR SURVEYING OPERATIONS

TCP(S-5)-08

REVISIONS

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

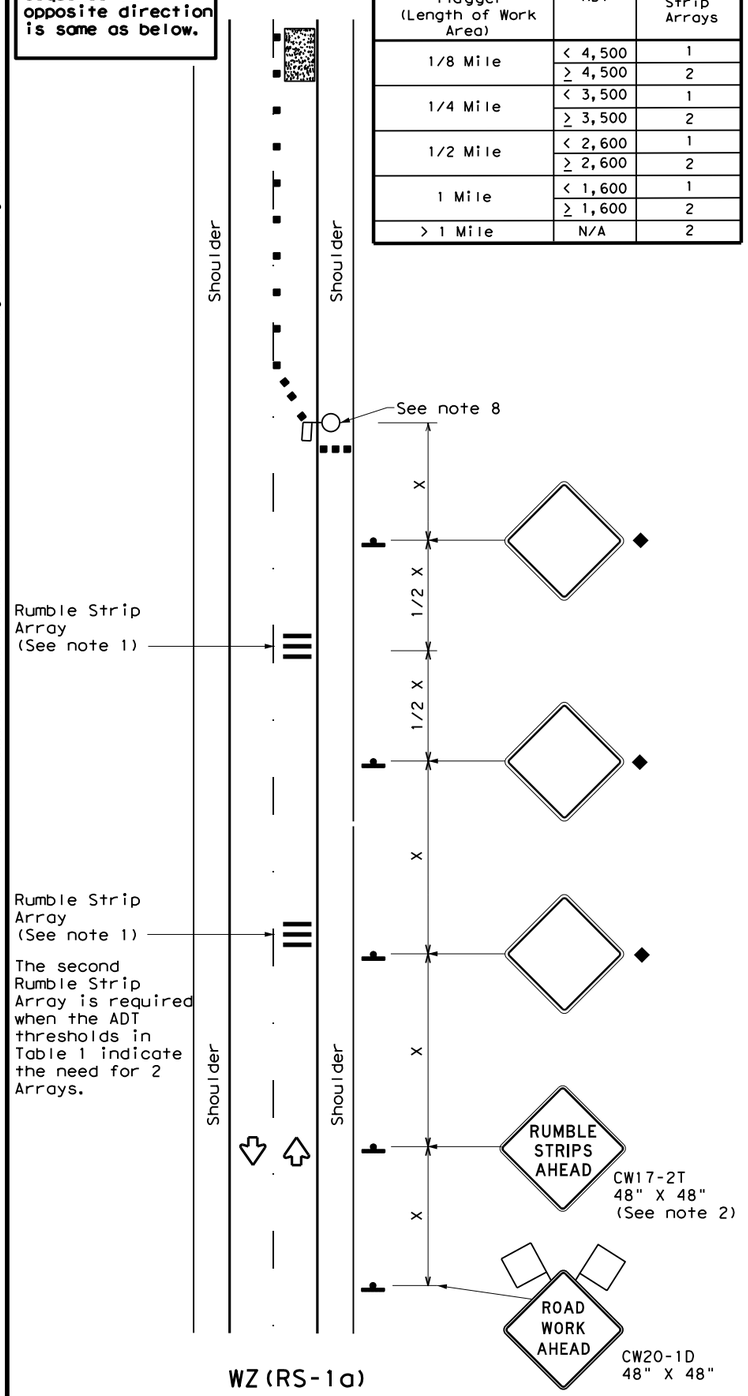
CONT	SECT	JOB	HIGHWAY
0052	05	047	US 84

DIST	COUNTY	SHEET NO.
05	LAMB, ETC.	25

DATE:
FILE:

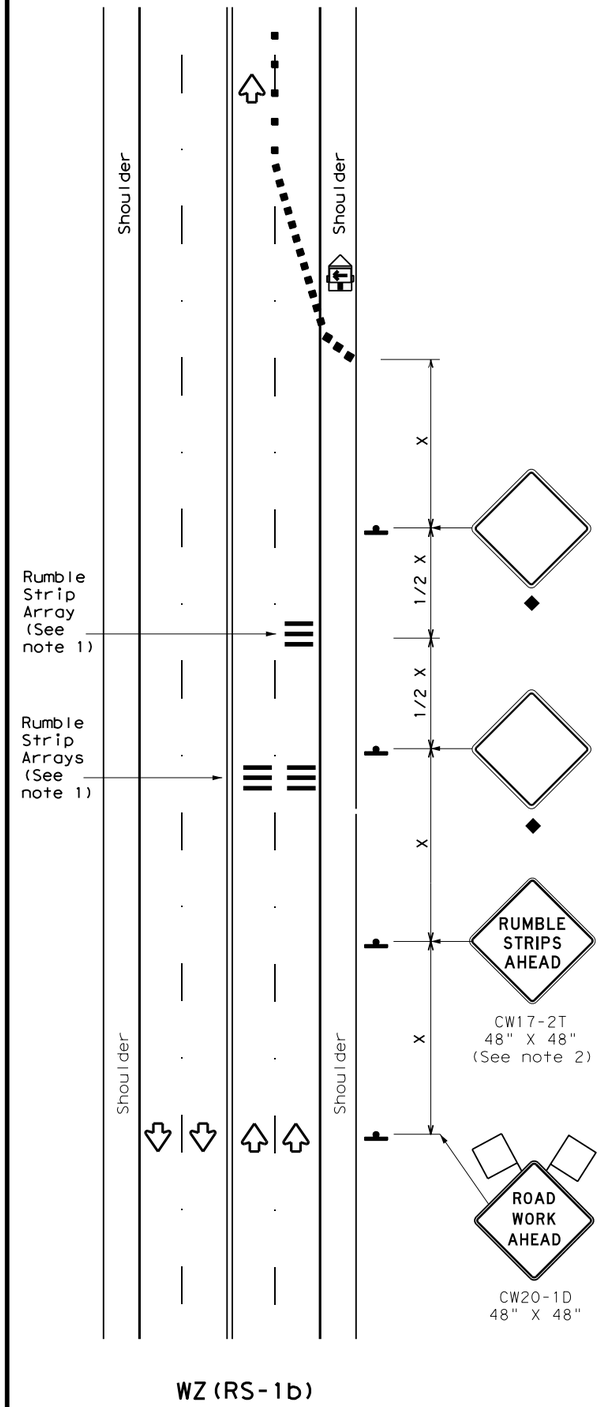
Warning sign and rumble strip sequence in opposite direction is same as below.

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



WZ(RS-1a)

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION



WZ(RS-1b)

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

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

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

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

* Conventional Roads Only

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

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

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

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

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

Texas Department of Transportation

Traffic Safety Division Standard

TEMPORARY RUMBLE STRIPS

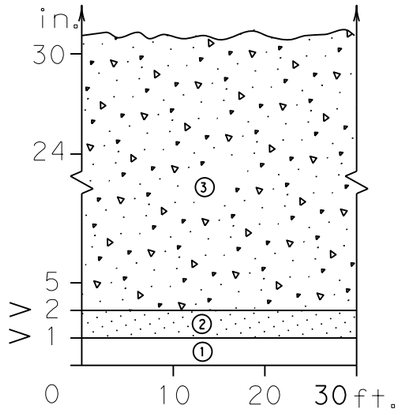
WZ(RS)-22

FILE: wzrs22.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-14 1-22 4-16	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		26

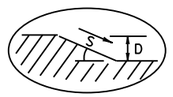
DATE:
FILE:

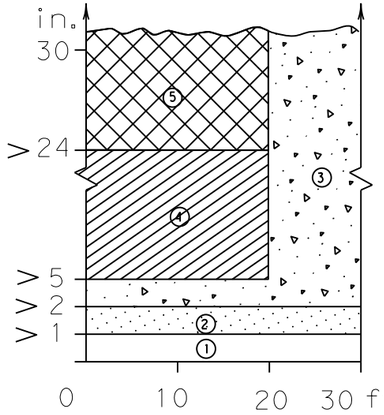
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

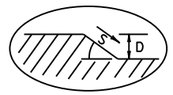


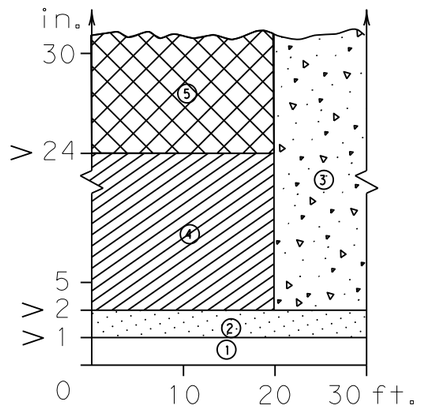
Edge Condition I
S = (3:1) (or flatter)



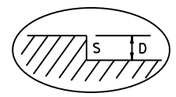


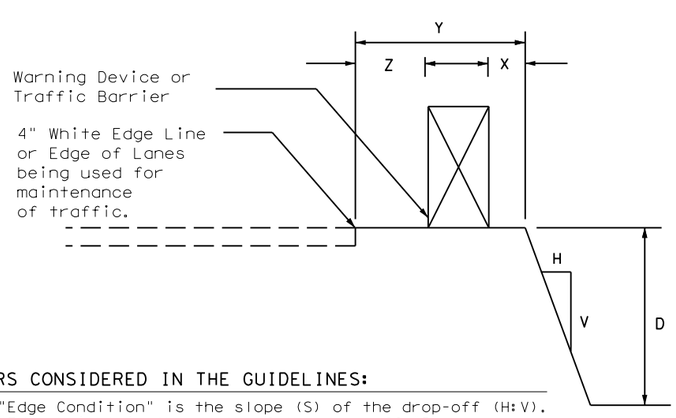
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

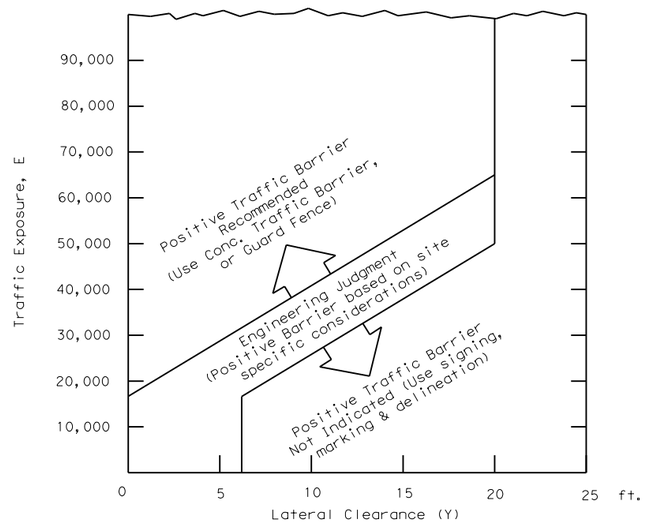
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Date 3/3/2022

Texas Department of Transportation

Traffic Safety Division Standard

TREATMENT FOR VARIOUS EDGE CONDITIONS

FILE: edgecon.dgn	DN:	CK:	DW:	CK:
©TxDOT August 2000	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
03-01 08-01 9-21	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		27

Lamb County

Horizontal Alignment Report			
Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
Element: Linear			
POB ( )	1248+87.1174	7377751.4400	836805.6660
PC ( )	1402+32.3166	7367344.2199	848082.4079
Tangential Direction:	S 47°17'46.7" E		
Tangential Length:	15345.1992		

*Alignment data for contractor information only.

Hockley County

Horizontal Alignment Report			
Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
Element: Linear			
POB ( )	0+00.0000	7367350.2897	848088.0097
PC ( )	57+69.6073	7363433.3090	852324.2380
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Tangential Length:	5769.6073		
Element: Circular			
PC ( )	57+69.6073	7363433.3090	852324.2380
PI ( )	61+79.9415	7363154.7334	852625.5183
CC ( )		7361144.8578	850208.2464
PT ( )	65+85.5831	7362807.6730	852844.4321
Radius:	3116.7979		
Delta:	15.0	Right	
Degree of Curvature (Arc):	1.8		
Length:	815.9758		
Tangent:	410.3342		
Chord:	813.6475		
Middle Ordinate:	26.6646		
External:	26.8947		
Tangent Direction:	S 47°14'32.3" E		
Radial Direction	S 42°45'27.7" W		
Chord Direction	S 39°44'32.3" E		
Radial Direction	S 57°45'27.7" W		
Tangent Direction:	S 32°14'32.3" E		
Element: Circular			
PC ( )	65+85.5831	7362807.6730	852844.4321
PI ( )	65+85.5832	7362807.6729	852844.4322
CC ( )		7362790.6070	852817.3760
PT ( )	65+85.5832	7362807.6729	852844.4321
Radius:	31.9887		
Delta:	0.0	Right	
Degree of Curvature (Arc):	179.1		
Length:	0.0001		
Tangent:	0.0001		
Chord:	0.0001		
Middle Ordinate:	0.0000		
External:	0		
Tangent Direction:	S 32°14'32.3" E		
Radial Direction	S 57°45'27.7" W		
Chord Direction	S 32°14'32.1" E		
Radial Direction	S 57°45'28.5" W		
Tangent Direction:	S 32°14'31.5" E		
Element: Linear			
POB ( )	65+85.5832	7362807.6729	852844.4321
PC ( )	69+17.0408	7362527.3255	853021.2640
Tangential Direction:	S 32°14'31.5" E		
Tangential Length:	331.4576		

STATE OF TEXAS
NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Melch, P.E.
3/3/2022

Texas Department of Transportation

Sheet 1 of 3 Sheets

ALIGNMENT DATA

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			28
STATE	STATE DIST.NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84AlignData.dgn		

Horizontal Alignment Report

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Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
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PC ( )	69+17.0408	7362527.3255	853021.2640
PI ( )	73+27.3754	7362180.2648	853240.1780
CC ( )		7364190.1408	855657.4496
PT ( )	77+33.0174	7361901.6890	853541.4587
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Delta:	15.0	Left	
Degree of Curvature (Arc):	1.8		
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Tangent:	410.3346		
Chord:	813.6483		
Middle Ordinate:	26.6647		
External:	26.8948		
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Radial Direction	S 57°45'27.6" W		
Chord Direction	S 39°44'32.4" E		
Radial Direction	S 42°45'27.6" W		
Tangent Direction:	S 47°14'32.4" E		
Element: Linear			
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PC ( )	116+26.0112	7359258.7390	856399.8177
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Tangential Length:	3892.9938		
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PC ( )	116+26.0112	7359258.7390	856399.8177
PI ( )	120+33.9442	7358981.7937	856699.3351
CC ( )		7361583.3248	858549.2183
PT ( )	124+37.4068	7358789.8176	857059.2720
Radius:	3166.0105		
Delta:	14.7	Left	
Degree of Curvature (Arc):	1.8		
Length:	811.3957		
Tangent:	407.9331		
Chord:	809.1769		
Middle Ordinate:	25.9578		
External:	26.1724		
Tangent Direction:	S 47°14'32.5" E		
Radial Direction	S 42°45'27.5" W		
Chord Direction	S 54°35'03.6" E		
Radial Direction	S 28°04'25.3" W		
Tangent Direction:	S 61°55'34.7" E		
Element: Linear			
POB ( )	124+37.4068	7358789.8176	857059.2720
PC ( )	128+15.8642	7358611.7214	857393.2058
Tangential Direction:	S 61°55'39.9" E		
Tangential Length:	378.4574		

Horizontal Alignment Report

Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
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PI ( )	128+15.8646	7358611.7212	857393.2061
CC ( )		7358583.4965	857378.1526
PT ( )	128+15.8650	7358611.7210	857393.2065
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Degree of Curvature (Arc):	179.1		
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Tangent:	0.0004		
Chord:	0.0008		
Middle Ordinate:	0.0000		
External:	0		
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Radial Direction	S 28°04'20.1" W		
Chord Direction	S 61°55'37.3" E		
Radial Direction	S 28°04'25.2" W		
Tangent Direction:	S 61°55'34.8" E		
Element: Circular			
PC ( )	128+15.8650	7358611.7210	857393.2065
PI ( )	132+08.5978	7358426.8985	857739.7315
CC ( )		7355919.5321	855957.3012
PT ( )	135+97.0354	7358160.3481	858028.1582
Radius:	3051.1809		
Delta:	14.7	Right	
Degree of Curvature (Arc):	1.9		
Length:	781.1704		
Tangent:	392.7327		
Chord:	779.0386		
Middle Ordinate:	24.9655		
External:	25.1715		
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Radial Direction	S 28°04'25.2" W		
Chord Direction	S 54°35'30.6" E		
Radial Direction	S 42°44'33.6" W		
Tangent Direction:	S 47°15'26.4" E		
Element: Linear			
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Tangential Length:	13762.3922		

Horizontal Alignment Report

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	Station	Northing	Easting
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PT ( )	281+75.6862	7348310.2563	868772.2533
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Delta:	8.2	Left	
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Chord:	815.5674		
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Chord Direction	S 51°20'30.6" E		
Radial Direction	S 34°34'25.1" W		
Tangent Direction:	S 55°25'34.9" E		
Element: Linear			
POB ( )	281+75.6862	7348310.2563	868772.2533
PC ( )	328+06.5217	7345682.4517	872585.2941
Tangential Direction:	S 55°25'36.6" E		
Tangential Length:	4630.8355		
Element: Circular			
PC ( )	328+06.5217	7345682.4517	872585.2941
PI ( )	328+06.5218	7345682.4516	872585.2942
CC ( )		7345656.1125	872567.1422
PT ( )	328+06.5220	7345682.4515	872585.2944
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Tangent:	0.0002		
Chord:	0.0003		
Middle Ordinate:	0.0000		
External:	0		
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Radial Direction	S 34°34'23.4" W		
Chord Direction	S 55°25'35.5" E		
Radial Direction	S 34°34'25.3" W		
Tangent Direction:	S 55°25'34.7" E		

Hockley County Cont.

*Alignment data for contractor information only.

ALIGNMENT DATA

3/3/2022

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			29
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84AlignData.dgn		

Horizontal Alignment Report

Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
Element: Circular			
PC ( )	328+06.5220	7345682.4515	872585.2944
PI ( )	332+62.0993	7345423.9270	872960.4154
CC ( )		7343318.6972	870956.2506
PT ( )	337+10.1411	7345061.9680	873237.0674
Radius:	2870.7348		
Delta:	18.0	Right	
Degree of Curvature (Arc):	2.0		
Length:	903.6190		
Tangent:	455.5773		
Chord:	899.8932		
Middle Ordinate:	35.4806		
External:	35.9246		
Tangent Direction:	S 55°25'34.7" E		
Radial Direction	S 34°34'25.3" W		
Chord Direction	S 46°24'31.8" E		
Radial Direction	S 52°36'31.1" W		
Tangent Direction:	S 37°23'28.9" E		
Element: Circular			
PC ( )	337+10.1411	7345061.9680	873237.0674
PI ( )	337+10.1411	7345061.9679	873237.0674
CC ( )		7345042.5429	873211.6525
PT ( )	337+10.1413	7345061.9678	873237.0675
Radius:	31.9883		
Delta:	0.0	Right	
Degree of Curvature (Arc):	179.1		
Length:	0.0002		
Tangent:	0.0001		
Chord:	0.0002		
Middle Ordinate:	0.0000		
External:	0		
Tangent Direction:	S 37°23'28.9" E		
Radial Direction	S 52°36'31.1" W		
Chord Direction	S 37°23'27.6" E		
Radial Direction	S 52°36'32.5" W		
Tangent Direction:	S 37°23'27.5" E		
Element: Linear			
POB ( )	337+10.1413	7345061.9678	873237.0675
PC ( )	349+18.5731	7344101.8564	873970.8886
Tangential Direction:	S 37°23'27.5" E		
Tangential Length:	1208.4318		

Horizontal Alignment Report

Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
Element: Circular			
PC ( )	349+18.5731	7344101.8564	873970.8886
PI ( )	359+73.4747	7343263.7302	874611.4835
CC ( )		7345861.0648	876272.5596
PT ( )	369+41.9070	7343033.7600	875641.0131
Radius:	2896.9818		
Delta:	40.0	Left	
Degree of Curvature (Arc):	2.0		
Length:	2023.3339		
Tangent:	1054.9016		
Chord:	1982.4595		
Middle Ordinate:	174.8563		
External:	186.0883		
Tangent Direction:	S 37°23'28.8" E		
Radial Direction	S 52°36'31.2" W		
Chord Direction	S 57°23'59.4" E		
Radial Direction	S 12°35'30.1" W		
Tangent Direction:	S 77°24'29.9" E		
Element: Linear			
POB ( )	369+41.9070	7343033.7600	875641.0131
PC ( )	375+63.2454	7342898.3148	876247.4091
Tangential Direction:	S 77°24'32.5" E		
Tangential Length:	621.3385		
Element: Circular			
PC ( )	375+63.2454	7342898.3148	876247.4091
PI ( )	375+63.2457	7342898.3147	876247.4094
CC ( )		7342867.0958	876240.4360
PT ( )	375+63.2458	7342898.3147	876247.4095
Radius:	31.9882		
Delta:	0.0	Right	
Degree of Curvature (Arc):	179.1		
Length:	0.0004		
Tangent:	0.0002		
Chord:	0.0004		
Middle Ordinate:	0.0000		
External:	0		
Tangent Direction:	S 77°24'32.5" E		
Radial Direction	S 12°35'27.5" W		
Chord Direction	S 77°24'31.8" E		
Radial Direction	S 12°35'30.1" W		
Tangent Direction:	S 77°24'29.9" E		

Horizontal Alignment Report

Alignment Name:	GeomCL		
Alignment Description:	Base Line		
Alignment Style:	Geom_Centerline		
	Station	Northing	Easting
Element: Circular			
PC ( )	375+63.2458	7342898.3147	876247.4095
PI ( )	381+39.3153	7342772.7306	876809.6236
CC ( )		7340000.5678	875600.1276
PT ( )	387+01.2462	7342446.0134	877284.0832
Radius:	2969.1600		
Delta:	22.0	Right	
Degree of Curvature (Arc):	1.9		
Length:	1138.0004		
Tangent:	576.0695		
Chord:	1131.0477		
Middle Ordinate:	54.3540		
External:	55.3676		
Tangent Direction:	S 77°24'29.9" E		
Radial Direction	S 12°35'30.1" W		
Chord Direction	S 66°25'42.0" E		
Radial Direction	S 34°33'05.9" W		
Tangent Direction:	S 55°26'54.1" E		
Element: Circular			
PC ( )	387+01.2462	7342446.0134	877284.0832
PI ( )	387+01.2481	7342446.0123	877284.0848
CC ( )		7342419.6674	877265.9412
PT ( )	387+01.2501	7342446.0112	877284.0864
Radius:	31.9882		
Delta:	0.0	Right	
Degree of Curvature (Arc):	179.1		
Length:	0.0038		
Tangent:	0.0019		
Chord:	0.0038		
Middle Ordinate:	0.0000		
External:	0		
Tangent Direction:	S 55°26'54.1" E		
Radial Direction	S 34°33'05.9" W		
Chord Direction	S 55°26'41.7" E		
Radial Direction	S 34°33'30.6" W		
Tangent Direction:	S 55°26'29.4" E		
Element: Linear			
POB ( )	387+01.2501	7342446.0112	877284.0864
PC ( )	413+12.0634	7340965.0339	879434.2148
Tangential Direction:	S 55°26'29.4" E		
Tangential Length:	2610.8133		

*Alignment data for contractor information only.

Hockley County Cont.

Sheet 3 of 3 Sheets

STATE OF TEXAS
NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Melch, P.E.
3/3/2022

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.	SHEET NO.
6		30

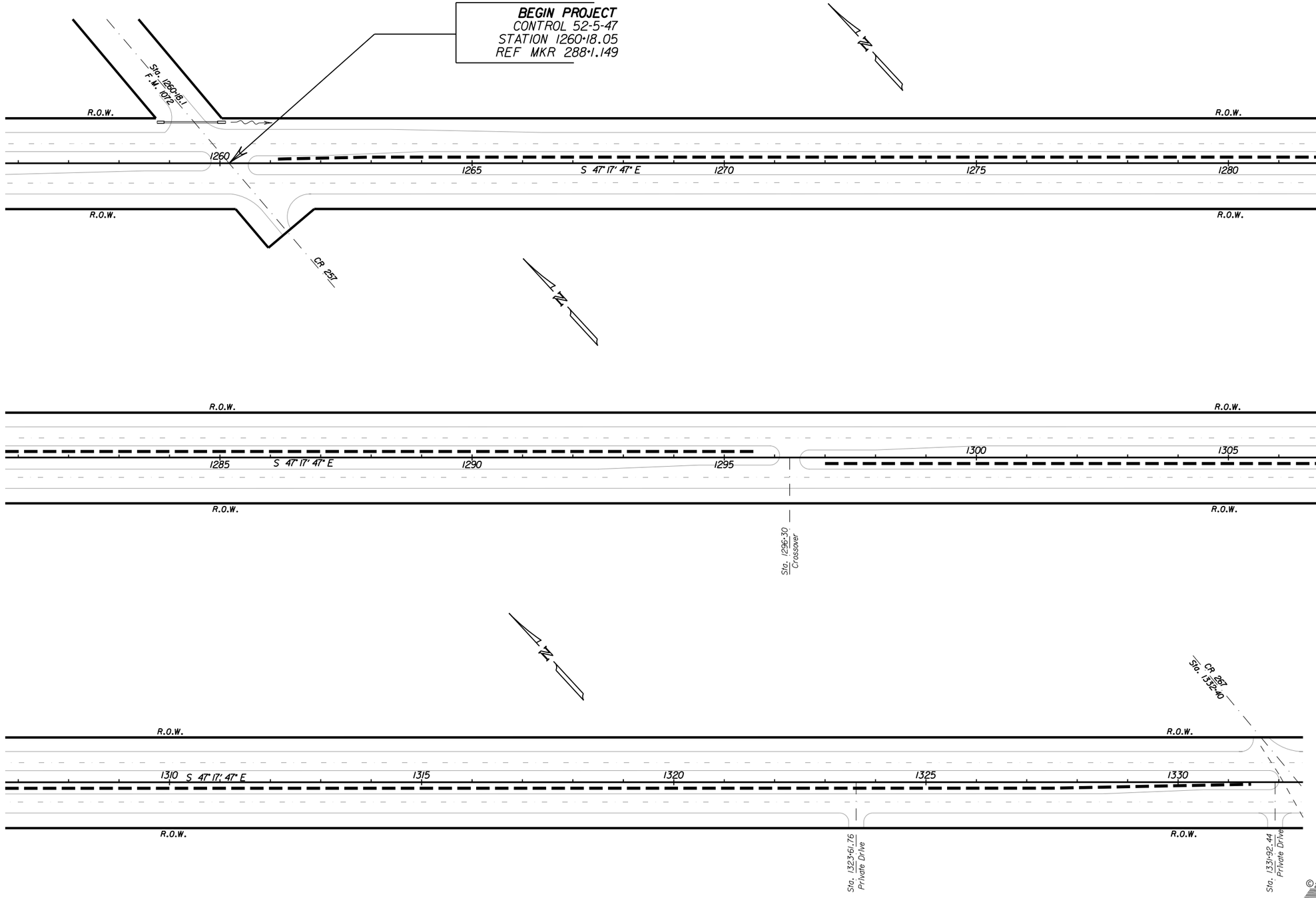
STATE	STATE DIST. NO.	COUNTY
TEXAS	LBB	LAMB, etc.

CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84

FILENAME: US84AlignData.dgn

ALIGNMENT DATA

BEGIN PROJECT
CONTROL 52-5-47
STATION 1260+18.05
REF MKR 288+1.149



Sheet 1 of 8 Sheets
Scale: 1" = 200'

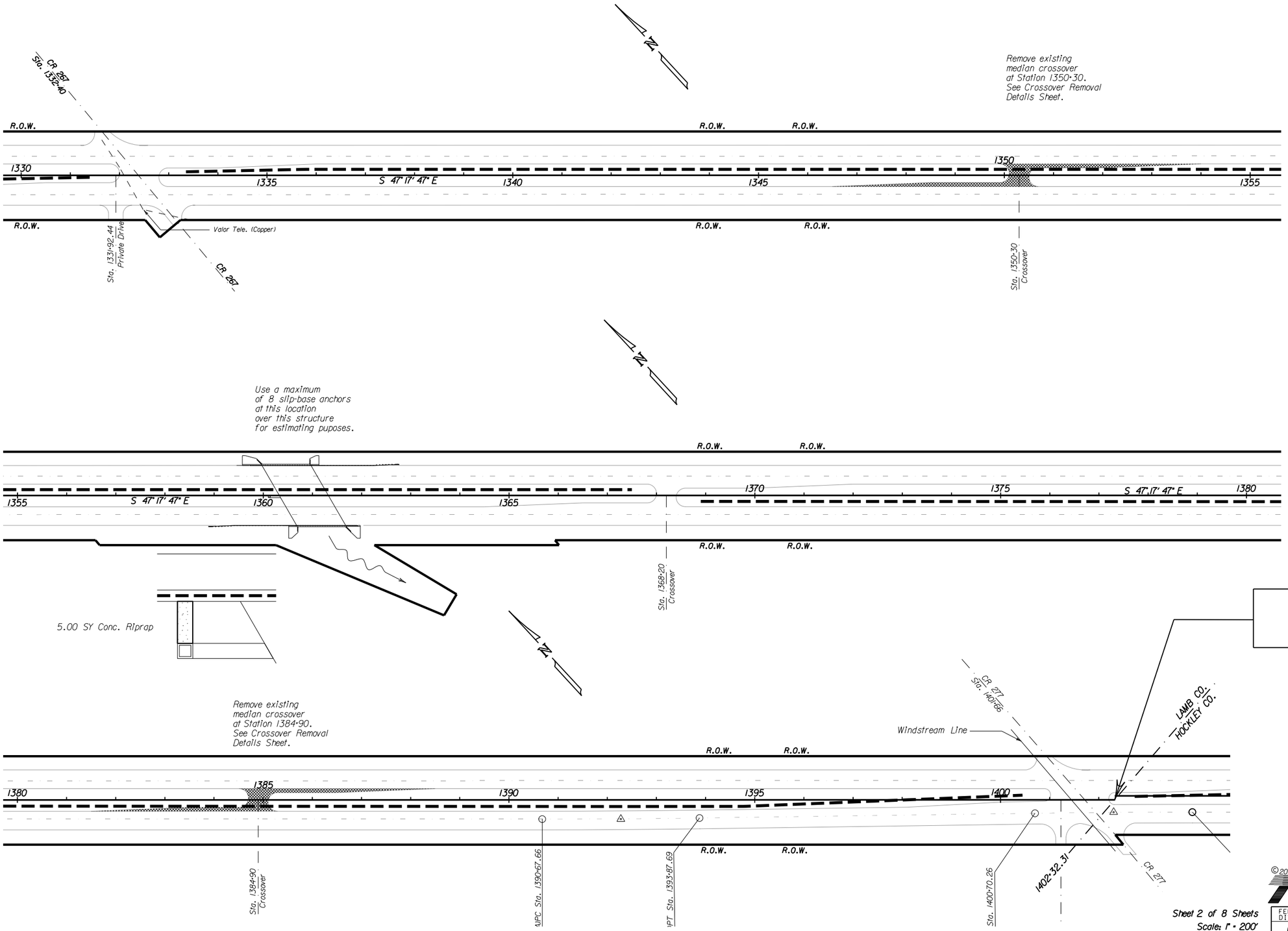
PLAN

Texas Department of Transportation

STATE OF TEXAS
NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Melch, P.E.
3/3/2022

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			31
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	ppl-2.dgn		



Sheet 2 of 8 Sheets
Scale: 1" = 200'

PLAN

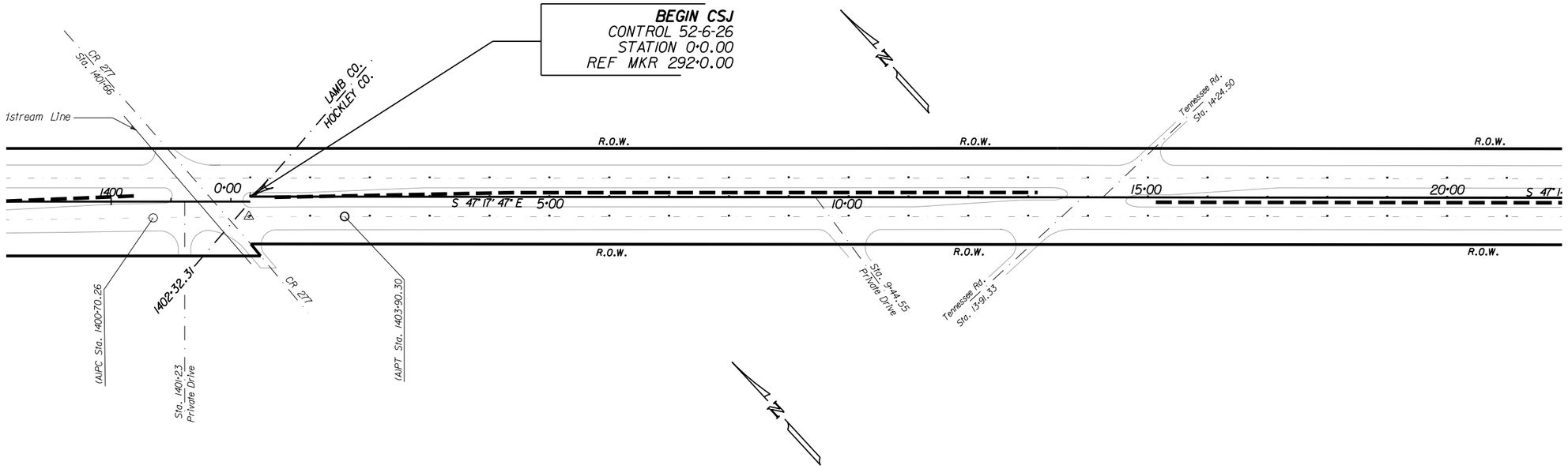
STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

3/3/2022

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			32
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	ppl-2.dgn		

BEGIN CSJ
CONTROL 52-6-26
STATION 0+0.00
REF MKR 292+0.00



PI STATION = 61+79.94
DELTA = 15° 00' 00.00" (RT)
DEGREE OF CURVE = 1° 50' 17.84"
TANGENT = 410.33
LENGTH = 815.98
RADIUS = 3,116.80
PC STATION = 57+69.61
PT STATION = 65+85.58

Texas Department of Transportation

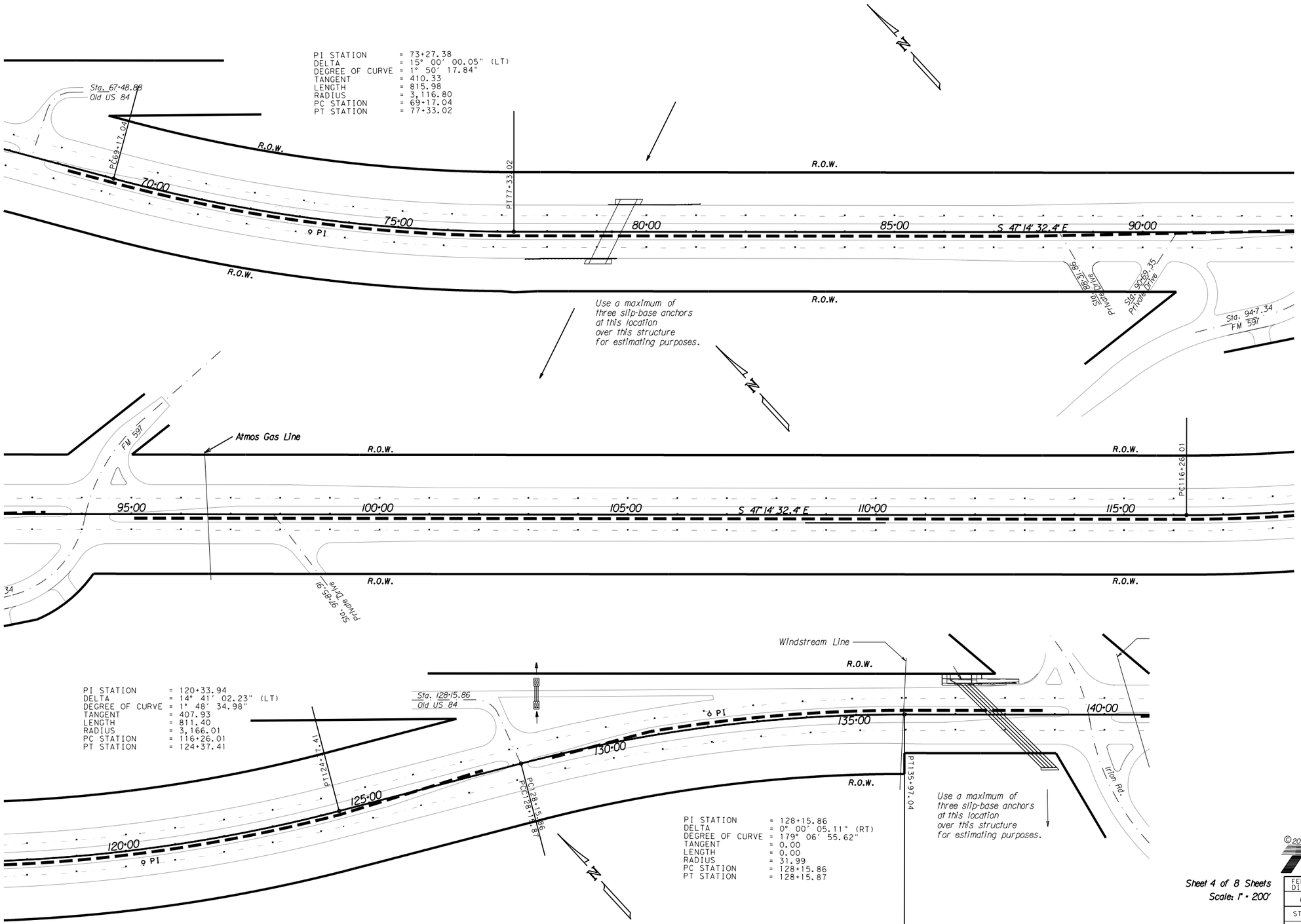
Sheet 3 of 8 Sheets
Scale: 1" = 200'

PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			33
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp3-5.dgn		

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Welch, P.E.
3/3/2022



Texas Department of Transportation

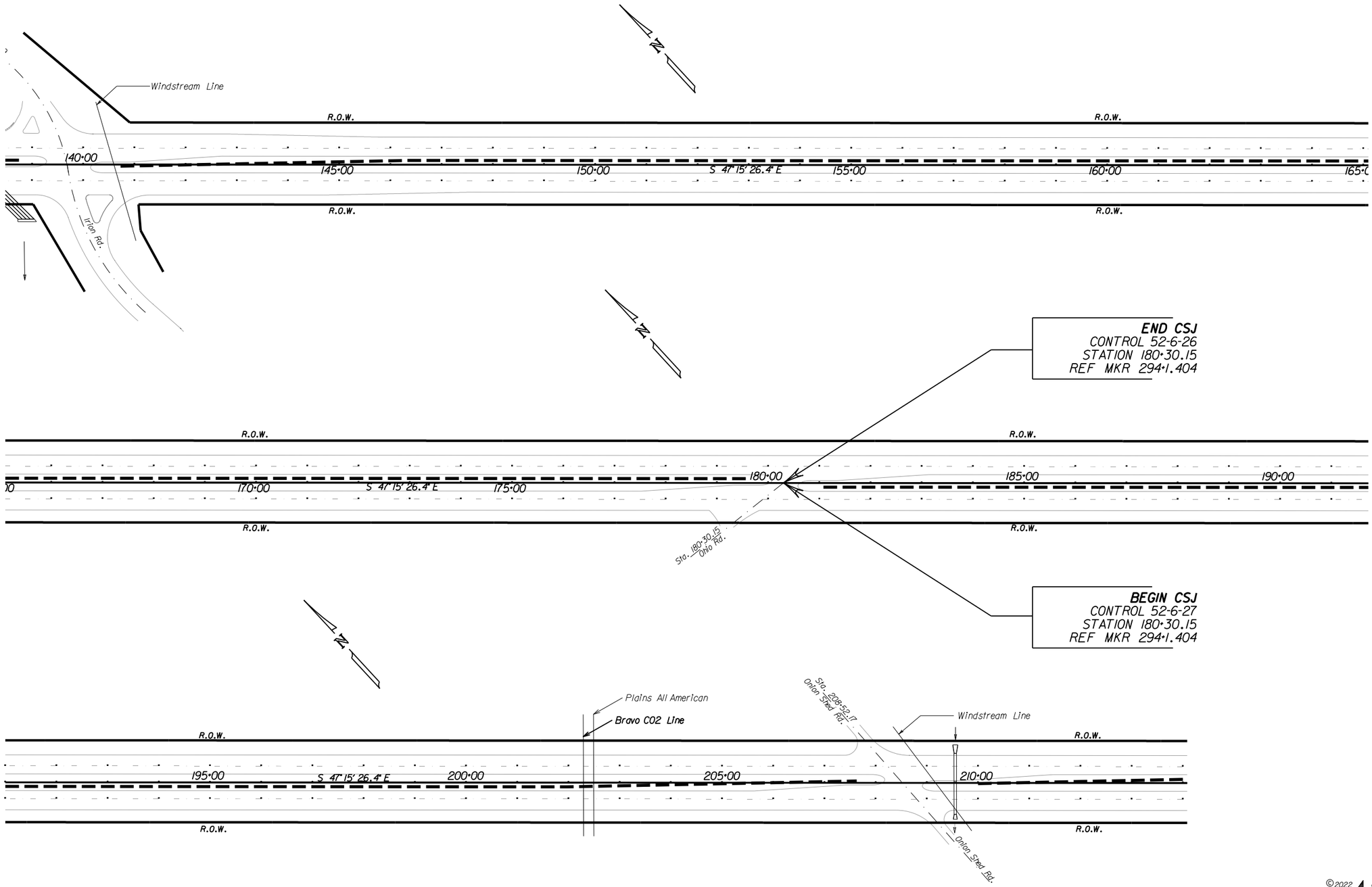
NEIL WELCH
92644
REGISTERED PROFESSIONAL ENGINEER

Neil Welch, P.E.
3/3/2022

Sheet 4 of 8 Sheets
Scale: 1" = 200'

PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			34
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp3-5.dgn		



STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

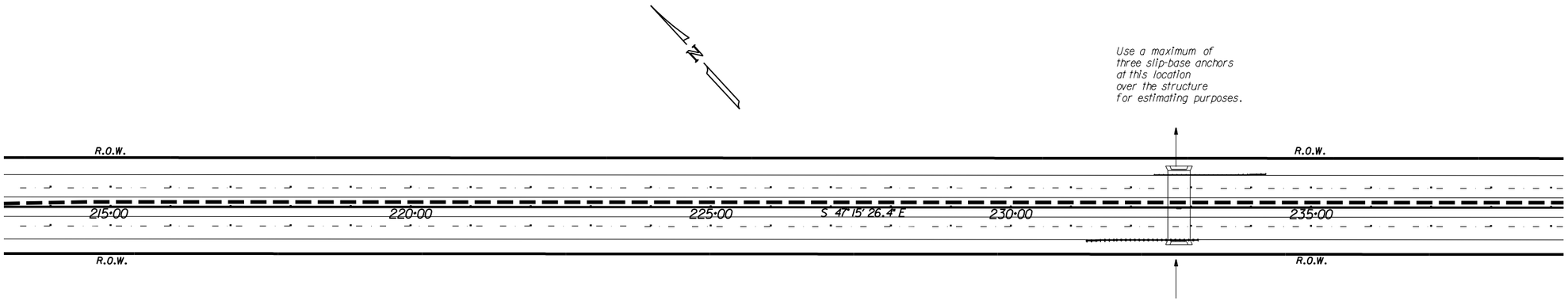
Neil Welch, P.E.
3/3/2022

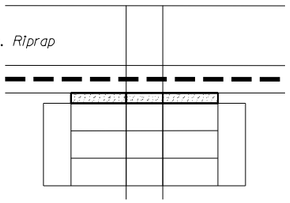
Texas Department of Transportation

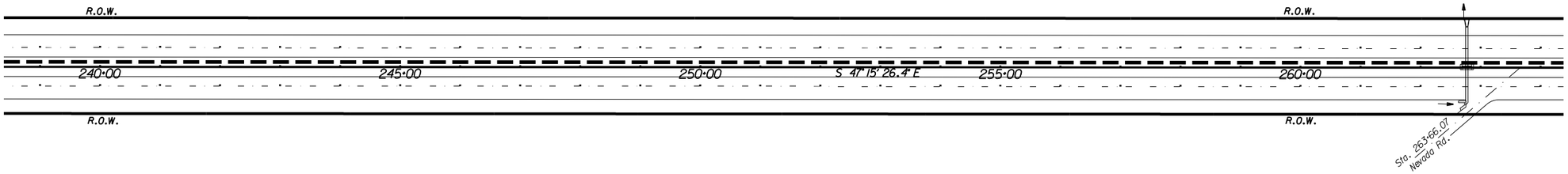
Sheet 5 of 8 Sheets
Scale: 1" = 200'

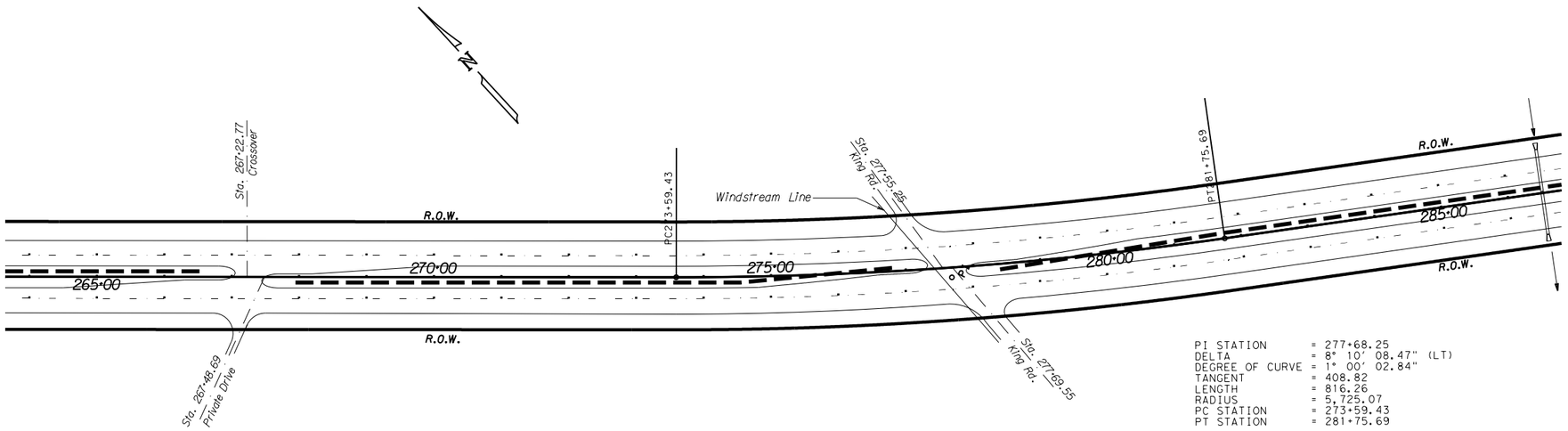
PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			35
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp3-5.dgn		









PI STATION	= 277+68.25
DELTA	= 8° 10' 08.47" (LT)
DEGREE OF CURVE	= 1° 00' 02.84"
TANGENT	= 408.82
LENGTH	= 816.26
RADIUS	= 5,725.07
PC STATION	= 273+59.43
PT STATION	= 281+75.69

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

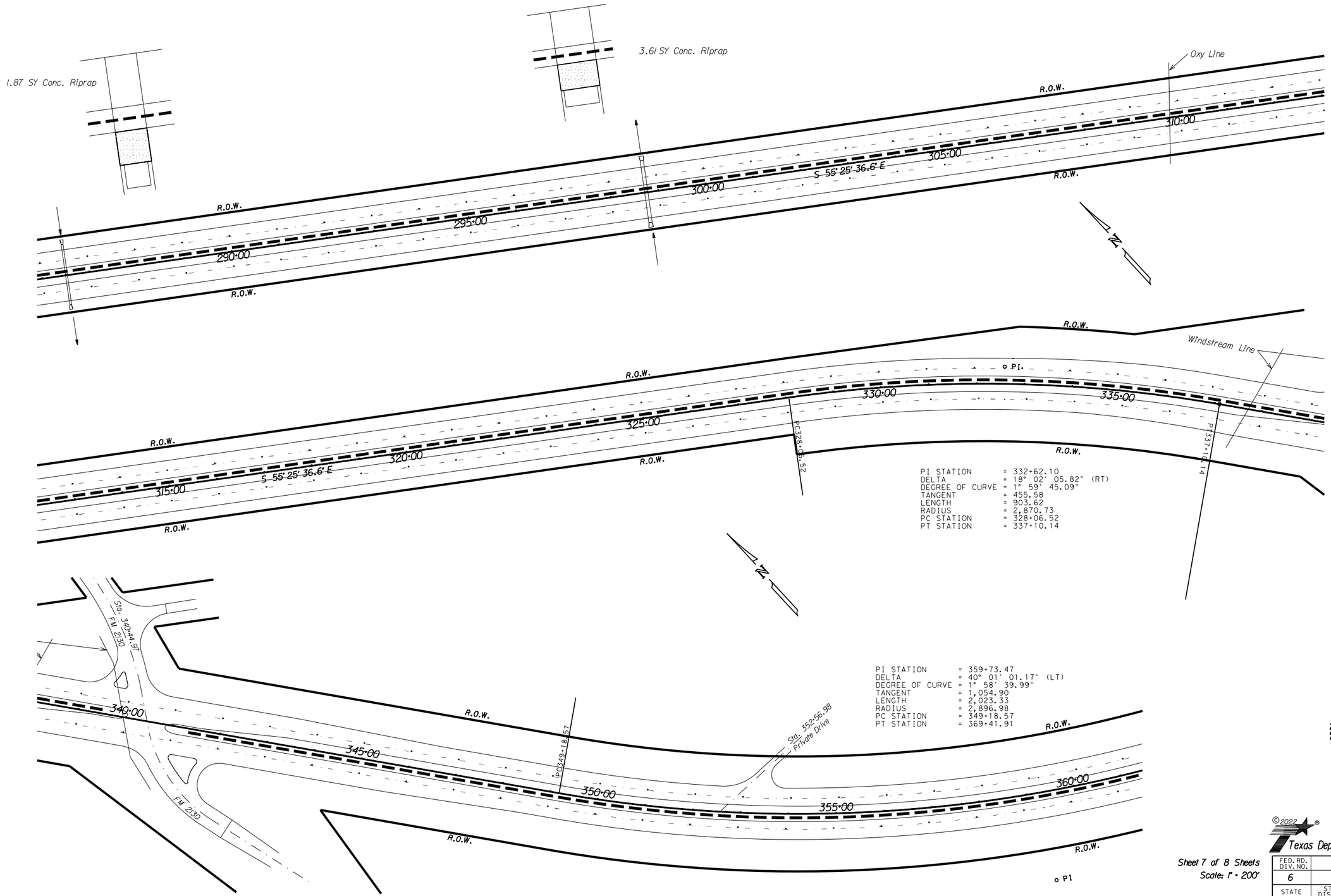
Neil Welch, P.E.
3/3/2022

Texas Department of Transportation

Sheet 6 of 8 Sheets
Scale: 1" = 200'

PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			36
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp6-8.dgn		



NEIL BELCH
92644
REGISTERED
PROFESSIONAL ENGINEER
STATE OF TEXAS

N. Belch, P.E.
3/3/2022

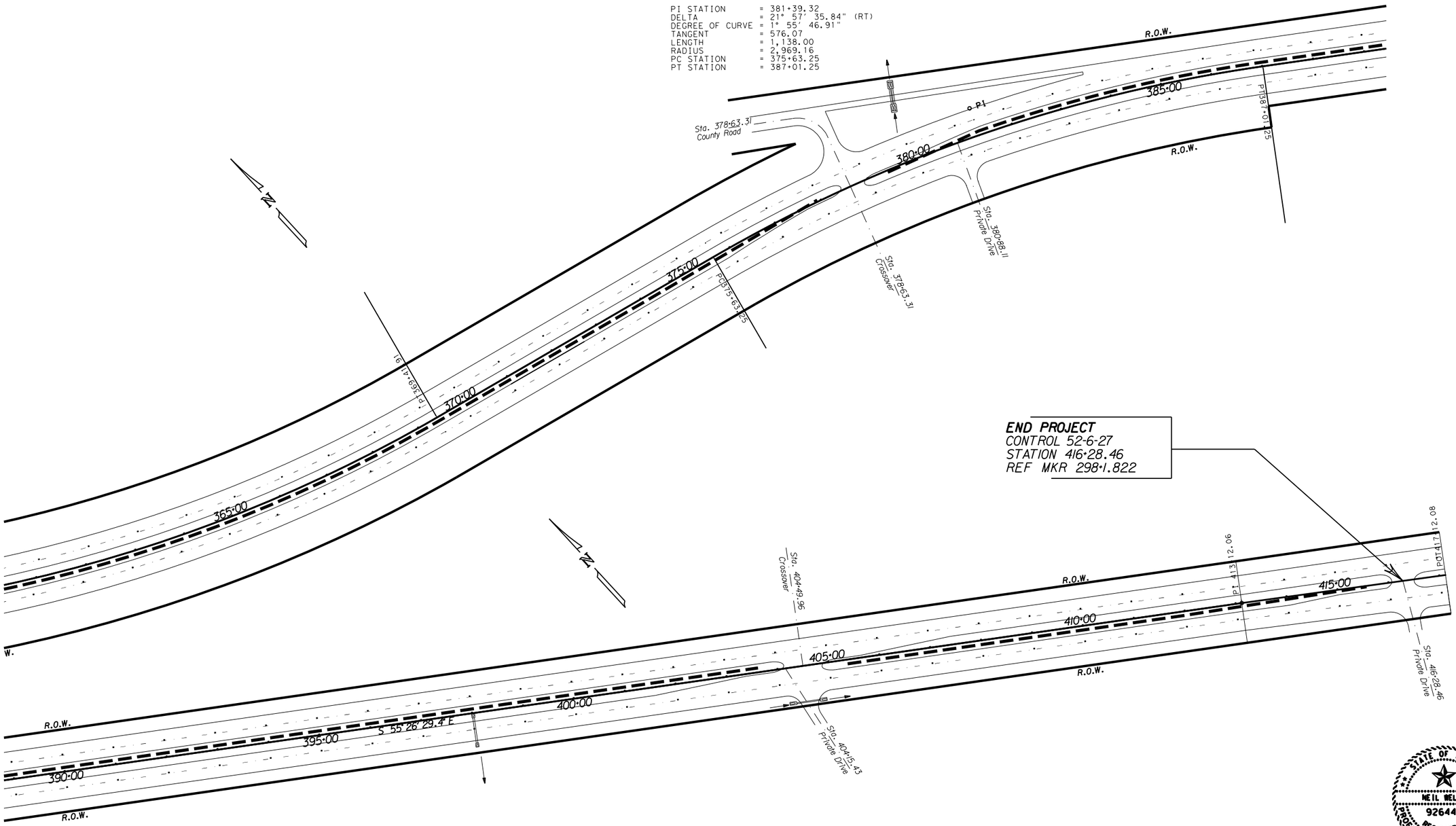
Texas Department of Transportation

Sheet 7 of 8 Sheets
Scale: 1" = 200'

PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			37
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp6-8.dgn		

PI STATION = 381+39.32
DELTA = 21° 57' 35.84" (RT)
DEGREE OF CURVE = 1° 55' 46.91"
TANGENT = 576.07
LENGTH = 1,138.00
RADIUS = 2,969.16
PC STATION = 375+63.25
PT STATION = 387+01.25



END PROJECT
CONTROL 52-6-27
STATION 416+28.46
REF MKR 298+1.822

Neil Melch, P.E.
3/3/2022

Texas Department of Transportation

Sheet 8 of 8 Sheets
Scale: 1" = 200'

PLAN

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			38
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	pp6-8.dgn		

CABLE BARRIER CSJ: 0294-01-042

CABLE RUN	Station		General Location		BASELINE OFFSET LEFT OR RIGHT	ENTIRE LENGTH	543-6002 CABLE BARRIER SYSTEM (TL-4)	543-6020 END TERM (EA)	432-6046 5" MOW STRIP (CY)	RIPRAP (CONC) (CL A) AREA	432-6005 RIPRAP (CONC) (CL A)	658-6095 INSTL DEL ASSM (D-DY)SZ IIYFLX)GND	134-6002 BACKFILL	150-6001 BLADE	EMULS ASPH (EROSION CONT) (WIDTH)	EMULS ASPH (EROSION CONT) (AREA)	♫ EMULS ASPH (EROSION CONT) (CSS-1H) (0.13gal/sy)
	From	To	From	To		LF	LF	EA	CY	SY	CY	EA	STA	STA	LF	SY	GAL
CSJ: 0052-05-047																	
1	1261+15.00	1295+60.00	FM 1072	Crossover	LT	3445	3390	2	159.49			2	34.45	34.45	23	8803.89	1144.51
2	1297+00.00	1331+45.00	Crossover	CR 267	RT	3445	3390	2	159.49			2	34.45	34.45	23	8803.89	1144.51
3	1333+35.00	1367+50.00	CR 267	Crossover	LT	3415	3360	2	158.10	4.89	0.68	2	34.15	34.15	23	8727.22	1134.54
4	1368+90.00	1400+45.00	Crossover	CR 277	RT	3155	3100	2	146.06			2	31.55	31.55	23	8062.78	1048.16
					CSJ 0052-05-047 TOTAL:	13460.00	**13240.00**	**8**	**623.14**	4.89	**0.68**	**8**	**134.60**	**134.60**		34397.78	4471.72
CSJ: 0052-06-026																	
5	0+40.00	13+15.00	CR 277	Tennessee Rd.	LT	1275	1220	2	59.03			2	12.75	12.75	16	2266.67	294.67
6	15+13.50	28+68.50	Tennessee Rd.	Crossover	RT	1355	1300	2	62.73	4.28	0.59	2	13.55	13.55	16	2408.89	313.16
7	30+17.50	50+12.50	Crossover	Crossover	RT	1995	1940	2	92.36			2	19.95	19.95	16	3546.67	461.07
8	51+55.00	66+70.00	Crossover	Old US 84	LT	1515	1460	2	70.14			2	15.15	15.15	16	2693.33	350.13
9	68+25.00	93+30.00	Old US 84	FM 597	RT	2505	2450	2	115.97			2	25.05	25.05	16	4453.33	578.93
10	95+05.00	127+40.00	FM 597	Crossover	RT	3235	3180	2	149.77			2	32.35	32.35	16	5751.11	747.64
11	128+85.00	138+80.00	Crossover	FM 168	LT	995	940	2	46.06			2	9.95	9.95	16	1768.89	229.96
12	140+70.00	179+55.00	FM 168	Ohio Rd.	LT	3885	3830	2	179.86			2	38.85	38.85	16	6906.67	897.87
					CSJ 0052-06-026 TOTAL:	16760.00	**16320.00**	**16**	**775.92**	4.28	**0.59**	**16**	**167.60**	**167.60**		29795.56	3873.43
CSJ: 0052-06-027																	
13	181+10.00	207+65.00	Ohio Rd.	Onion Shed Rd.	RT	2655	2600	2	122.92			2	26.55	26.55	16	4720.00	613.60
14	210+00.00	266+55.00	Onion Shed Rd.	Crossover	LT	5655	5600	2	261.81	2.00	0.28	2	56.55	56.55	16	10053.33	1306.93
15	267+95.00	276+80.00	Crossover	King Rd.	RT	885	830	2	40.97			2	8.85	8.85	16	1573.33	204.53
16	278+35.00	339+50.00	King Rd.	FM 2130	LT	6115	6060	2	283.10	5.48	0.76	2	61.15	61.15	16	10871.11	1413.24
17	341+35.00	378+00.00	FM 2130	Crossover	RT	3665	3610	2	169.68			2	36.65	36.65	16	6515.56	847.02
18	379+40.00	403+65.00	Crossover	Crossover	LT	2425	2370	2	112.27			2	24.25	24.25	16	4311.11	560.44
19	405+36.50	415+51.50	Crossover	Crossover	RT	1015	960	2	46.99			2	10.15	10.15	16	1804.44	234.58
					CSJ 0052-06-027 TOTAL:	22415.00	**22030**	**14**	**1037.74**	7.48	**1.04**	**14**	**224.15**	**224.15**		39848.88	5180.34
					CSJ 0052-05-047 TOTAL:	13460.00	**13240**	**8**	**623.14**	4.89	**0.68**	**8**	**134.60**	**134.60**		34397.78	4471.72
					CSJ 0052-06-026 TOTAL:	16760.00	**16320**	**16**	**775.92**	4.28	**0.59**	**16**	**167.60**	**167.60**		29795.56	3873.43
					PROJECT TOTAL:	52635	**51590**	**38**	**2436.80**	16.65	**2.31**	**38**	**526.35**	**526.35**		104042.22	13525.49

♫ Emulsion quantities for contractor information only. Emulsion for backfill shall be subsidiary to Item 134.

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED PROFESSIONAL ENGINEER

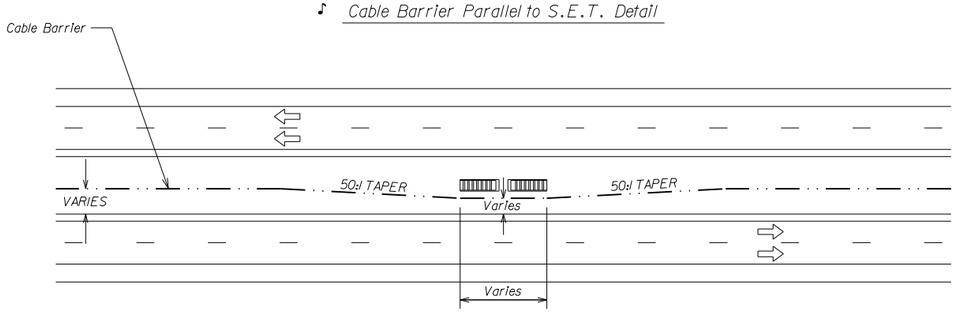
Neil Welch, P.E.
3/3/2022

Texas Department of Transportation

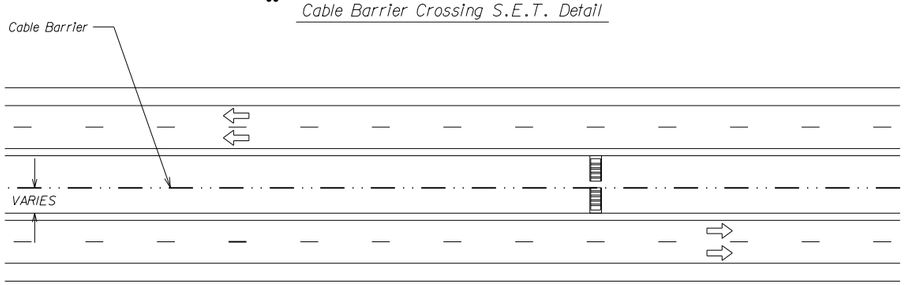
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			39
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84_CableSUM.dgn		

CABLE BARRIER SUMMARY

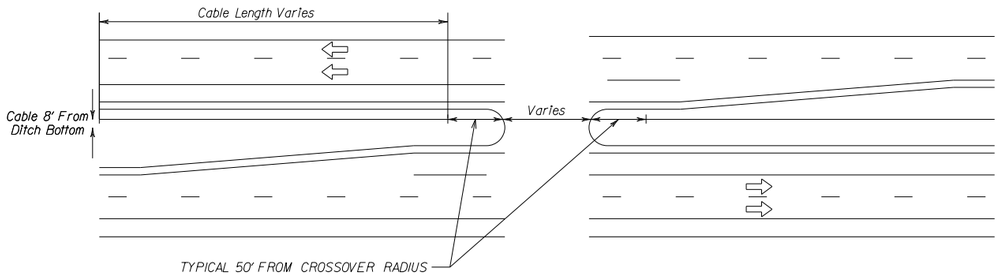
♪ Cable Barrier Parallel to S.E.T. Detail



♫ Cable Barrier Crossing S.E.T. Detail



TERMINAL SECTION AT CROSSOVER DETAIL

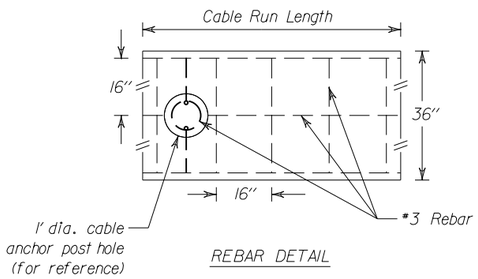


♪ Place concrete riprap conneting median inlets and structures parallel to the road, to the adjacent cable barrier mow strip.

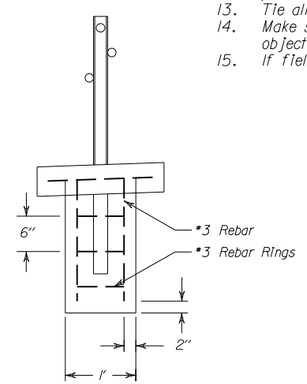
♫ Do not continue mowstrip through an S.E.T. perpendicular to the cable barrier. Run the cable according to the plans over the S.E.T. Should it become apparent a that a cable post will come into conflict with an S.E.T., place the post on the upstream side relative to the direction the cable will be tensioned; i.e. maintain cable post spacing at a length not greater than dictated in the applicable standard(s), and shorten the distance between the posts as needed to achieve no conflict with the S.E.T.

♫ Length of overlap is typically 80', plus the length of anchor terminals; field conditions may dictate otherwise.

♫♫ Length of cable break will be field determined based upon median width, TxDOT, Law Enforcement input and any applicable sight distance considerations.

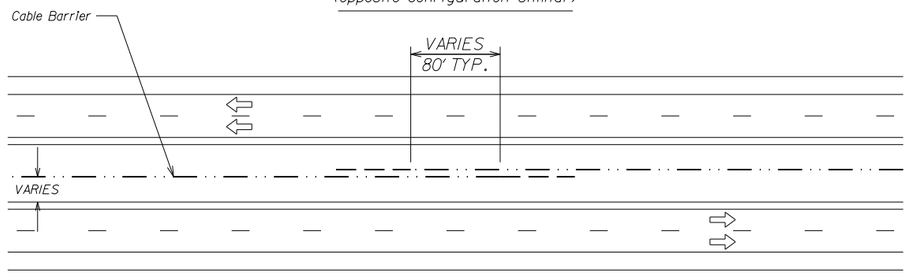


REBAR DETAIL

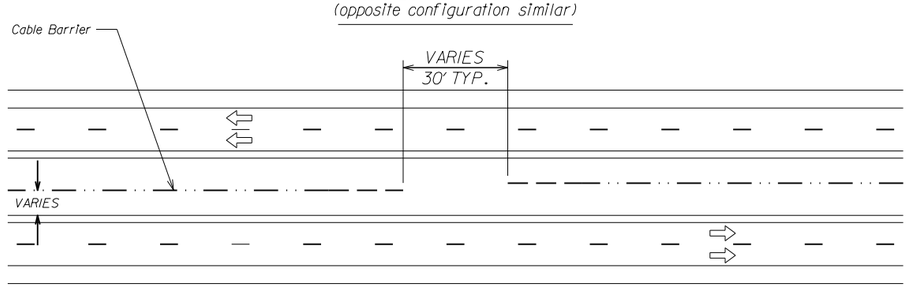


DRILLED SHAFT CAGE DETAIL

♫ Cable Barrier Overlap Detail (opposite configuration similar)

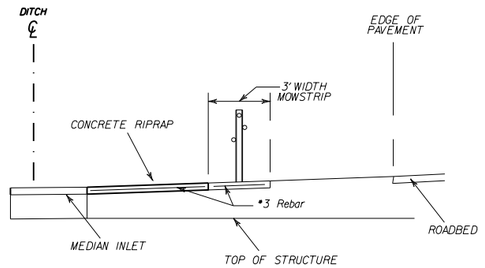


♫♫ Cable Barrier Break Detail (opposite configuration similar)



Notes:

1. Riprap mowstrip shall be TY A concrete 3' wide and be 5" thick for the entire length of a cable run. Place mowstrip 2' beyond all anchor terminals.
2. Number 3 reinforcing steel shall be used for all riprap mowstrip. No welded wire, wire mesh, or fiber-reinforced concrete will be allowed.
3. See steel detail below for dimensions and spacing.
4. Drill shafts shall be TY A concrete and placed in accordance with manufacturer's recommendations.
5. Rebar rings shall be tied to the vertical rebars for drill shaft cages.
6. Provide expansion material at joints 100' apart for the length of the mowstrip.
7. Except where expansion joints are located, place tool joints every 20' for the length of the mowstrip.
8. Cold weather protection requirements will apply for mowstrip placement.
9. Riprap cross-slope shall match existing front slope; ensure water does not pond between mowstrip and edge of pavement.
10. Limits of pay for windrows vary. Additional soil removed will not be paid for but will be returned to existing conditions at no cost to the Department.
11. Provide 2" of clear cover for rebar in the mowstrip.
12. The center piece of longitudinal rebar shall be cut then resumed after any cable anchor post holes. A maximum length of 16" will be permissible.
13. Tie all transverse steel pieces at all 3 longitudinal steel pieces.
14. Make sure ALL object markers are placed according to cable barrier standards and object marker standards.
15. If field conditions differ from the plans, promptly notify the Engineer.



PROPOSED CONCRETE RIPRAP AT INLETS
(LT SIDE SIMILAR)

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED PROFESSIONAL ENGINEER

Neil Welch, P.E.
3/3/2022

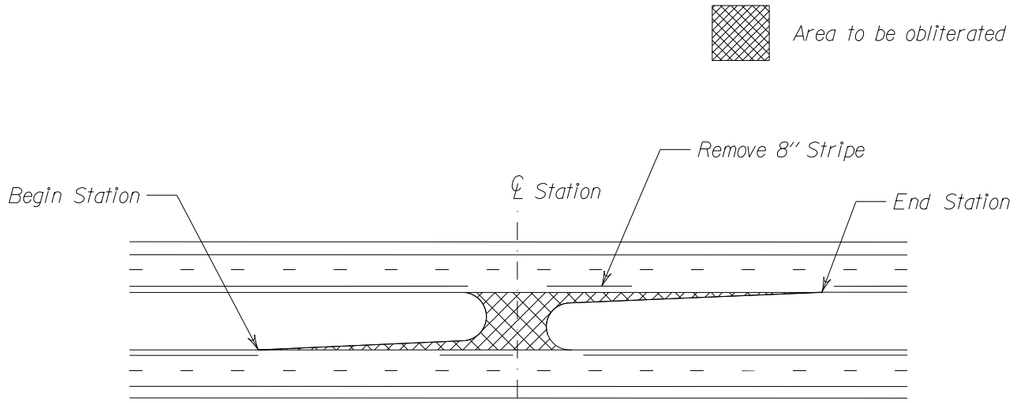
Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			40
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84_Rwy_details.dgn		

ROADWAY DETAILS

REMOVAL SUMMARY				
Control Section	Station	106-6001	644-6076	677-6003
		OBLITERATING ABANDONED ROAD	REMOVE SM RD SN SUP&AM	ELIM EXT PAV MRK & MRKS (8")
		STA	EA	LF
0052-05-047	1350+30	7.5	4	300
	1384+90	7.5	4	250
	Total:	15	8	550

NOTE:
Signs removed shall be returned to the Lamb County Maintenance office.



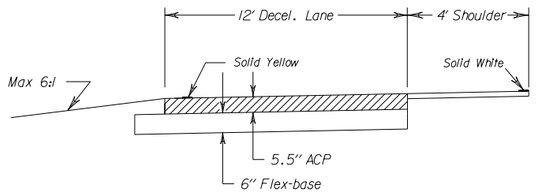
Obliterate Abandoned Road with Decel Lane

Notes:

1. Details are shown for estimating purposes only, and field conditions may vary. Item 106 will serve as full compensation for removal of any and all roadway material as determined by the Engineer.
2. The contractor will be responsible for any surveying of median ditch(es) to ensure existing drainage is maintained.

Sequence of Work for Obliterating Abandoned Road:

1. Remove crossovers, including signs, pavement markings and other debris.
2. Bring in engineer approved embankment.
3. Shape to drain as directed.



EXISTING MEDIAN D-LANE DETAIL

NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER
STATE OF TEXAS

Neil Melch, P.E.
3/3/2022

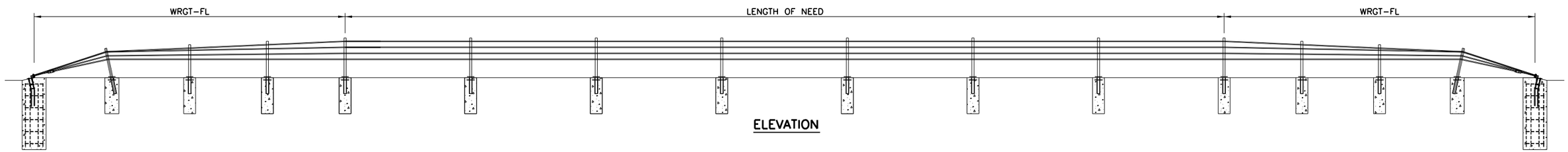
Texas Department of Transportation

No Scale

REMOVAL SUMMARY AND DETAILS

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			41
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84_Rem_details.dgn		

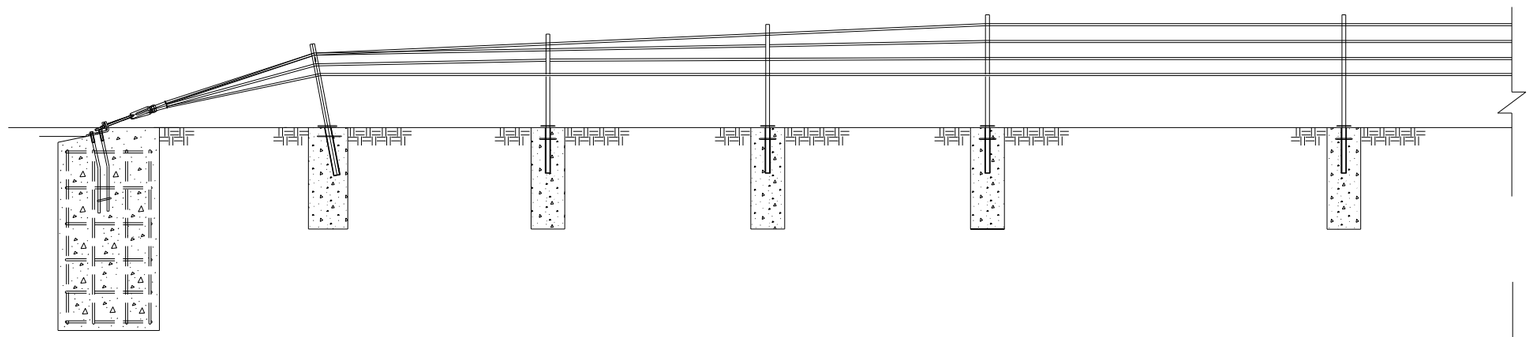
DATE:
FILE:

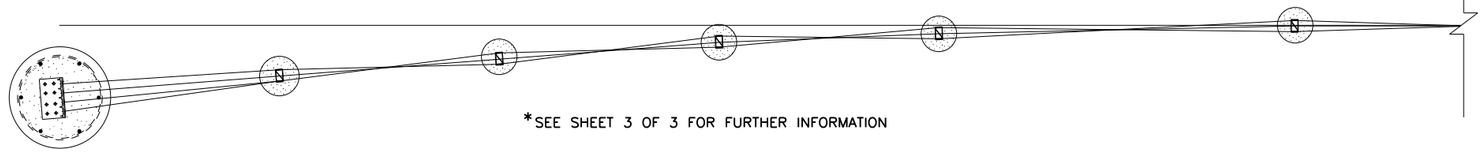


ELEVATION

PLAN

WRGT-FL END ANCHOR





*SEE SHEET 3 OF 3 FOR FURTHER INFORMATION

ROPE TENSION TABLE		
ROPE TEMP (°F)	TENSION (LBS)	TENSION (kN)
0	5700	25.4
5	5550	24.7
10	5400	24.0
15	5250	23.4
20	5100	22.7
25	4950	22.0
30	4800	21.4
35	4650	20.74
40	4500	20.0
45	4350	19.3
50	4200	18.7
55	4050	18.0
60	3900	17.3
65	3750	16.7
70	3600	16.0
75	3450	15.3
80	3300	14.7
85	3150	14.0
90	3000	13.3
95	2850	12.7
100	2700	12.0
105	2550	11.3
110	2400	10.7
115	2250	10.0
120	2100	9.3
125	1950	8.7
130	1800	8.0
135	1650	7.3
140	1500	6.7

*ROPE TENSION: ± 20% AFTER 2-WEEK INTERVAL

GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. AT 1-866-427-4336.

2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.

3. THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 21'-0".

4. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACT MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

5. THE WRGT-FL END ANCHOR HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-3 CONDITIONS. THE LENGTH OF NEED BEGINS 31'-0" FROM THE END ANCHOR. POSTS A THROUGH POST B3, SPACED 6'-6" APART, HAVE WEAKENED CUTS AT THE GROUND THAT SHALL FACE THE ANCHOR.

6. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.

7. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.

8. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.

9. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

10. TAPER RATES FOR THE BRIFEN WRSF ARE AS FOLLOWS:
    HORIZONTAL: 25:1 MAXIMUM, 50:1 PREFERABLE
    VERTICAL: 25:1 MAXIMUM, 50:1 PREFERABLE

Texas Department of Transportation

Design Division Standard

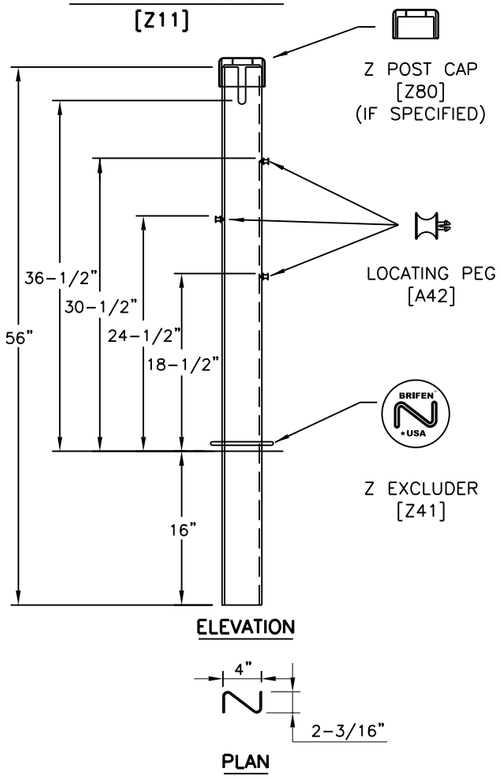
BRIFEN
WIRE ROPE SAFETY FENCE
(TL-4)

BRIFEN(TL4)-14

FILE: brifentl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: MARCH 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		42

DATE:
FILE:

LINE POST ASSEMBLY [Z11]



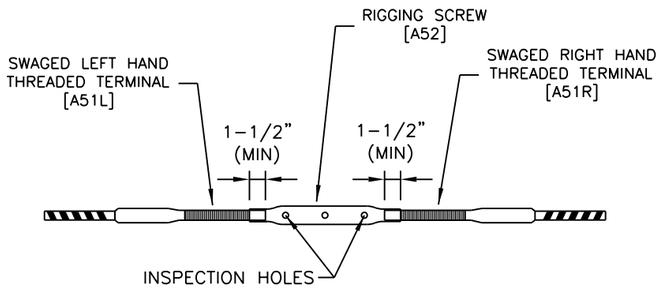
ELEVATION

PLAN

NOTES SPECIFIC TO LINE POST ASSEMBLY

1. ROPE HEIGHTS SHALL BE ±1" TO GROUND LINE.
2. POST SHALL BE ±4" FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.

ROPE CONNECTION DETAIL

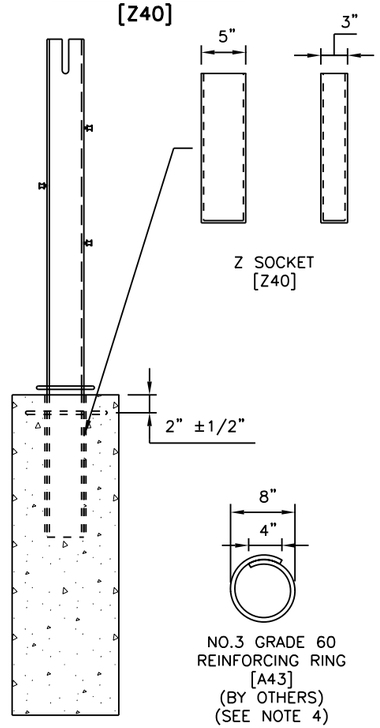


NOTES SPECIFIC TO ROPE CONNECTION DETAIL

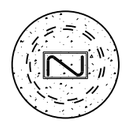
1. THE WIRE ROPE TERMINALS SHALL BE THREADED A MINIMUM OF 1-1/2" INTO RIGGING SCREW.
2. AFTER FINAL TENSIONING, THE TERMINALS SHALL BE VISIBLE IN THE INSPECTION HOLES.

SOCKET ASSEMBLY

CONCRETE FOOTING [Z40]



ELEVATION

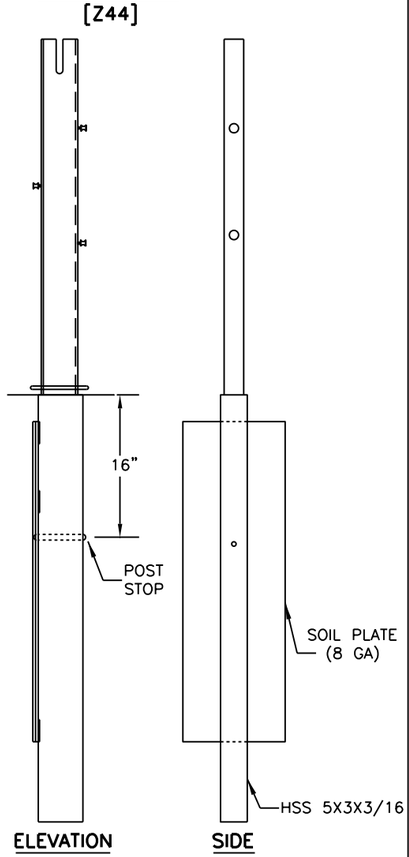


PLAN

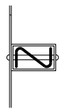
NOTES SPECIFIC TO CONCRETE FOOTING

1. SIZE OF FOOTING WILL BE DETERMINED BY SOIL CONDITIONS, FOUNDATION TYPE AND PROJECT CONDITIONS.
2. CONCRETE BASED ON AGENCY SPECIFICATIONS.
3. CONCRETE BY OTHERS.
4. REINFORCING RING (BY OTHERS) WILL BE USED ACCORDING TO FOUNDATION SIZE AND TYPE. THE REINFORCEING RING MAY BE OMITTED IF THE FOOTING IS PLACED IN A CONTINOUS CONCRETE MOW STRIP.
5. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
6. SOCKET SHALL BE ±2° OF VERTICAL PLUMB.

DRIVE SOCKET [Z44]



ELEVATION SIDE



PLAN

NOTES SPECIFIC TO DRIVE SOCKETS

1. SIZE OF SOIL PLATE WILL BE DETERMINED BY SOIL CONDITIONS AND PROJECT CONDITIONS.
2. THE SOIL PLATE SHALL BE PARALLEL TO ROADWAY AND CAN FACE TOWARD OR AWAY FROM THE TRAVEL LANE.
3. FOOTING SHALL BE FLUSH WITH THE GROUND LINE, TO A MAXIMUM OF 1 INCH BELOW OR ABOVE GROUND LINE.
4. SOCKET SHALL BE ±2° OF VERTICAL PLUM.
5. SOCKETS SHALL BE DRIVEN IN A MANNER TO NOT DISTORT OR DESTROY THE TOP OF SOCKET TO A DEGREE THAT PLACES THE SOCKET OR LINE POST OUT OF CONSTRUCTION TOLERANCES.

GENERAL NOTES:

1. BRIFEN DRAWINGS, SPECIFICATIONS, AND PRODUCT MANUAL SHOULD BE REVIEWED PRIOR TO STARTING AN INSTALLATION. FOR ADDITIONAL INFORMATION OR QUESTIONS, CONTACT BRIFEN USA, INC. 1-866-427-4336.
2. THE BRIFEN WRSF HAS BEEN SUCCESSFULLY TESTED TO NCHRP 350 TL-4 CONDITIONS ON SLOPES 6:1 OR FLATTER AND NCHRP 350 TL-3 CONDITIONS ON SLOPES 4:1 TO 6:1.
3. THE POST SPACING SHALL BE DETERMINED BY THE SPECIFYING AGENCY. POST SPACING MAY BE DECREASED TO AVOID OBSTRUCTIONS OR UTILITIES. IN NO EVENT SHALL THE POST SPACING EXCEED 21'-0".
4. BRIFEN WRSF SHALL BE PLACED ON A SMOOTH SURFACE, WITHOUT HUMPS, DROP-OFFS, HOLES, ETC THAT WOULD INTERFERE WITH THE STABILITY OF THE ERRANT VEHICLE. GRADING, FILL AND COMPACTION MAY BE REQUIRED TO ASSURE THAT ROPES ARE INSTALLED AT THE DESIGN HEIGHT.

Texas Department of Transportation

Design Division Standard

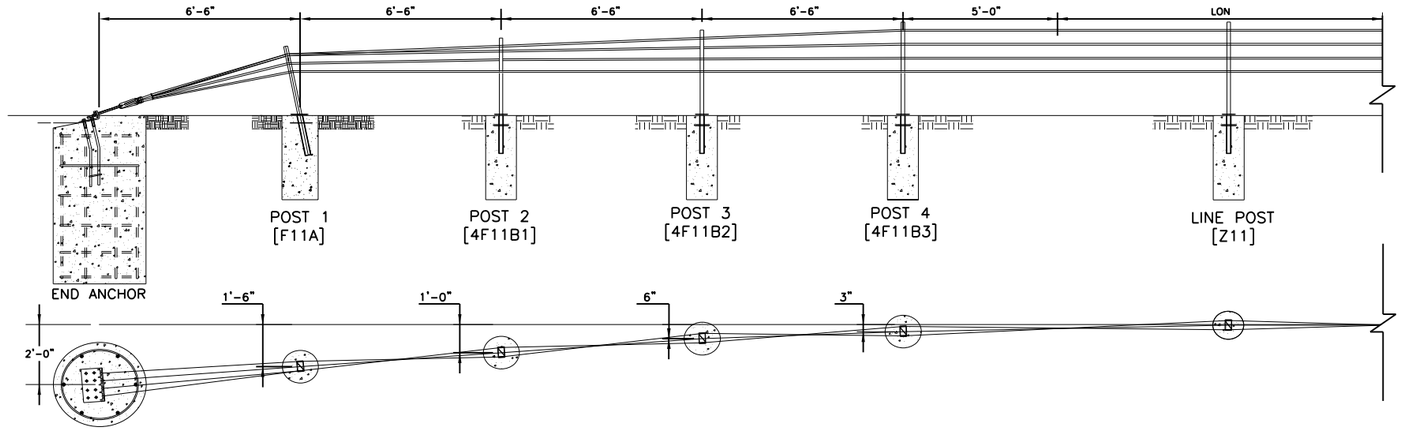
BRIFEN WIRE ROPE SAFETY FENCE (TL-4)

BRIFEN(TL4)-14

FILE: brifentl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
© TxDOT: MARCH 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		43

DATE:
FILE:

WRGT-FL END ANCHOR LAYOUT



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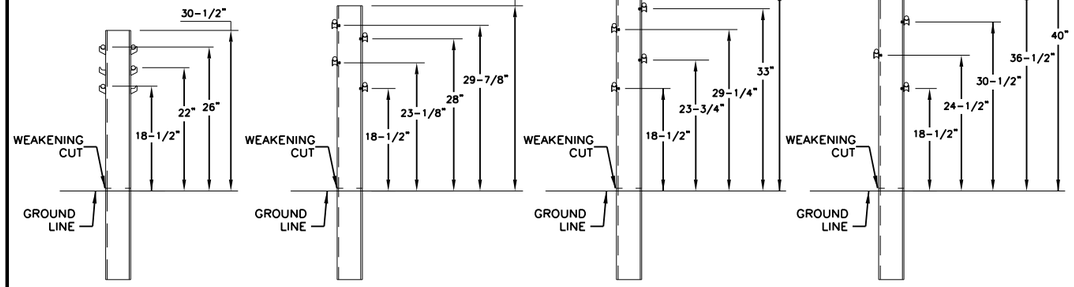
3. ANCHOR AND LINE POST DIMENSIONS AND STEEL REINFORCEMENT WILL BE DETERMINED ON PROJECT SPECIFIC SOIL CLASSIFICATION, PROPERTIES AND TEMPERATURE EXTREMES. CONTACT BRIFEN USA, INC. FOR ADDITIONAL INFORMATION.
4. ALL REINFORCEMENT AND CONCRETE FOR THE ANCHORS AND LINE POSTS PROVIDED BY OTHERS.
5. REINFORCEMENT AND CONCRETE PROPERTIES SHALL MEET AGENCY SPECIFICATIONS.
6. FOR PLACEMENT NEAR GUARDRAIL OR OTHER OBSTACLES CONTACT BRIFEN USA, INC. FOR ADDITIONAL DRAWINGS AND SUPPORT.

WRGT-FL POST DETAILS

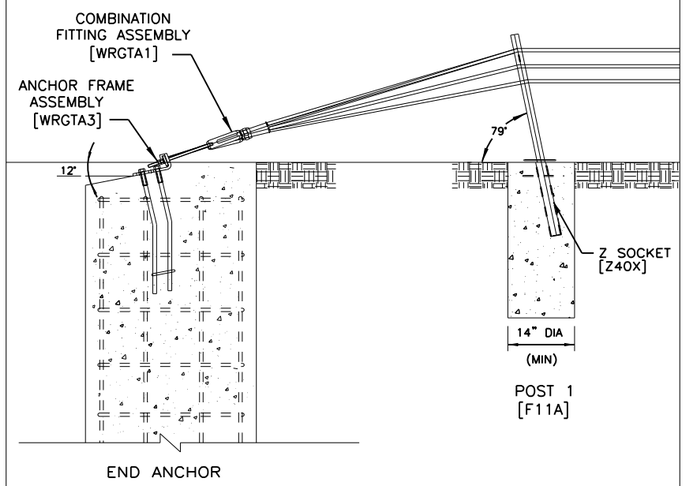


POST 1 [F11AL] | POST 2 [4F11B1L] | POST 3 [4F11B2L] | POST 4 [4F11B3L]

NOTES SPECIFIC TO WRGT-FL POST DETAIL

1. ROPE HEIGHTS SHALL BE ±1" TO GROUND LINE.
2. POST SHALL BE ±4" FROM VERTICAL PLUMB.
3. POST CAPS SHALL BE USED IF SPECIFIED.
4. REFLECTORS SHALL BE SPACED ACCORDING TO AGENCY SPECIFICATIONS.
5. REFLECTORS CAN BE PLACED ON THE POST CAP OR POST.
6. Z EXCLUDER (Z41) SHALL BE USED.
7. POST A & SOCKET SHALL BE PLACED 79" (±4") TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
8. POST A SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.
9. FOUNDATIONS FOR POST 2 THRU 4 SHALL BE THE SAME AS THE LINE POST ASSEMBLY'S FOR THE PROJECT.
10. WEAKENED CUTS SHALL FACE END ANCHOR.

END ANCHOR DETAILS

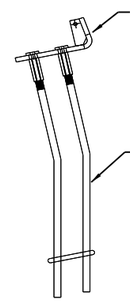


NOTES SPECIFIC TO END ANCHOR DETAIL

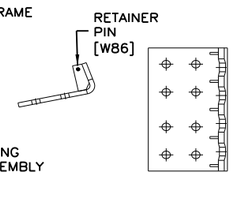
1. THE END ANCHOR ASSEMBLY SHALL BE PLACED 12" (+3", -1") BELOW HORIZONTAL PLANE.
2. POST 1 & SOCKET SHALL BE PLACED 79" (±4") TOWARD END ANCHOR FROM THE HORIZONTAL PLANE.
3. POST 1 SOCKET SHALL BE PLACED IN 14" (MIN) CONCRETE FOUNDATION. DEPTH TO BE DETERMINED FROM SOIL CONDITIONS AND PROJECT CONDITIONS.

END ANCHOR COMPONENTS

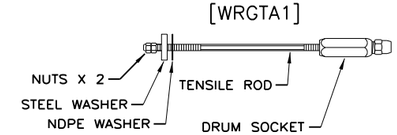
ANCHOR FRAME ASSEMBLY



ANCHOR FRAME [A70]



COMBINATION FITTING [WRGTA1]



SHEET 3 OF 3

Texas Department of Transportation | Design Division Standard

BRIFEN
WIRE ROPE SAFETY FENCE
(TL-4)

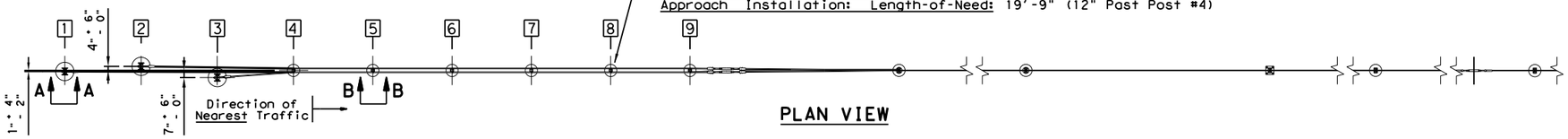
BRIFEN(TL4)-14

FILE: brifent1414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
© TxDOT: MARCH 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		44

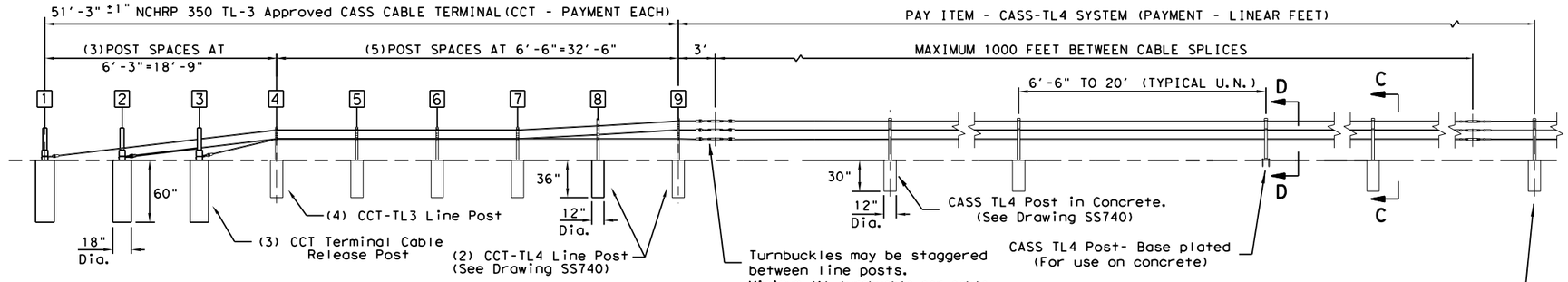
DATE:
FILE:

Preferred Installation: Locate post #2 away from nearest traffic.
System has been succesfully tested with opposite installation.

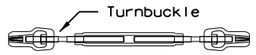
Length-of-Need Cass Cable Terminal (CCT):
Departure Installation: Length-of-Need: 44'-9" (At Post #8)
Approach Installation: Length-of-Need: 19'-9" (12" Past Post #4)



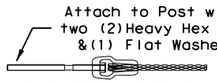
PLAN VIEW



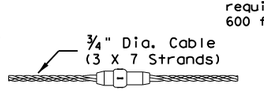
ELEVATION VIEW
(TYPICAL LAY-OUT)



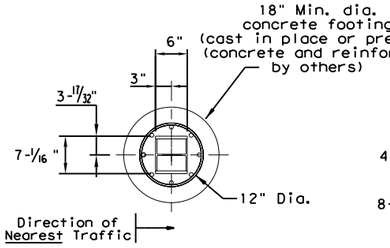
CABLE SPLICE WITH TURNBUCKLE
(OPEN BODY STYLE)



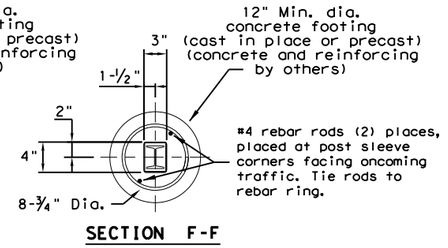
CABLE STUD ASSEMBLY



TORPEDO CABLE SPLICE



SECTION E-E



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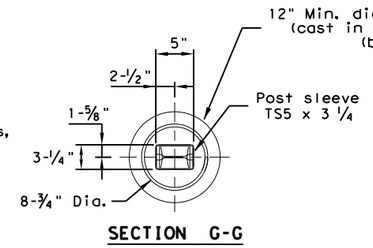
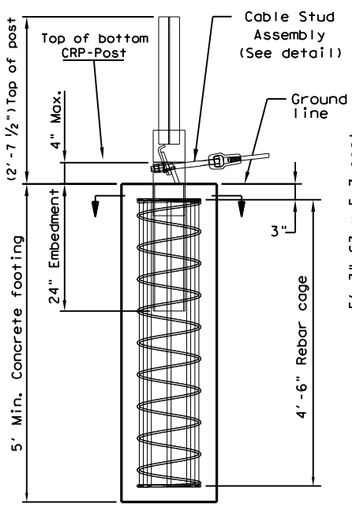
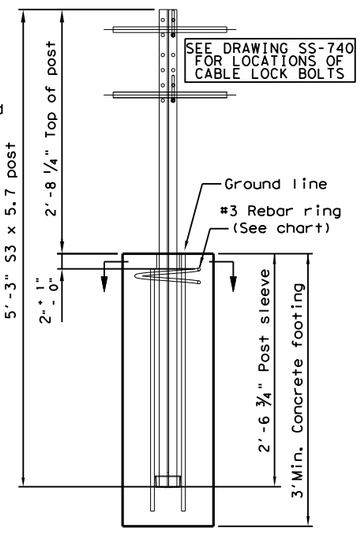


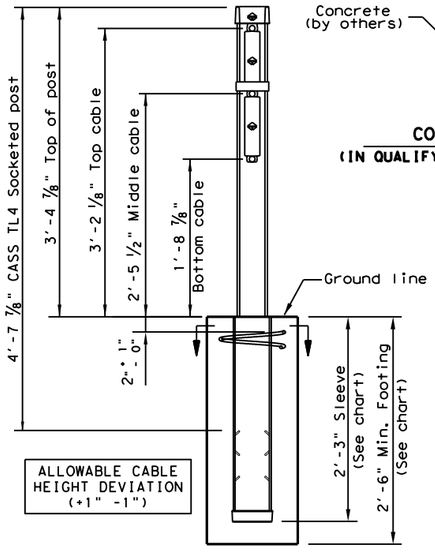
SECTION G-G



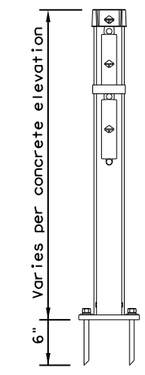
VIEW A-A
(CABLE RELEASE POST 1-3)



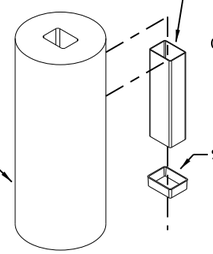
VIEW B-B
(TERMINAL LINE POST 4-7)



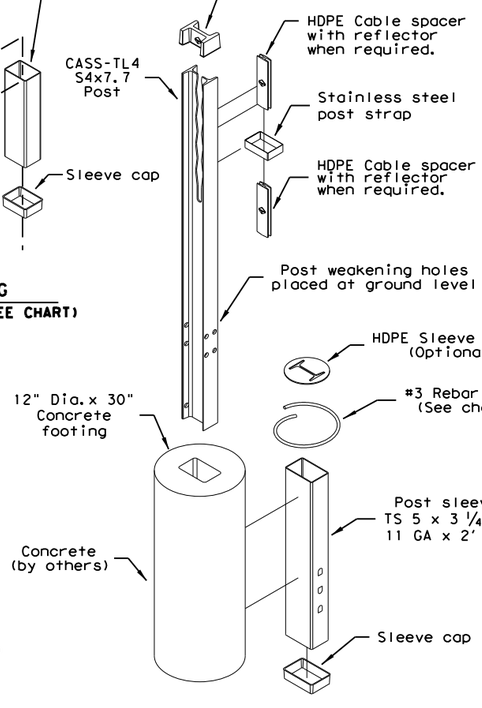
SECTION C-C
(SOCKETED POST)



SECTION D-D
(BASE PLATED POST)



CONCRETE FOOTING
(IN QUALIFYING MOW STRIP SEE CHART)



STANDARD POST & CONCRETE FOOTING
(SOCKETED POST)

GENERAL NOTES

1. This drawing is a general overview of CASS TL-4 Barrier System. See SS-740 (latest version) for specific details of CASS cable terminal (CCT) and cable safety system (CASS) requirements, proper installation, options and specification.
2. CASS is designed for bi-directional traffic flows and can be installed on either side of the median. Contact Trinity (800-527-6050) or consult the design, installation, or repair manual(s) for additional information.
3. All concrete for CASS footings shall be TxDOT class A. If class A or stronger concrete is utilized for the mowstrip, please see chart below for allowable footing depth and sleeve deviations.
4. All posts shall be socketed unless otherwise specified. All cables shall be pre-stretched unless otherwise specified.
5. For payment see Special Specification "Cable Barrier System".
6. CASS-TL4 shall be installed on shoulders or medians with slopes of 6:1 or flatter without obstructions, depressions, etc. That may significantly affect the stability of an errant vehicle. Grading of site and/or appropriate fill materials may be required. The designer/installer shall "Flatten" or "Round" various topographical inconsistencies that could interfere with the ability of the installer to consistently maintain the design height (in relation to the terrain) of the cables. Please consult manual(s) and / or TxDOT Memo(s) for installations in "Ditch Sections".
7. CASS TL-4 post spacing may be modified to avoid obstacles that conflict with the installation of cass-tl4 line posts or to reduce deflection on radiuses. No post space can exceed the maximum post TxDOT space limit of 20'. Reducing or increasing post spacing affects deflection. CASS TL-4 may be laterally transferred at a rate not to exceed 30:1.
8. Post foundations may be drilled through existing pavement. Please see line post foundation chart for minimum footing requirements in various applications.
9. For aesthetic purposes Trinity recommends all sleeves, driven posts, and lower cable release posts to be installed reasonably plumb (approximately 1/8" per foot).
10. CASS TL-4 shall be installed in well-drained, compacted, NCHRP Report 350 Standard soil. If soil does not meet this classification, if solid rock/concrete is encountered below grade or if soil is susceptable to severe freeze/thaw cycles, please contact Trinity about alternate footing design(s). Trinity suggests the use of "Mow strips" for erosion prevention and ease of maintenance / installation.
11. See the Texas MUTCD for proper "Barrier" Delineation.

MOW STRIP DETAIL*			CONCRETE FOOTING CHART		
MOW STRIP	DEPTH	WIDTH	FOOTING	TUBE SLEEVE	REBAR RING
NONE			30" Min.	27" Min.	YES
HMA	6" Min.	3' Min.	27" Min.	15" Min.	NO
HMA	8" Min.	3' Min.	24" Min.	15" Min.	NO
RC	3" Min.	3' Min.	24" Min.	15" Min.	NO

Chart does not apply to Terminal Posts 1 thru 9.
* Mow strip or pavement.
HMA = Hot Mix Asphalt (Not Recycled Asphalt Pavement).
RC = Reinforced Concrete (TxDOT Class A Minimum).

CABLE TENSION CHART	
FAHRENHEIT	PRE-STRETCHED
DEGREES	LB / FORCE
-10	7300
0	7000
10	6600
20	6300
30	6000
40	5600
50	5300
60	5000
70	4600
80	4300
90	4000
100	3600
110	3300
120	3000
130	2700
140	2500
150	2300

Allowable deviation from chart in tangent sections: +800, -200 pounds/force. Cable tension readings are typically higher in curved cable sections.

Trinity Highway Products, LLC.
2525 Stemmons Freeway
Dallas, TX 75207
Phone: (800) 644-7976

Product.INFO@TRIN.NET

Texas Department of Transportation

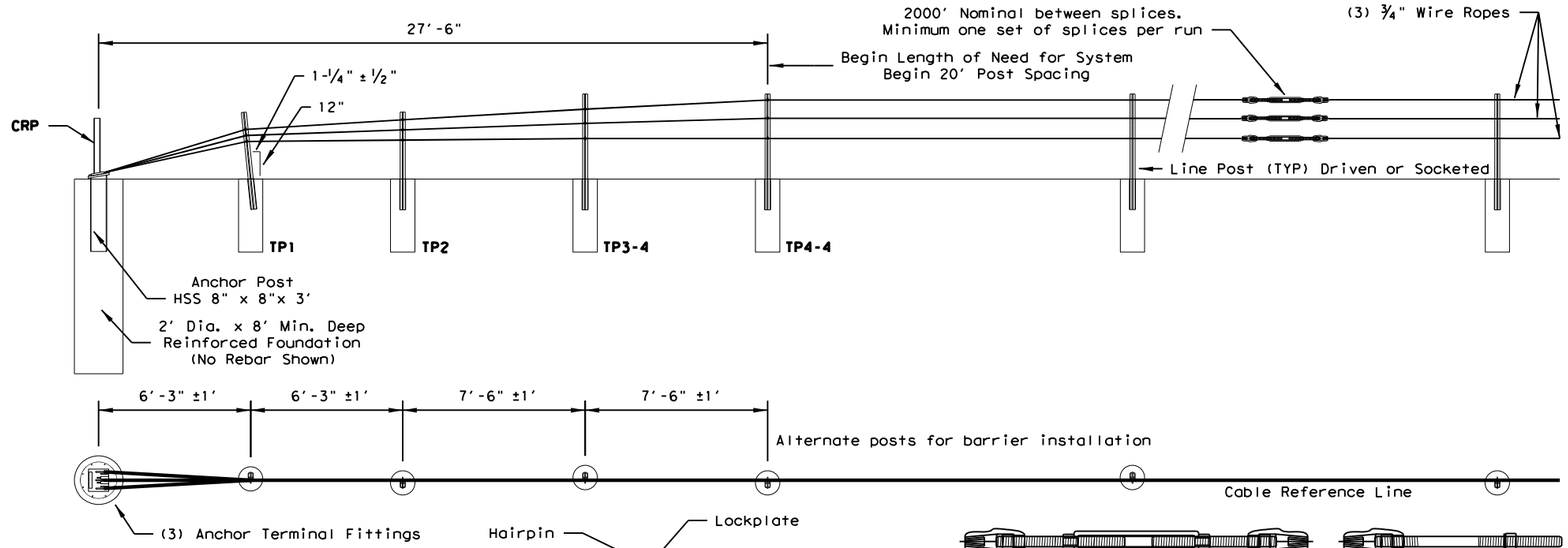
Design Division Standard

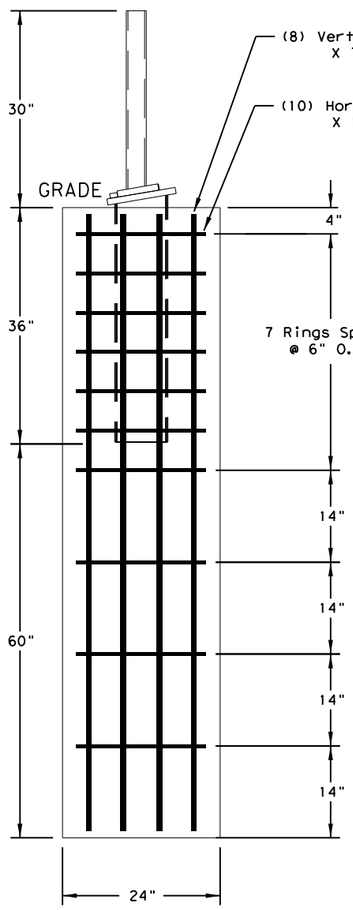
TRINITY CABLE SAFETY SYSTEM (TL-4)

CASS(TL4)-14

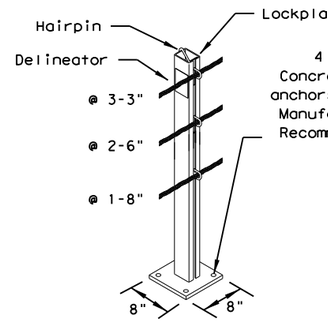
FILE: casstl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		45

DATE:
FILE:

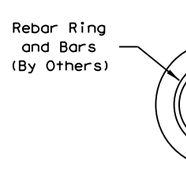




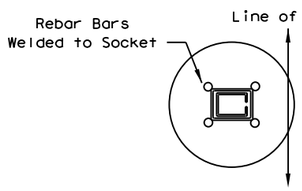
CABLE RELEASE AND ANCHOR POST



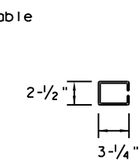
LINE POST
(BASE-PLATED OPTION)
Low-Fill Box Culvert Less than 15" Fill



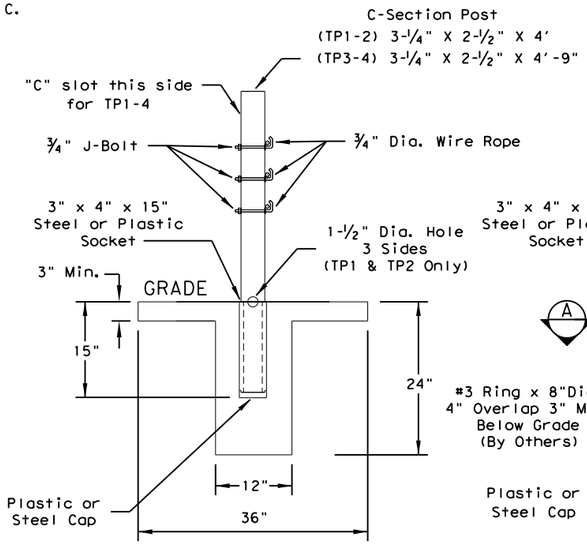
SECTION A



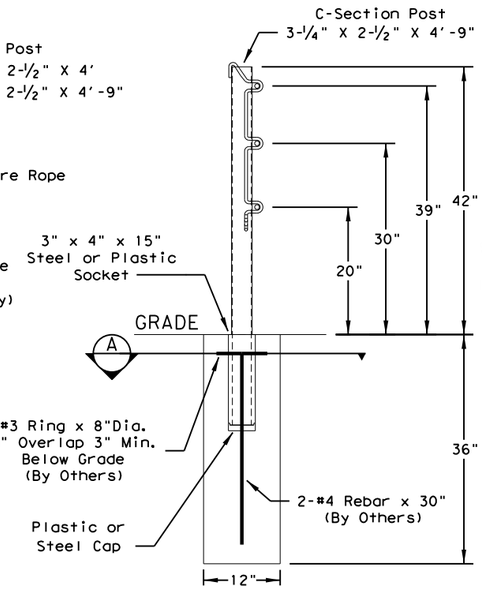
SECTION B



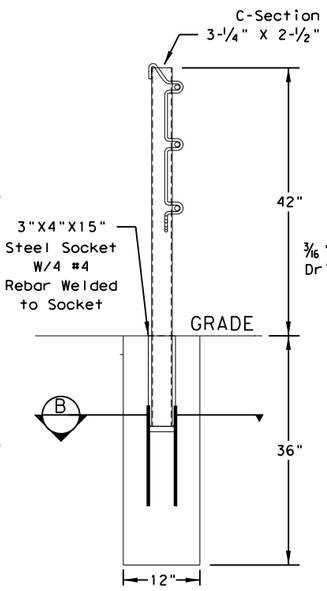
C-SECTION POST



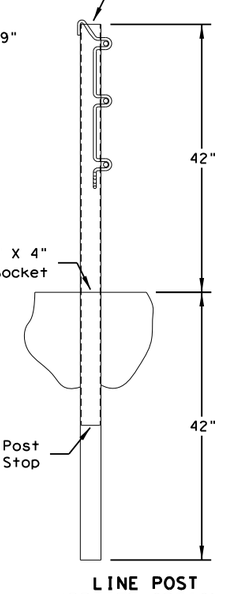
TERMINAL POST
(SHOWN WITH CONCRETE MOWSTRIP)
(Shown with Tube Plate Option)
(See Note 10)



LINE POST SOCKETED
(Shown with Rebar Ring/Bars Socket Option)
(See Note 9)



LINE POST SOCKETED
(Shown with Welded Rebar Socket Option)
(See Note 9)



LINE POST
(DRIVEN OPTION)
(Shown with Driven
Socket Option)
(See Note 9)

GENERAL NOTES

1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. All concrete shall be CLASS A.
3. The Cable Barrier System shall be installed on shoulders or on medians with slopes of 6:1 or flatter. If installed on slopes steeper than 6:1 up to 4:1 the TL-4 system performs as a TL-3 and Gibraltar must be contacted for various guidelines related to placement.
4. The Cable Barrier System is accepted by the FHWA Test Level - 4.
5. See the Texas MUTCD for proper "Barrier" delineation.
6. Rock Clause: Where solid rock is encountered:
   A. For socketed post, continue digging 12" diameter, 15" deep into rock or the required plan depth, whichever comes first.
   B. For driven post, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
   C. For Anchor post, continue digging 24" diameter, 30" deep into rock or the required plan depth, whichever comes first.
7. Tolerances:
   * LP = 3" out of plumb, at top
   * Cable height = ±1"
   * Anchor Post = ±5" off of Cable Reference Line
8. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
9. All non-welded rebar by others.
10. Minimum recommended line post foundation.
    A. Without mowstrip, 36" Deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long
    B. With 4" minimum depth hot mix asphalt, 30" deep x 12" diameter foundations with #3 rebar ring x 8" diameter with two #4 rebar vertical bars 30" long.
    C. With 3" minimum depth concrete mowstrip, 24" deep x 12" diameter foundations. (No rebar required)
    D. Direct drive post 42" deep.

CABLE TENSION CHART*	
-10 °F	8000
0 °F	7600
10 °F	7200
20 °F	6800
30 °F	6400
40 °F	6000
50 °F	5600
60 °F	5200
70 °F	4800
80 °F	4400
90 °F	4000
100 °F	3600
110 °F	3200

DEFLECTION	
Deflection	Post Spacing
8'-0"	20 FT
7'-0"	12 FT
6'-8"	10 FT

* Allowable Deviation from Chart +/- 10%

Texas Department of Transportation

Design Division Standard

GIBRALTAR CABLE BARRIER SYSTEM (TL-4)

GBRLTR(TL4)-14

FILE: gbrltrtl414.dgn	DN: TxDOT	CK: RM	DW: VP	CK:
©TxDOT: March 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		46

DATE:
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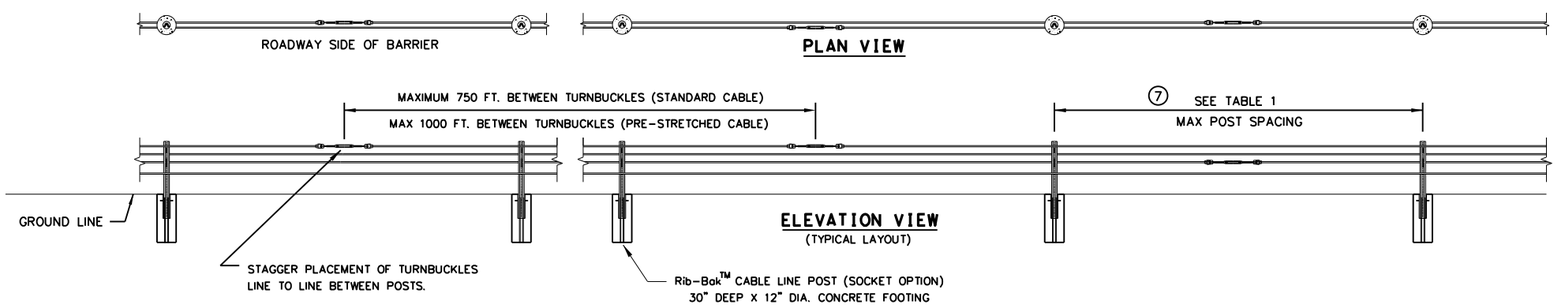
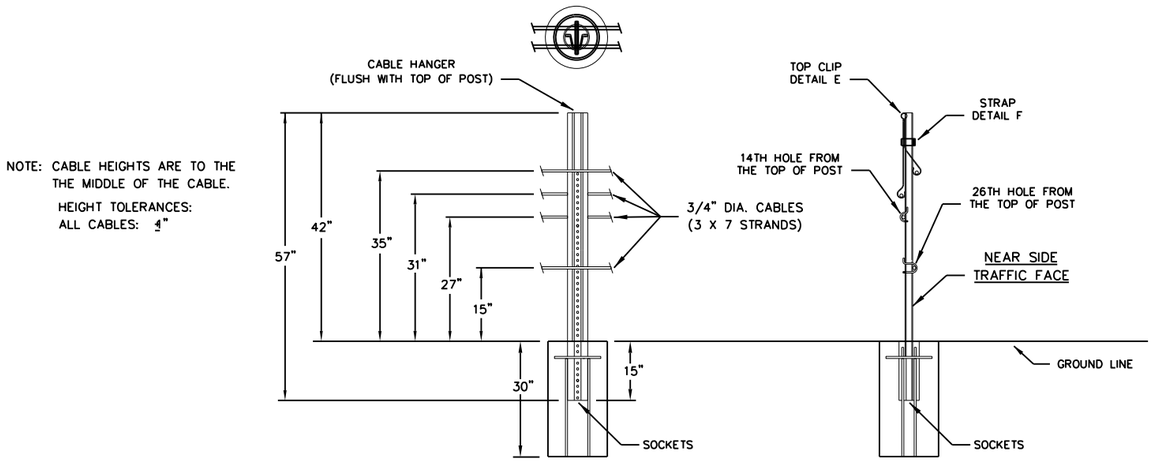
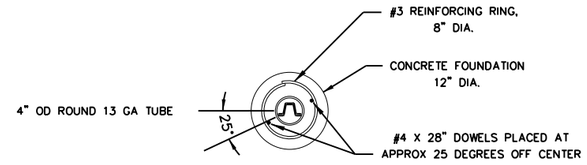
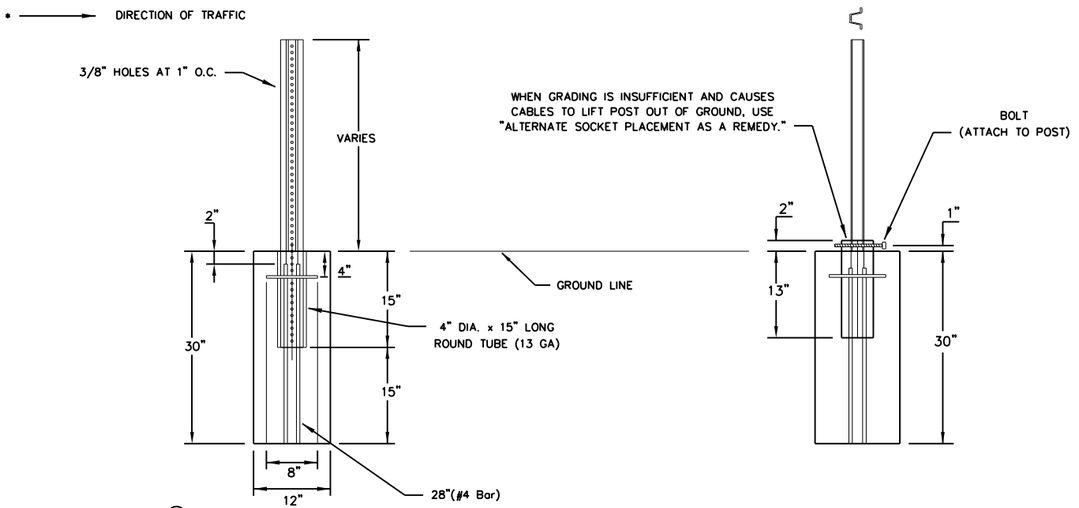




LENGTH OF NEED POSTS
MEDIAN CONFIGURATION

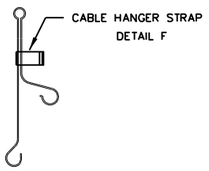
INSTALLATION DETAIL
4 CABLE 6:1



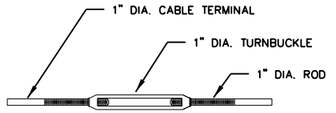


⑪ **SOCKETED POST OPTION**
(TYPE S POST)

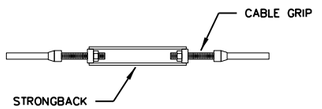
ALTERNATE SOCKET PLACEMENT
(TYPE S POST)



CABLE HANGER BRACKET
DETAIL E
(SUBJECT TO MANUFACTURER'S TOLERANCES)



WEDGED FITTING
TURNBUCKLE DETAIL
(TYPICAL)



STRONGBACK (SELF-SWAGING)
TURNBUCKLE DETAIL
(OPTIONAL)

GENERAL NOTES

1. FOR ADDITIONAL INFORMATION CONTACT YOUR DISTRIBUTOR OR NUCOR STEEL MARION, INC. AT (740) 383-4011.
2. FOR PAYMENT SEE SPECIAL SPECIFICATION "CABLE BARRIER SYSTEM".
3. FOR ADDITIONAL INFORMATION SEE THE MANUFACTURER'S PRODUCT MANUAL.
4. THE NU-CABLE SYSTEM IS DESIGNED FOR BI-DIRECTIONAL TRAFFIC FLOWS. SEE THE MANUFACTURER'S PRODUCT MANUAL FOR PLACEMENT ADJACENT TO GUARDRAIL END TREATMENTS.
5. THE NU-CABLE SYSTEM SHALL BE INSTALLED ON MEDIANS WITH SLOPES OF 6:1 OR FLATTER WITHOUT OBSTRUCTIONS, DEPRESSIONS, ETC; THAT MAY SIGNIFICANTLY AFFECT THE STABILITY OF AN ERRANT VEHICLE.
6. THE NU-CABLE SYSTEM MAY BE INSTALLED ON EITHER SIDE OF THE ROADWAY. Rib-Bak™ CABLE LINE POSTS MAY BE SOCKETED OR DRIVEN DESIGN.
7. THE TL-4 FOR 6:1 SLOPES CAN USE 4# / LF POST. SEE TABLE #1 FOR POST SIZE PER SPACING.
8. SEE (TABLE 2) FOR TENSION AMOUNT AT SPECIFIC CABLE TEMPERATURE FOR INITIAL INSTALLATION.
9. SEE (TABLE 3) FOR TENSION AMOUNT AT SPECIFIC CABLE TEMPERATURE FOR MAINTENANCE.
10. FOURTH (LOWEST) CABLE IS NOT OPTIONAL ON THE TL-4 SYSTEM.
11. CONSULT YOUR PROJECT PLAN SHEETS AND CABLE BARRIER SPECIFICATIONS FOR DESIRED SOCKET MATERIAL.
12. ALL FOUNDATION DESIGNS ARE BASED ON NCHRP 350 STRONG (S1) SOIL. CONSULT THE MANUFACTURER FOR SPECIFIC FOUNDATION DESIGN IF SOIL TYPES DIFFER.

⑦ TABLE 1

POST SIZE TABLE	
POST SPACING	POST SIZE
0' - 17'-6"	4# / LF X 4' OR 6' POST
17'-6" - 20'	5# / LF X 4' POST

POST SPACING IS PER 8 FOOT DEFLECTION REQUIRMENTS.
CONSULT PRODUCT MANUAL IF GREATER DEFLECTION IS PERMISSIBLE.

⑧ TABLE 2

CABLE TENSION CHART	
INITIAL INSTALL	
F	LBF
120	4624
110	4986
100	5350
90	5713
80	6077
70	6440
60	7167
50	7894
40	8619
30	9346
20	10073
10	10800
0	11525
-10	12252
-20	12979
-30	13706

⑨ TABLE 3

CABLE TENSION CHART	
MAINTENANCE	
F	LBF
120	4021
110	4336
100	4652
90	4968
80	5284
70	5600
60	6232
50	6864
40	7495
30	8127
20	8759
10	9391
0	10022
-10	10654
-20	11286
-30	11918

Texas Department of Transportation

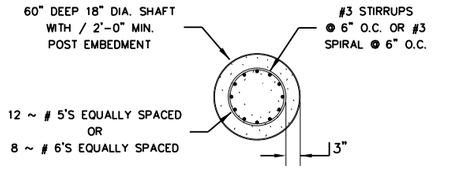
Design Division Standard

NU-CABLE BARRIER SYSTEM (TL-4) (4 CABLE)

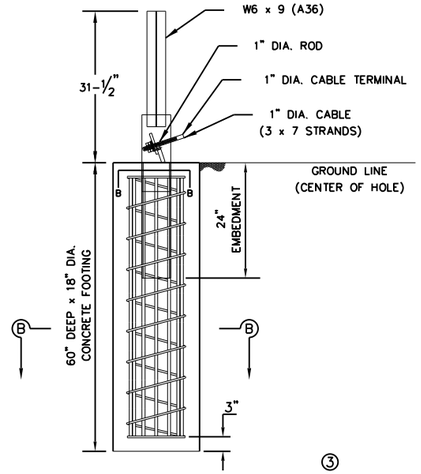
NU-CABLE(TL4)-14

FILE:	DN:		CK:	DW:	CK:
© TxDOT:	CONT	SECT	JOB		HIGHWAY
REVISIONS	0052	05	047		US 84
	DIST	COUNTY			SHEET NO.
	05	LAMB, ETC.			47

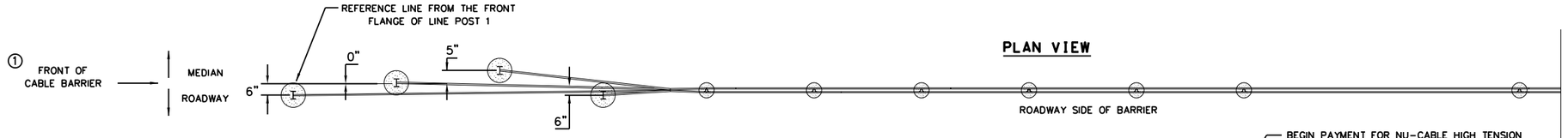
DATE:
FILE:



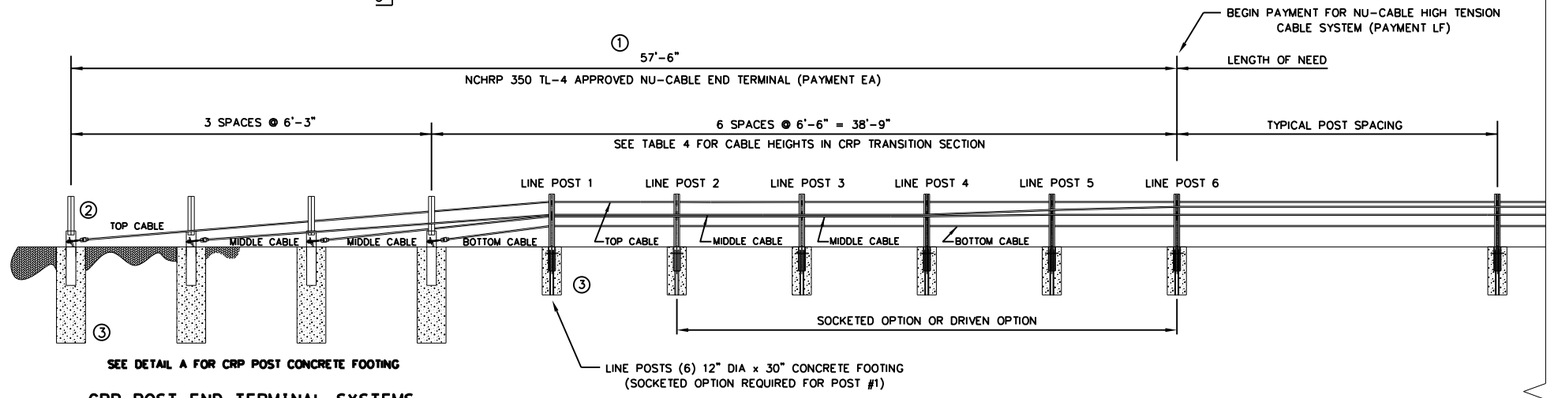
SECTION B-B
(CABLE RELEASE POST)



DETAIL A – CRP IN CONCRETE FOOTING ③
(3000 PSI MIN CONCRETE)



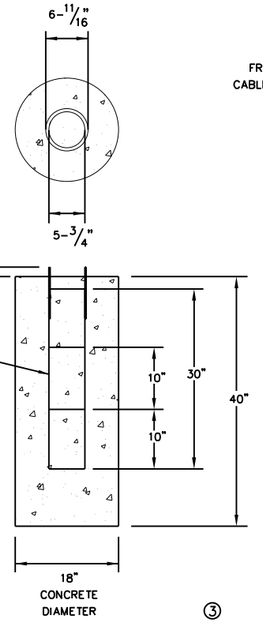
PLAN VIEW



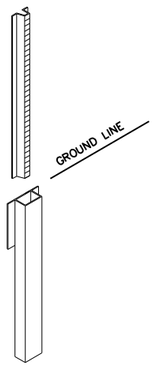
CRP POST END TERMINAL SYSTEMS

ELEVATION VIEW

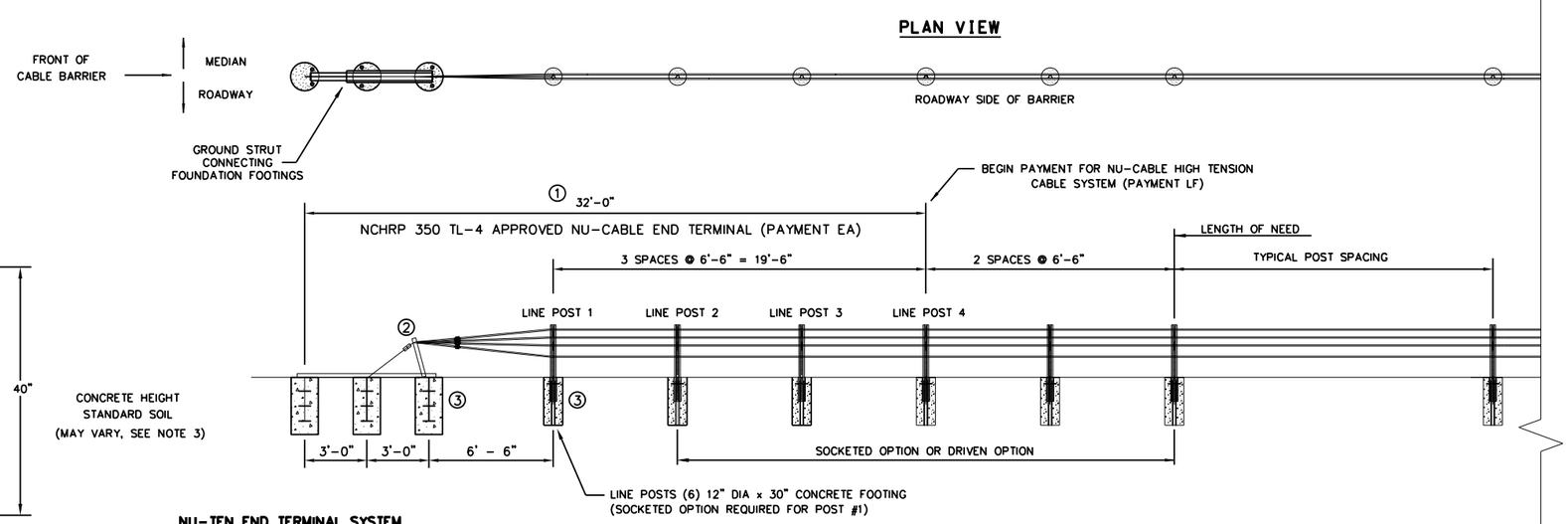
① THE OPPOSING END TREATMENTS ON A PARTICULAR RUN ARE MIRRORED IN THEIR LAYOUT.



NU-TEN CONCRETE FOOTING DETAIL



DRIVEN SOCKET OPTION



NU-TEN END TERMINAL SYSTEM

ELEVATION VIEW

④ **TABLE 4**

CRP END TERMINAL CABLE HEIGHTS - TL-4						
	LP 1	LP 2	LP 3	LP 4	LP 5	LP 6
TOP CABLE	34"	34"	34"	34"	34"	34"
UPPER-MIDDLE CABLE	27"	27"	27"	27"	28"	31"
BOTTOM-MIDDLE CABLE	24"	24"	24"	24"	24"	24"
BOTTOM CABLE	15"	15"	15"	15"	15"	15"

NOTES

1. THE OPPOSING END TREATMENTS ON A PARTICULAR RUN ARE MIRRORED IN THEIR LAYOUT. SYSTEM PAYMENT IS PER EACH (EA). REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL PAYMENT INFORMATION
2. REFER TO INSTALLATION MANUAL FOR CABLE END ASSEMBLY DETAIL.
3. ALL FOUNDATION DESIGNS ARE BASED ON NCHRP 350 STRONG (S1) SOIL. CONSULT THE MANUFACTURER FOR SPECIFIC FOUNDATION DESIGNS IF SOIL TYPES DIFFER.
4. SEE TABLE 4 CABLE HEIGHTS IN CRP TRANSITION SECTION.

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NU-CABLE BARRIER SYSTEM (TL-4) (4 CABLE)

NU-CABLE(TL4)-14

FILE:	DN:	CK:	DW:	CK:
©TxDOT:	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		48

Final Striping Summary						
BID ITEM			315-6004	315-6004	533-6003	666-6315
			FOG SEAL (AREA)	FOG SEAL (CSS-1H) (0.18 GAL/SY)	RUMBLE STRIPS	SY
Control Section	Station				SHLDR	4"
	FROM	TO	SY	GAL	LF	LF
0052-05-047	1340+25.00	1360+75.00	456	82.08	2050	2050
	1375+25.00	1395+75.00	456	82.08	2050	2050
PROJECT TOTALS:			912	164.16	4100	4100

Milled Rumble Strip Detail

Use Option 4 shown on RS(I)-13.

STATE OF TEXAS
NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Melch, P.E.
3/3/2022

Texas Department of Transportation

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			49
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	US84_Striping_SUM.dgn		

STRIPING & RUMBLE STRIP SUMMARY

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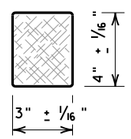
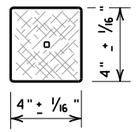
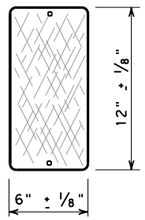
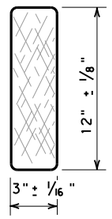
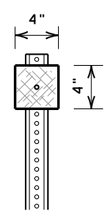
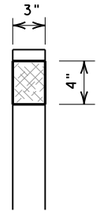
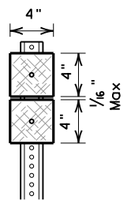
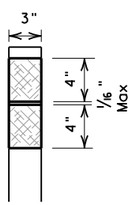
DATE:
FILE:

REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

	SINGLE		DOUBLE	
DEVICE				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

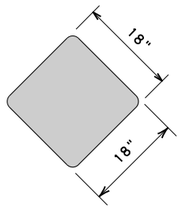
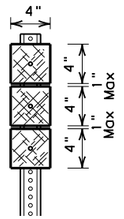
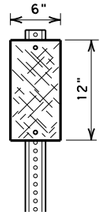
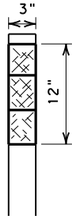
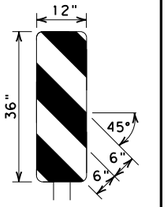
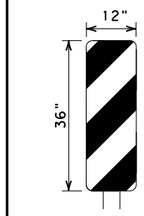
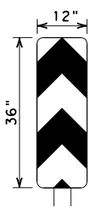
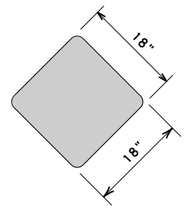
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

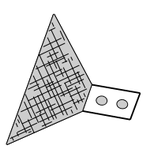
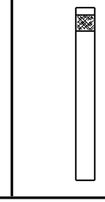
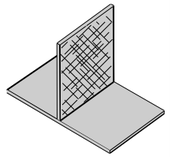
DIRECTION
If Required
BI = Bi-Directional

OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

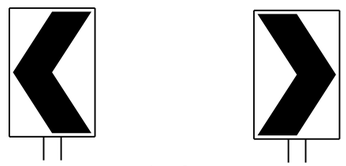
DEPARTMENTAL MATERIAL SPECIFICATIONS	
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE



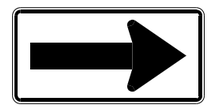
W1-8

SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



W1-6

SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:

Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

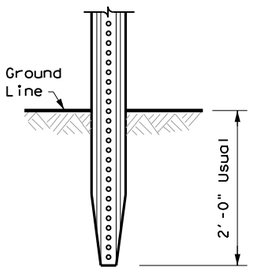
FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	05	LAMB, ETC.		50

20A

POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

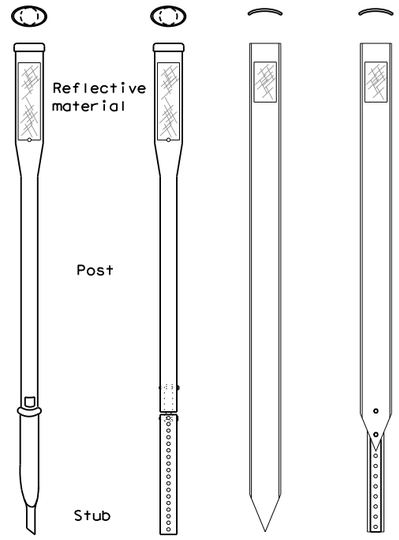


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

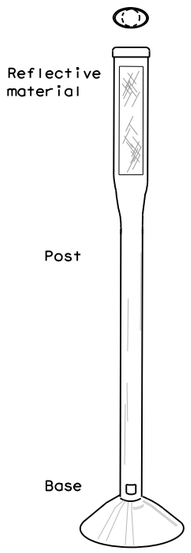
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



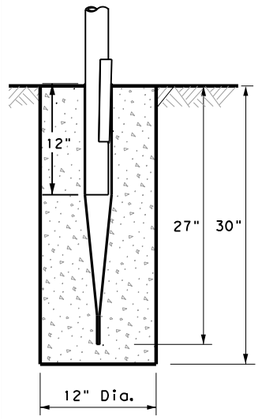
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

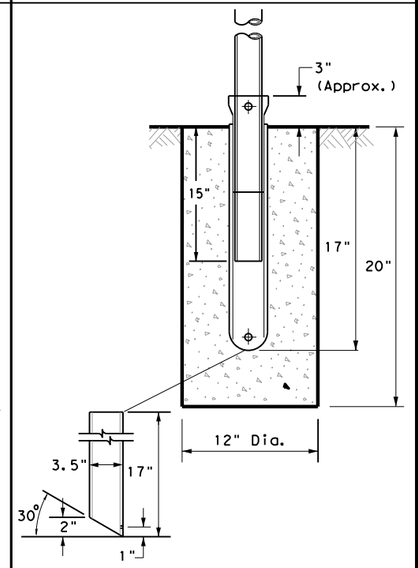
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

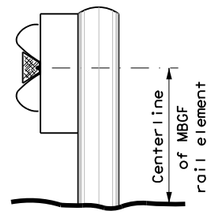
NOTE

1. Install per manufacturer's recommendations.

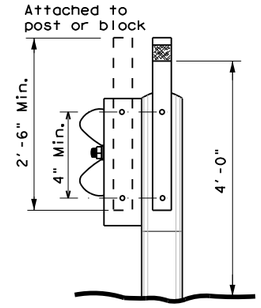
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

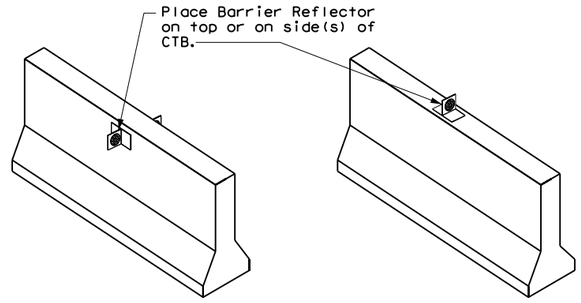
GF1



GF2



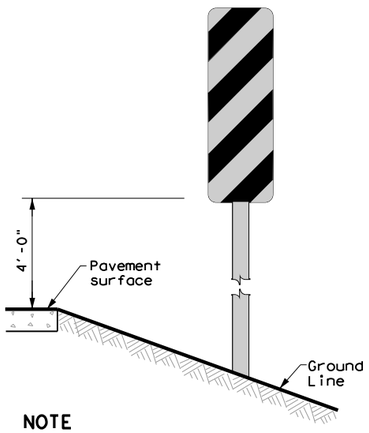
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

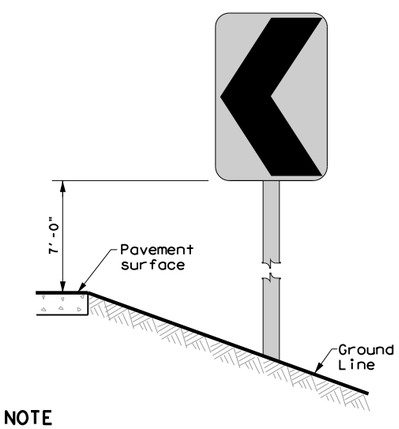
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

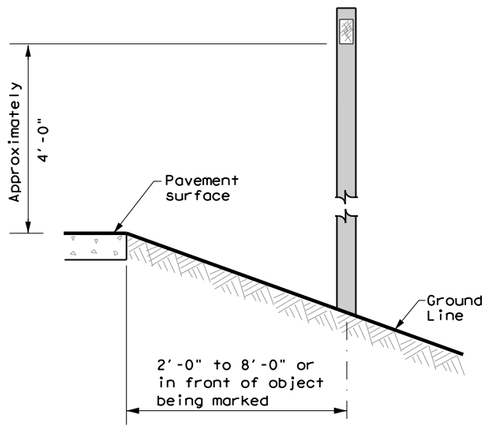
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

FILE: dom2-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	05	LAMB, ETC.		51

20B

DATE:
FILE:

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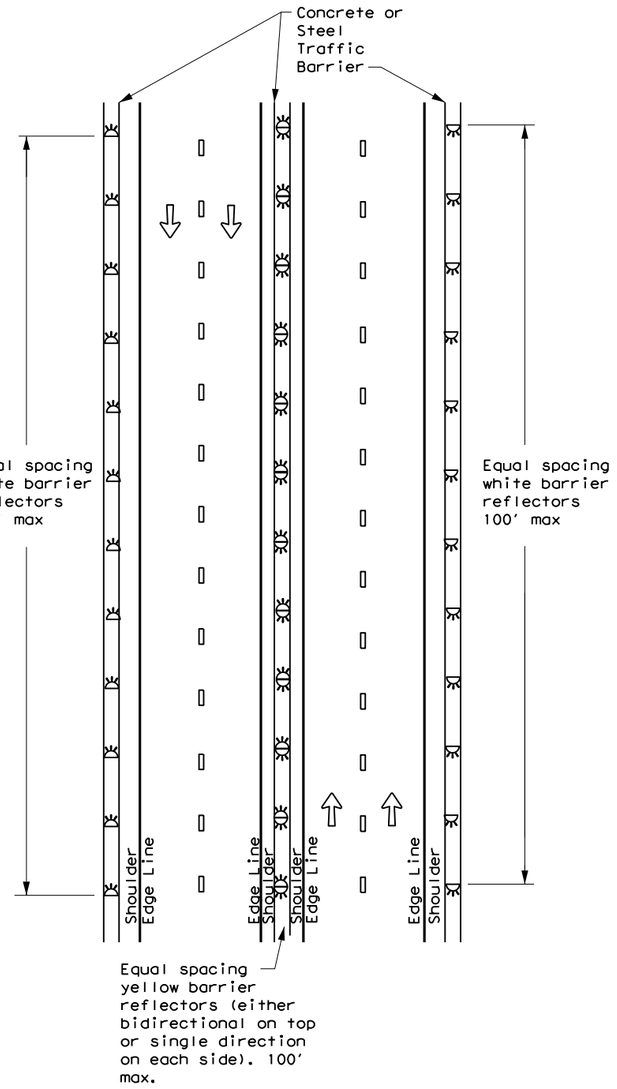
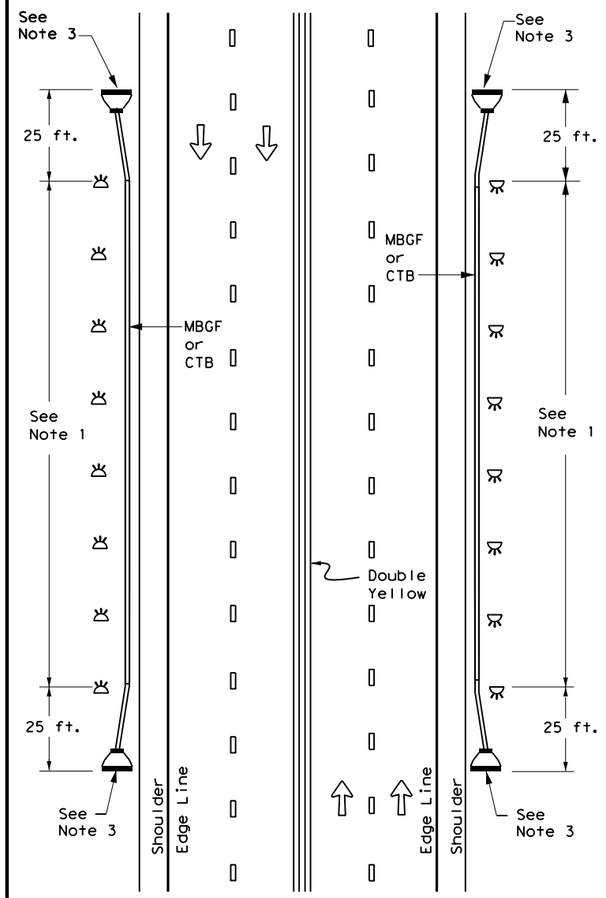
DATE:
FILE:

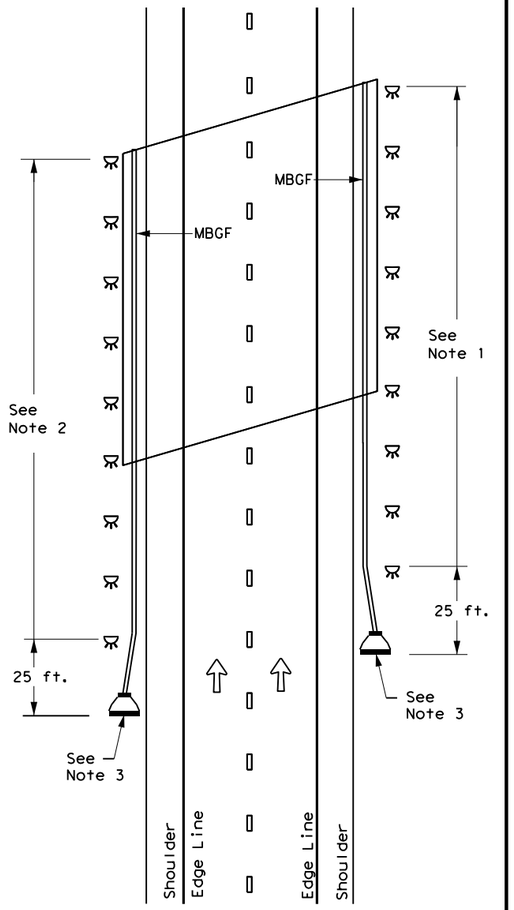
CONTINUOUS CONCRETE OR STEEL BARRIER



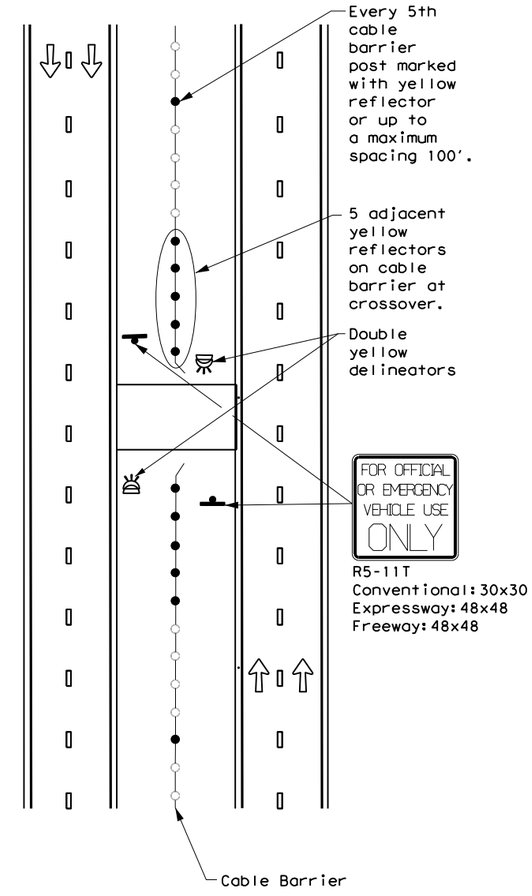
MULTI-LANE UNDIVIDED, TWO-WAY ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



DIVIDED ROADWAY WITH METAL BEAM GUARD FENCE (MBGF)



EMERGENCY CROSSOVER



NOTES

1. Equal spacing (100' max), but not less than 3 single directional white barrier reflectors or delineators. On Continuos Barrier, equal spacing (100' max.)
2. Equal spacing (100' max), but not less than 3 single directional yellow barrier reflectors or delineators.
3. Terminal ends require reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3)in front of the terminal end.

LEGEND

	Bidirectional Delineator
	Delineator
	OM-3
	OM-2
	Terminal End
	Traffic Flow

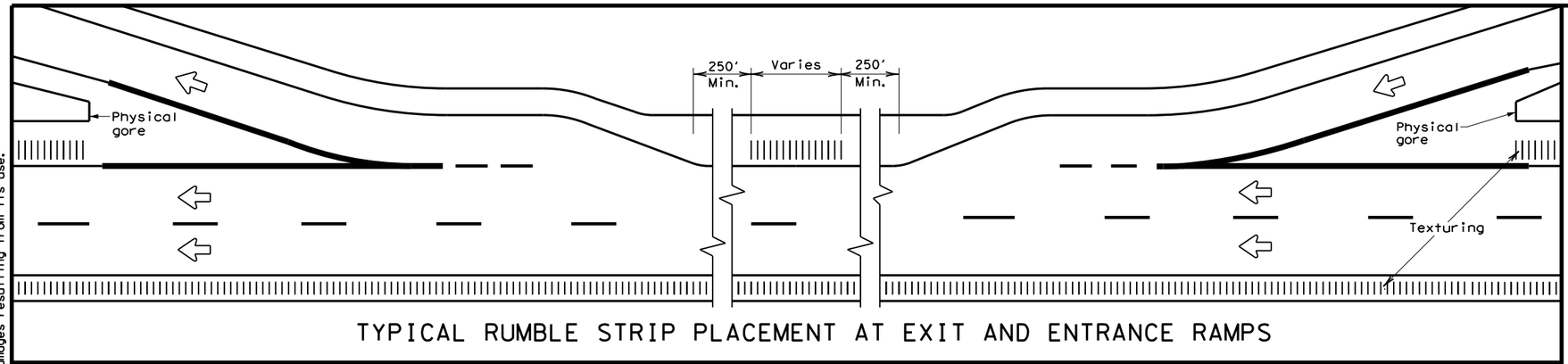
Texas Department of Transportation

Traffic Safety Division Standard

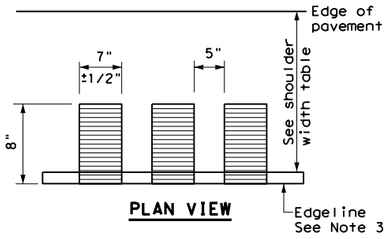
DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(6)-20

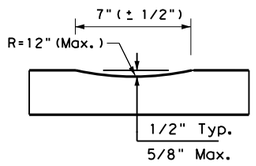
FILE: dom6-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT August 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
7-20	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		52



TYPICAL RUMBLE STRIP PLACEMENT AT EXIT AND ENTRANCE RAMPS

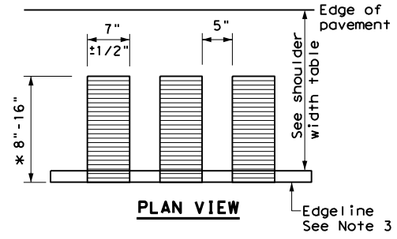


PLAN VIEW



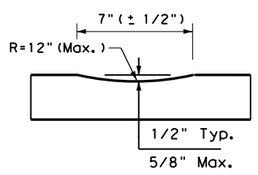
PROFILE VIEW
OPTION 1

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



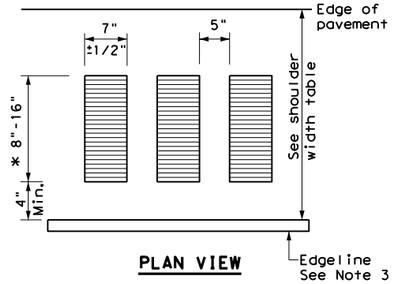
PLAN VIEW

* This distance may vary based on width of shoulder



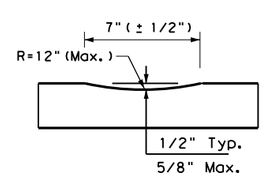
PROFILE VIEW
OPTION 2

CONTINUOUS MILLED DEPRESSIONS
(Rumble Stripes)



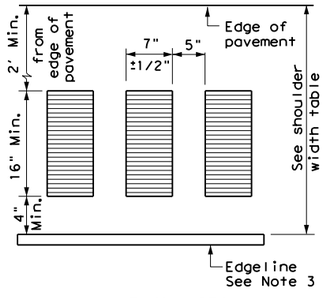
PLAN VIEW

* This distance may vary based on width of shoulder

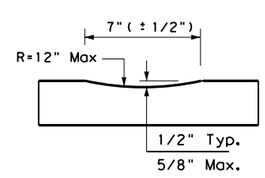


PROFILE VIEW
OPTION 3

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)



PLAN VIEW



PROFILE VIEW
OPTION 4

CONTINUOUS MILLED DEPRESSIONS
(Rumble Strips)

GENERAL NOTES

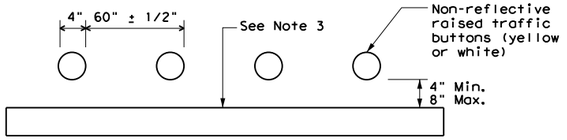
1. Rumble strips and profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.
2. Milled rumble strips are preferred when adequate pavement depth is available. If pavement thickness is less than 2 inches, milled rumble strips shall not be used. Rumble strips shall not be milled or depressed into bridge decks.
3. Use Standard Sheet PM(2) for positioning, dimensioning, and spacing of all reflective raised pavement markers, pavement markings, and profile markings.
4. See the table below for determining what options may be used for edgeline rumble strips.

WHEN INSTALLING MILLED DEPRESSION EDGELINE RUMBLE STRIPS:

5. See dimensions for milled rumble strips. Other shapes and dimensions may be used if approved by the Traffic Operations Division.
6. Pavement markings can be applied over milled shoulder rumble strips to create an edgeline rumble stripe.
7. Breaks in edgeline rumble strips shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossings, intersections and driveways with high usage of large trucks when installed on conventional highways.
8. Rumble strips shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
9. Consideration should be given to noise levels when edgeline rumble strips are installed near residential areas, schools, churches, etc. A minimum of 3/8 inches depth of milled rumble strip may be considered in these areas.
10. On roadways with high bicycle activity, consideration should be given before the installation of edgeline rumble strips. Things to consider include size of rumble strips, rumble strip material and location of rumble strips on the shoulder. If the designer determines that gaps are needed in the rumble strips due to bicycle use of the road, then follow the requirement shown in FHWA Technical Advisory T5040.39, or latest version. A detail of the spacing shall be included in the plans.

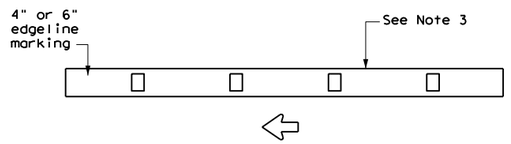
WHEN INSTALLING RAISED OR PROFILE EDGELINE RUMBLE STRIPS:

11. Raised rumble strips consisting of non-reflective raised traffic buttons may be used. Non-reflective raised traffic buttons can be affixed to asphalt or concrete with bitumen or adhesives, as per the manufacturer's recommendations.
12. Non-reflective traffic buttons shall be placed adjacent to the pavement marking delineating the edgeline when used as a rumble strip. The color of the button should match the color of the adjacent edgeline marking (white or yellow). The buttons will be paid for under Item 672, "Raised Pavement Markers." Non-reflective traffic buttons must meet the requirements of DMS-4300.
13. Non-reflective traffic buttons shall not be placed across exit or entrance ramps, acceleration and deceleration lanes, crossovers, gore areas or intersections with other roadways.
14. Breaks in edgeline rumble strips using raised traffic buttons shall occur at least 50 feet and no more than 150 feet in advance of bridges, railroad crossing, intersections and driveways with high usage of large trucks when installed on conventional highways.
15. The minimum distance between the edgeline and the buttons should be used if the shoulder is less than 8 feet in width.
16. Raised profile thermoplastic markings used as edgelines may substitute for buttons.



PLAN VIEW
OPTION 5

RAISED EDGELINE RUMBLE STRIPS



PLAN VIEW
OPTION 6

PROFILE EDGELINE MARKINGS

SHOULDER WIDTH TABLE		
EQUAL TO OR LESS THAN 2 FEET	GREATER THAN 2 FEET LESS THAN 4 FEET	EQUAL TO OR GREATER THAN 4 FEET
Option 1, 5 OR 6	Option 1, 2, 3, 5 or 6	Option 2, 4, 5 OR 6

Texas Department of Transportation

Traffic Operations Division Standard

EDGELINE RUMBLE STRIPS ON FREEWAYS AND DIVIDED HIGHWAYS
RS(1)-13

FILE: rs(1)-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2006	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-10 10-13	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		53

DATE:
FILE:

DATE:
FILE:

I. WORK AT CROSSING LOCATIONS (AT GRADE, HIGHWAY OVERPASS, HIGHWAY UNDERPASS, PEDESTRIAN, OR CLOSED/ABANDONED)

A. DOT #: 014891K
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 60.88
RR Subdivision: SLATON
City: LITTLEFIELD
County: LAMB
CSJ at this Crossing: 0052-05-047
Highway/Roadway name crossing the railroad: FM 1072
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

B. DOT #: 014892S
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 62.24
RR Subdivision: SLATON
City:
County: LAMB
CSJ at this Crossing: 0052-05-047
Highway/Roadway name crossing the railroad: CR 267
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

C. DOT #: 014893Y
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 63.56
RR Subdivision: SLATON
City:
County: LAMB
CSJ at this Crossing: 0052-05-047
Highway/Roadway name crossing the railroad: CR 277
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

D. DOT #: 014894F
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 63.88
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-026
Highway/Roadway name crossing the railroad: TENNESSEE RD
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

E. DOT #: 014895M
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 65.44
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-026
Highway/Roadway name crossing the railroad: FM 597
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
3/2020	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		54

F. DOT #: 014898H
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 66.21
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-026
Highway/Roadway name crossing the railroad: FM 168 SPADE RD
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

G. DOT #: 014899P
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 67.51
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-027
Highway/Roadway name crossing the railroad: ONION SHED RD
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

H. DOT #: 014900G
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 68.81
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-027
Highway/Roadway name crossing the railroad: KING RD
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

I. DOT #: 014901N
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 70.00
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-027
Highway/Roadway name crossing the railroad: FM 2130
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

H. DOT #: 014902V
Crossing Type: ** AT GRADE
RR Company Owning Track at Crossing: BNSF
Operating RR Company at Track: BNSF
RR MP: 70.45
RR Subdivision: SLATON
City: ANTON
County: HOCKLEY
CSJ at this Crossing: 0052-06-027
Highway/Roadway name crossing the railroad: MAINE ST
# of regularly scheduled trains per day at this crossing: 16
# of switching movements per day at this crossing: 0
% of estimated contract cost of work within railroad ROW: $0

Scope of Work at this Crossing to Be Performed by State Contractor:
N/A

Scope of Work at this Crossing to Be Performed by Railroad Company:
N/A

** Choose: Highway Overpass, Highway Underpass, At Grade, Pedestrian, or Closed/Abandoned

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn		DN: TxDOT	CK:	DW:		CK:	
© TxDOT June 2014		CONT	SECT	JOB		HIGHWAY	
REVISIONS		0052	05	047		US 84	
3/2020		DIST	COUNTY			SHEET NO.	
		05	LAMB, ETC.			55	

DATE:
FILE:

DATE:
FILE:

II. OTHER PROJECT WORK WITHIN RAILROAD RIGHTS-OF-WAY (ROW)

N/A

III. FLAGGING & INSPECTION

of Days of Railroad Flagging Expected: ____

On this project, night or weekend flagging is:

☐ Expected

☒ Not Expected

Flagging services will be provided by:

☐ Railroad Company: TxDOT will pay flagging invoices

☐ Outside Party: Contractor will pay flagging invoices, to be reimbursed by TxDOT

Contractor must incorporate flaggers into anticipated construction schedule. The Railroad requires a 30 day notice if their flaggers are to be utilized. If Contractor falls behind schedule due to their own negligence and is not ready for scheduled flaggers, any flagging charges will be paid by Contractor.

Contact Information for Flagging:

☐ UPRR - UP.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ BNSF - BNSF.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging

☐ KCS - KCS.info@railpros.com
Call Center 877-315-0513, Select #1 for flagging
- Bottom Line On-Track Safety Services
bottomline076@aol.com, 903-767-7630

☐ OTHERS _____

Contractor must incorporate Construction Inspection into anticipated construction schedule.

☒ Not Required

☐ Required: Contact Information for Construction Inspection:

IV. CONSTRUCTION WORK TO BE PERFORMED BY THE RAILROAD

On this project, construction work to be performed by a railroad company is:

☐ Required

☒ Not Required

Coordinate with TxDOT for any work to be performed by the Railroad Company. TxDOT must issue a work order for any work done by the Railroad Company prior to the work being performed.

V. RAILROAD INSURANCE REQUIREMENTS

Railroad reference number shall be provided by TxDOT CST or DO.

The Contractor shall confirm the insurance requirements with the Railroad as the insurance limits are subject to change without notice.

Insurance policies must be issued for and on behalf of the Railroad. Where more than one Railroad Company is operating on the same right of way or where several Railroad Companies are involved and operate on their own separate rights of way, provide separate insurance policies in the name of each Railroad Company.

No direct compensation will be made to the Contractor for providing the insurance coverages shown below or any deductibles. These costs are incidental to the various bid items.

Type of Insurance	Amount of Coverage (Minimum)
Workers Compensation	$500,000 / $500,000 / $500,000
Commercial General Liability	$2,000,000 / $4,000,000
Business Automobile	$2,000,000 combined single limit
Railroad Protective Liability	
☒ Not Required	
☐ Non - Bridge Projects	$2,000,000 / $6,000,000
☐ Bridge Projects	$5,000,000 / $10,000,000
☐ Other	

VI. CONTRACTOR'S RIGHT OF ENTRY (ROE) AGREEMENT

On this project, an ROE agreement is:

☒ Not Required

☐ Required: TxDOT CST to assist in obtaining with the UPRR (see Item 5, Article 8.3)

☐ Required: Contractor to obtain (see Item 5, Article 8.4)

With the following railroad companies: _____

To view previously approved ROE Agreement templates agreed upon between the State and Railroad, see:

http://www.txdot.gov/inside-txdot/division/rail/samples.html

Approved ROE Agreement templates are not to be modified by the Contractor.

Contractor shall not operate within Railroad Right of Way without an executed Construction & Maintenance Agreement between the State and the Railroad and an executed ROE agreement between the Contractor and the Railroad if required on project.

VII. RAILROAD COORDINATION MEETING

On this project, a Railroad Coordination Meeting is:

☒ Not Required

☐ Required

See Item 5, Article 8.1 for more details.

VIII. SUBCONTRACTORS

Contractor shall not subcontract work without written consent of TxDOT. Subcontractors are required to maintain the same insurance coverage as required of the Contractor.

IX. EMERGENCY NOTIFICATION

In Case of Railroad Emergency
Call BNSF
Railroad Emergency Line at 1-800-832-5452

Location: DOT 014891K
RR Milepost: 60.88 Subdivision: SLATON

Location: DOT 014892S
RR Milepost: 62.24 Subdivision: SLATON

Location: DOT 014893Y
RR Milepost: 63.56 Subdivision: SLATON

Location: DOT 014894F
RR Milepost: 63.88 Subdivision: SLATON

Location: DOT 014895M
RR Milepost: 65.44 Subdivision: SLATON

Location: DOT 014898H
RR Milepost: 66.21 Subdivision: SLATON

Location: DOT 014899P
RR Milepost: 67.51 Subdivision: SLATON

Location: DOT 014900G
RR Milepost: 68.81 Subdivision: SLATON

Location: DOT 014901N
RR Milepost: 70.00 Subdivision: SLATON

Location: DOT 014902V
RR Milepost: 70.45 Subdivision: SLATON

Texas Department of Transportation | Rail Division

RAILROAD SCOPE OF WORK
PROJECT SPECIFIC DETAILS

FILE: RR Scope of Work.dgn	DN: TxDOT	CK:	DW:	CK:
© TxDOT June 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
3/2020	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		56

PART 1 - GENERAL

1.01 DESCRIPTION

This project includes construction work within the right of way and/or properties of the Railroad and adjacent to its tracks, wire lines and other facilities. These sheets describe the minimum special requirements for coordination with the Railroad when working upon, over or under Railroad Right of Way or when impacting current or future Railroad operations. Coordinate with the Railroad while performing the work outlined herein, and afford the same cooperation with the Railroad as with TxDOT. Complete all submittals and work in accordance with TxDOT Standard Specifications, Railroad Guidelines and AREMA recommendations as modified by these minimum special requirements or as directed in writing by the Railroad Designated Representative.

For purposes of this project, the Railroad Designated Representative is the person or persons designated by the Railroad Manager of Industry and Public Projects to handle specific tasks related to the project.

1.02 REQUEST FOR INFORMATION / CLARIFICATION

Submit Requests for Information ("RFI") involving work within any Railroad Right of Way to the TxDOT Engineer. The TxDOT Engineer will submit the RFI to the Railroad Designated Representative for review and approval for RFI's corresponding to work within Railroad Right of Way. Allow six (6) weeks total time for review and approval, which includes four (4) weeks for review and approval by the Railroad.

1.03 PLANS / SPECIFICATIONS

TxDOT has received written Railroad approval of the plans and specifications for this project. Any revisions or changes in the plans after award of the Contract must have the approval of TxDOT and the Railroad.

PART 2 - UTILITIES AND FIBER OPTIC

Construct all utility installations in accordance with current AREMA recommendations, Railroad, TxDOT and owning utility specifications and requirements. Railroad general guidelines can be found on the Railroad website or by contacting the Railroad Designated Representative.

PART 3 - CONSTRUCTION

3.01 GENERAL

A. Perform all work in compliance with all applicable Railroad, Federal Railroad Administration (FRA), and TxDOT rules and regulations. Arrange and conduct work in a manner that does not endanger or interfere with the safe operation of the tracks and property of the Railroad and the traffic moving on such tracks, or the wires, signals and other property of the Railroad, its tenants or licensees, at or in the vicinity of the Work. The safe operation of railroad train movements takes precedence over any work to be performed by the Contractor. The Contractor is responsible for train delay cost and lost revenue claims due to any delays or interruption of train operations resulting from Contractor's construction or other activities.

B. Construction activities within 15 feet of the operational tracks will only be allowed if absolutely necessary and the Railroad's Designated Representative grants approval. Construction activities within 15 feet of the operational track(s) preferably allow the tracks to stay operational. In such cases, coordination and approval by the Railroad Track Manager is required with regard to schedule, flagging, and slow orders. See Sections 3.07 and 3.08 for additional information.

C. Provide track protection for all work equipment (including rubber tired equipment) operating within 25 feet from nearest rail. When not in use, keep Contractor machinery and materials at least 50 feet from the Railroad's nearest track.

D. Vehicular crossings of railroad track are allowed only at existing crossings, or haul road crossings developed with Railroad approval.

E. The Contractor is also advised that new railroad facilities within the project may be built by the Railroad. If applicable, these facilities are delineated in the plans. Be aware of the limits of responsibilities and coordinate efforts with the Railroad and TxDOT.

F. Railroad requirements do not allow work within 50 feet of track centers when a train passes the work site and all personnel must clear the area within 50 feet of the track centerline and secure all equipment. Additional allowances may be pursued as outlined in 3.02 and 3.03.

G. All permanent clearances shall be verified before project closing.

3.02 RAILROAD OPERATIONS

A. Trains and/or equipment are expected on any track, at any time, in either direction. Become familiar with the train schedules in this location and structure bid assuming intermittent track windows in this period, as defined in Paragraph B that follows.

B. All railroad tracks within and adjacent to the contract site are active, and rail traffic over these facilities shall be maintained throughout the Project. Activities may include both through moves and switching moves to local customers. railroad traffic and operations will occur continuously throughout the day and night on these tracks and shall be maintained at all times as defined herein. Coordinate and schedule the work so that construction activities do not interfere with railroad operations.

C. Coordinate work windows with TxDOT and the Railroad's Designated Representative. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

1. Conditional Work Window: A Conditional Work Window is a period of time that railroad operations have priority over construction activities. When construction activities may occur on and/or adjacent to the railroad tracks within 25 feet of the nearest track, a railroad flag person will be required. At the direction of the railroad flag person, upon approach of a train, and when trains are present on the tracks, the tracks must be cleared (i.e., no construction equipment, materials or personnel within 25 feet, or as directed by the Railroad Designated Representative, from the tracks). Conditional Work Windows are available for the Project.

2. Absolute Work Window: An Absolute Work Window is a period of time that construction activities are given priority over railroad operations. During this time frame, the designated railroad track(s) will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window, the railroad tracks and/or signals must be completely operational for train operations and all Railroad, Public Utilities Commission (PUC) and FRA requirements, codes and regulations for operational tracks must be satisfied. In the situation where the operating tracks and/or signals have been affected, the Railroad will perform inspections of the work prior to placing that track back into service. Railroad flag persons will be required for construction activities requiring an Absolute Work Window. Absolute Work Windows will not generally be granted. Any request will require a detailed explanation for Railroad review.

3.03 RIGHT OF ENTRY, ADVANCE NOTICE AND WORK STOPPAGES

A. Do not perform any work within Railroad Right of Way without a valid executed Right of Entry Agreement if required on this project.

B. Give advance notice to the Railroad as required in the "Contractor's Right of Entry Agreement" before commencing work in connection with construction upon or over Railroad Right of Way and observe the Railroad's rules and regulations with respect thereto.

C. Perform all work upon Railroad Right of Way in a manner to avoid interference with or endanger the operations of the Railroad. Whenever work may affect the operations or safety of trains, submit the work method to the Railroad Designated Representative for approval. Approval does not relieve the Contractor from liability. Do not commence any work which requires flagging service or inspection service until the flagging protection required by the Railroad is available at the job site. See Section 3.15 for railroad flagging requirements.

D. Make requests in writing for both Absolute and Conditional Work Windows, at least 30 days in advance of any work. Include in the written request:
1. Exactly what the work entails.
2. The days and hours that work will be performed.
3. The exact location of work, and proximity to the tracks.
4. The type of window requested and the amount of time requested.
5. The designated contact person.

Provide a written confirmation notice to the Railroad at least 48 hours before commencing work in connection with approved work windows when work is within 25 feet of nearest rail. Perform all work in accordance with previously approved work plans.

E. Make provisions to protect operations and property of the Railroad should a condition arising from, or in connection with the work, require immediate and unusual action. If in the judgment of the Railroad Designated Representative such provisions are insufficient, the Railroad Designated Representative may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense and without cost to the Railroad or TxDOT. The Railroad or TxDOT shall have the right to order the Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of the Railroad Designated Representative, the Contractor's operations could endanger railroad operations. In the event of such an order, immediately notify TxDOT of the order.

3.04 INSURANCE

Do not begin work upon or over Railroad Right of Way until furnishing the Railroad with the insurance policies, binders, certificates and endorsements required by the "Contractor's Right of Entry Agreement", and until the Railroad Designated Representative has advised TxDOT that such insurance is in accordance with the Agreement.

3.05 RAILROAD SAFETY ORIENTATION

A. Complete the railroad course "Orientation for Contractor's Safety", and maintain current registration prior to working on railroad property. This course is required to be completed annually by Contractor and Subcontractor personnel working on site.

"UPRR, BNSF, KCS/TEXMEX will not accept on-track safety training certificates from other railroads. Refer to Railroad specific contractor right of entry for training information."

B. Know and follow the "Contractor's Right of Entry Agreement" EXHIBIT D, MINIMUM SAFETY REQUIREMENTS regarding clothing, personal protective equipment, and general safety requirements.

3.06 COOPERATION

The Railroad will cooperate with Contractor so that work may be conducted in an efficient manner, and will cooperate with Contractor in enabling use of Railroad Right of Way in performing the work.

3.07 MINIMUM CONSTRUCTION CLEARANCES FOR FALSEWORK AND OTHER TEMPORARY STRUCTURES

Abide by the following minimum temporary clearances during the course of construction:
A. 15' - 0" (BNSF)(UPRR)and 14'-0" (KCS) horizontal from centerline of track
B. 22' (KCS) and 21' - 6" (UPRR & BNSF) vertically above top of rail.

For construction clearance less than listed above, obtain local Railroad Operating Unit review and approval.

3.08 APPROVAL OF REDUCED CLEARANCES

A. Maintain minimum track clearances during construction as specified in Section 3.07.

B. Submit any proposed infringement on the specified minimum clearances to the Railroad Designated Representative through TxDOT at least 30 days in advance of the work. Do not proceed with such infringement without written approval by the Railroad Designated Representative.

C. Do not commence work involving an approved infringement without receiving written assurance from the Railroad Designated Representative that arrangements have been made for any necessary flagging service.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		57

DATE:
FILE:

3.09 MAINTENANCE OF RAILROAD FACILITIES

A. Maintain all ditches and drainage structures free of silt or other obstructions resulting from Contractor's operations. Repair eroded areas and any other damage within Railroad Right of Way and repair any other damage to the property of the Railroad, or its tenants.

B. Perform all such maintenance and repair of damages due to the Contractors's operations at Contractor's expense.

C. Submit a proposed method of erosion control for review by the Railroad prior to beginning any grading on the project site. Comply with all applicable local, state and federal regulations when developing and implementing such erosion control.

3.10 SITE INSPECTIONS BY RAILROAD's DESIGNATED REPRESENTATIVE

A. In addition to the office reviews of construction submittals, site inspections may be performed by the Railroad Designated Representative at significant points during construction, including the following if applicable:
   1. Pre-construction meetings.
   2. Pile driving/drilling of caissons or drilled shafts.
   3. Reinforcement and concrete placement for railroad bridge substructure and/or superstructure.
   4. Erection of precast concrete or steel bridge superstructure.
   5. Placement of waterproofing (prior to placing ballast on bridge deck).
   6. Completion of the bridge structure.

B. Site inspection is not limited to the milestone events listed above. Site visits to check progress of the work may be performed at any time throughout the construction as deemed necessary by the Railroad.

C. Provide a detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to TxDOT for submittal to the Railroad Designated Representative for review prior to commencement of work. Include the anticipated dates when the above listed events will occur. Update this schedule for the above listed events as necessary and each month at a minimum to allow the Railroad to schedule site inspections.

3.11 RAILROAD REPRESENTATIVES

Railroad representatives, conductors, flag person or watch person will be provided by the Railroad at expense of TxDOT to protect Railroad facilities, property and movements of its trains or engines. In general, the Railroad will furnish such personnel or other protective services as follows:

A. When any part of any equipment is standing or being operated within 25 feet, measured horizontally, from nearest rail of any track on which trains may operate, or when any object is off the ground and any dimension thereof could extend inside the 25 foot limit, or when any erection or construction activities are in progress within such limits, regardless of elevation above or below track.

B. For any excavation below elevation of track subgrade if, in the opinion of the Railroad Designated Representative, track or other railroad facilities may be subject to settlement or movement.

C. During any clearing, grubbing, excavation or grading in proximity to railroad facilities, which, in the opinion of the Railroad Designated Representative, may endanger railroad facilities or operations.

D. During any Contractor's operations when, in the opinion of the Railroad Designated Representative, railroad facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.

E. Arrange with the Railroad Designated Representative to provide the adequate number of flag persons to accomplish the work.

3.12 COMMUNICATIONS AND SIGNAL LINES

If required, the Railroad will rearrange its communications and signal lines, its grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by the Railroad's forces in connection with its operation at expense of TxDOT. This work by the Railroad will be done by its own forces and it is not a part of the Work under this Contract.

3.13 TRAFFIC CONTROL

Coordinate any operations that control traffic across or around railroad facilities with the Railroad Designated Representative.

3.14 CONSTRUCTION EXCAVATIONS AND BORING ACTIVITIES UNDER TRACK

A. Take special precaution and care in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls or other facilities that require shoring shall comply with requirements of TxDOT, OSHA, AREMA and Railroad "Guidelines for Temporary Shoring".

B. The project plans indicate whether there are fiber optic lines or other such telecommunications systems that require consideration. Regardless, contact the necessary call center to determine if such cable systems are present:

   UPRR 1-800-336-9193
   7:00 AM to 9:00 PM CST Monday-Friday except holidays,
   staffed 24 hrs/day for emergencies
   48 hrs notice required

   BNSF 1-800-533-2891
   24 hour number
   5 working days notice required

   KCS 1-800-344-8377
   Texas One Call, a 24 hour number
   48 hrs notice required, excluding weekends and holidays

   If a telecommunications system is buried anywhere on or near railroad property, coordinate with TxDOT, the Railroad and the Telecommunication Company(ies) to arrange for relocation or protective measures prior to beginning work on or near railroad property. Refer to the project General Notes for additional information.

C. Projects involving a boring or jack and bore operation under track such as drainage pipes or culverts and utilities require an installation plan reviewed and approved by the Railroad and TxDOT prior to proceeding with such construction. A railroad inspector and contractor assisted monitoring of ground and track movement is required to maintain safe passage of rail traffic. Stop installation and do not allow passage of trains if movements in excess of 1/4 inch vertical or horizontal is detected in the tracks. Immediately repair the damage to the satisfaction of TxDOT and the Railroad before proceeding.

3.15 RAILROAD FLAGGING

Per the Right of Entry Agreement for flagging, notify the Railroad Representative at least 10 working days in advance of Contractor's work and at least 30 working days in advance of any Contractor's work in which any person or equipment will be within 25 feet of nearest rail or as specified in the Contractor Right of Entry (CROE).

3.16 CLEANING OF RIGHT-OF-WAY

When work is complete, remove all tools, implements, and other materials brought into Railroad Right of Way and leave the right of Way in a clean and presentable condition to the satisfaction of TxDOT and the Railroad.

Texas Department of Transportation | Rail Division

RAILROAD REQUIREMENTS FOR NON-BRIDGE CONSTRUCTION PROJECTS

FILE:	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT October 2018	CONT	SECT	JOB	HIGHWAY
REVISIONS March 2020	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		58

DATE:
FILE:

STORM WATER POLLUTION PREVENTION PLAN (SW3P):

This SW3P has been developed in accordance with TPDES General Permit TXR150000. The operator, the Texas Department of Transportation, provides project specifications for the development of adequate BMPs. The contractor shares responsibility for implementing the BMPs described herein. The contactor shall implement changes approved by the Project Engineer to the SW3P within the time specified in the SW3P or in the TPDES Construction General Permit. See EPIC sheet for a list of the MS4 Operators.

1. SITE OR PROJECT DESCRIPTION:

a. NATURE OF THE CONSTRUCTION ACTIVITY:
TxDOT (Lubbock District) is constructing a Cable Barrier in the median on US 84, in Lamb County, from FM 1072 to the Lubbock County Line, in Hockley County. The construction will consist of drilling, new cable, new posts, crossover elimination, concrete mow strip, pavement markings, and striping.

b. POTENTIAL POLLUTANTS AND SOURCES:

Sediment laden storm water	Storm water conveyance over disturbed areas
Fuels, oils, and lubricants	Construction vehicles and storage areas
Construction debris and waste	Various construction activities
Sanitary waste	Restroom facilities
Trash	Construction site and receptacles
Concrete Washout Water	Concrete Trucks, Concrete Pump Trucks, Paving Equipment

Potential pollutants will primarily be from sediments leaving the right-of-way and petroleum products. Principle sources of pollutants will be: disturbed soil from grading, excavation, embankment, and other roadway construction activities; litter and debris from construction activities; gasoline, oil, and grease from asphalt distributor vehicles, scrappers, trucks, rollers, compactors, and fuel trucks during daily, routine operations.

c. SEQUENCE OF ACTIVITIES THAT WILL DISTURB SOILS:
1. Drilling for new posts, addition of concrete mow strip and crossover elimination.

d. AREAS:

TOTAL AREA OF PROJECT:	0052-05-047	58.736 ACRES
	0052-06-026	99.112 ACRES
	0052-06-027	122.094 ACRES
	Project Total	279.942 ACRES
TOTAL AREA OF SOIL DISTURBANCE:	0052-05-047	8.572 ACRES
	0052-06-026	6.917 ACRES
	0052-06-027	8.140 ACRES
	Project Total	23.629 ACRES
TOTAL AREA OF OFF-SITE PSL:	To be determined when construction begins	

e. DATA DESCRIBING THE SOIL:
The area's predominate soil types for Lamb and Hockley Counties are Portales Loam & Olton Clay Loam, respectively. Pre-construction soils are covered 60% to 70% with various turf grasses, weeds and brush. The soils are friable and in dry weather condtions may be picked up by regional winds. The local climate for both counties is semi-arid (19.3" average annual rain).

WATER QUALITY ASSESSMENT: A site (visual & odor) assessment of water quality will be perfomed once construction begins.

f. GENERAL LOCATION MAP: SEE TITLE SHEET TO PROJECT PLANS.

g. DETAILED SITE MAP: SEE SW3P PLAN SHEET AND/OR TYPICAL SECTIONS AND PLAN SHEETS

h. THE LOCATION AND DESCRIPTIONS OF SUPPORT ACTIVITIES AUTHORIZED UNDER THE PERMITEE'S NOI: There are no asphalt or concrete batch plants providing support to the project authorized under the Lubbock District's (TxDOT) NOI.

I. NAME OF RECEIVING WATERS: Multiple playa lakes along the length of the project and Yellowhouse Draw.

j. A COPY OF TPDES CGP TXR150000 IS INCLUDED IN THE SW3P FILE.

k. A COPY OF THE NOI, ACKNOWLEDGEMENT CERTIFICATE AND/OR CONSTRUCTION SITE NOTICE IS IN THE PROJECT SW3P FILE

2. DESCRIPTION OF BMPs USED TO MINIMIZE POLLUTION IN RUNOFF:

EROSION AND SEDIMENT CONTROLS: if it is necessary to pump water, BMP's shall be used to reduce the off-site transport of sediment. BMP's shall be installed per the manufacturer specifications or as directed by the Engineer.

GENERAL SCHEDULE FOR IMPLEMENTATION OF SW3P CONTROLS

CONTROL	IMPLEMENTATION SCHEDULE AND DESCRIPTION	REMOVAL SCHEDULE
general, various controls	control measures are to be provided at a time and in a manner that will minimize impacts to receiving waters	at final stabilization; at the resumption of construction (temporary measures); at the direction of the SW3P plan; at the direction of the project manager
rock filter dams	to be installed prior to soil disturbing activities in the surrounding areas	at final stabilization or as directed by the project engineer
sandbag berms	to be installed prior to the start of construction; sandbag berms are to serve as water velocity dissipaters, as ditch blocks, as sedimentation basins, in support of other control devices, and as a final multiple control for water leaving the construction zone	at final stabilization or as directed by the project engineer
silt fence	silt fence will be installed prior to the start of construction along right-of-way lines silt fence will be installed as quickly as feasible (where it is reasonable to do so) at the toe of header bank and other slopes silt fence may be installed at the start of construction, during construction as appropriate, and during construction to support other controls as needed	at final stabilization or as directed by the project engineer at final stabilization or as directed by the project engineer at the removal of the construction exit, at final stabilization, or as directed by the project engineer
tackifiers	soil tackifiers may be used to control dust	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 20)
water	to be used to suppress dust and compact dirt on an as needed schedule	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 20)
seed, temporary	to be installed, when apprppriate, in disturbed areas where construction has temporarily ceased for 21 days	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 20)
seed, permanent	to be installed as a final stabilization measure where construction is complete or as directed by the Engineer	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 20)
construction exits	to be installed at all construction vehicle exit points to publicly traveled ways prior to the use of these exits by construction vehicles	as directed by construction conditions or by the Engineer
erosion control logs	to be installed prior to the start of construction; erosion control logs are to serve as water velocity dissipaters, as ditchblocks, as sedimentation basins, and in support of other control devices.	as directed by construction conditions or by the Engineer
soil retention blankets	to be installed as a final stabilization measure where construction is complete or as directed by the Engineer	erosion controls that are designed to remain in-place for a indefinite period, such as mulches and fiber mats, are not required to be removed or scheduled for removal (CGP, page 20)
inlet protectors	to be installed to cover curb inlets with support from sandbags or as directed by the Engineer	as directed by construction conditions or by the Engineer
compost socks	to be installed as channel blocks, inlet protectors, and to support sandbag berms, silt fences or as directed by the Engineer	as directed by construction conditions or by the Engineer

Note: this is a general schedule for the installation of and removal of SW3P best management practice controls, the final determination of the implementation and removal of controls is at the discretion of the project engineer.

Note: control measures must be properly selected, installed, and maintained according to the manufacturer's or designer's specifications. If periodic inspections or other information indicates control has been used incorrectly, or that the control is performing inadequately, the operator must replace or modify the control as soon as practicable after the discovery that the control has been used incorrectly, is performing inadequately, or is damaged.

Note: sediment must be removed from traps and sedimentation ponds no later than the time that design capacity has been reduced by 50 percent.

Note: if sediment escapes the site, accumulations must be removed at a frequency to minimize further negative effects, and whenever feasible, prior to the next rain event.

Note: controls must be developed to limit, to the extent practicable, the off-site transport of litter, construction debris, and construction materials.

Note: erosion and sediment controls must be designed to retain sediment on-site to the extent practicable with consideration for local topography, soil type, and rainfall. Controls must also be designed and utilized to reduce the off-site transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water.

STABILIZATION PRACTICES: The SW3P must include a description of interim and permanent stabilization practices, including a schedule describing when these practices will be implemented.
1. Water: water will be used to temporarily suppress dust and compact dirt.
2. Tackifiers: tackifiers such as asphalt emulsion, guar, (and other natural tackifiers), and synthetic tackifiers will be used to control air (dust) & water erosion.
3. Existing Vegetation & Vegetative Buffers: to the extent practicable, existing vegetation will not be disturbed by construction activities; where feasible (especially at storm water discharge sites) existing vegetation will remain undisturbed to form a vegetative buffer between construction areas and areas undisturbed by construction.
4. Riprap: concrete riprap can be installed as a permanent stabilization measure at locations where construction is complete and permanent stabilization is required.

Site Manager and CPM Sheet Incorporation into the SW3P

The Lubbock District of the Texas Department of Transportation uses Site Manager, a computer based construction record-keeping system. Documentation describing major grading activities, temporary or permanent cessation of construction, and temporary and permanent stabilization measures is a part of this system and is incorporated by reference into this SW3P.

Storm Water Pollution Plans (SW3P) are a part of a highway project's construction plans, and construction plans contain information that supplement a project's SW3P. Project plans provide information on changes in elevations, on the locations where dirt has been removed and the locations where dirt has been added; on construction sequencing and scheduling and other data that might be important to a full understanding of TCEQ storm water pollution prevention requirements and a project's SW3P.

Contactor's Critical Path Model (CPM) schedule is incorporated into the project's SW3P by reference.

Erosion control and stabilization measures must be initiated immediately in portions of the site where construcion activities have ceased and will not resume for a period exceeding 14 calendar days. Stabilization measures that provide a protective cover must be initiated immediately in portions of the site where construction activities have permanently ceased (CGP Part III Sect. F2(b) page 28, 29)

SEDIMENT CONTROL PRACTICES:
1. Sandbags: the purpose of a sandbag is to intercept sediment laden storm water from disturbed areas, create a detention pond, detain sediment and release water in a sheet flow. Sandbag berms are a general purpose sediment control device and will be used throughout the project to detain sediment on site. Sandbags will be placed in ditches and channels to form sedimentation basins. Sandbags will also be used where runoff exits the construction site to enter receiving waters and to support other storm water controls.
2. Silt fence: silt fence is to be installed with construction near the perimeter of a disturbed area to intercept sediment while allowing water to percolate through. This is a general use control that will be used to create detention basins that retain sediment on-site; they will also be used in support of other controls such as construction exits and rock filter dams.
Silt fence will be used along playa lakes to reduce the loss of sediment from roadway front slopes; it may be used in ditches, channels, discharge points to support sandbag berms; may be used to support stabilized construction exits.
3. Rock Filter Dams: the purpose of a rock filter dam is to intercept and slow sediment laden water runoff from disturbed areas, retain the sediment and release the water in sheet flow. Rock filter dams will generally be used in high water velocity flow channels.
4. Stabilized Construction Exit: the purpose of the stabilized exit is to reduce the tracking of sediment and dirt onto public roadways beyond the construction zone. Stabilized Construction Exits are to be in-place at exit points to streets and thoroughfares in urban areas and are to be used by all construction vehicles regardless of size. They are to be supported where appropriate with silt fence and mechanized brooms.

Sediment basins are required where feasible for common drainage locations that serve an area with 10 or more acres disturbed at one time. Temporary or permanent sediment basins that provide water storage capacity are located on the project; the following controls provide, where feasible, structural controls / sediment basins:
1. Sandbag Berm as a Sediment Basin: a temporary basin designed to intercept sediment-laden storm water runoff and to trap sediment on-site.
2. Vegetative Buffer Strip: vegetative buffer strips reduce water velocity which reduces the potential of water erosion and allows sediments to fall out of the storm water.
3. Silt Fence will be used to reduce the loss of sediment from roadway front slopes adjacent to playa lakes by filtering out silt laden storm water from construction area.

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED PROFESSIONAL ENGINEER

Neil Welch, P.E.
3/3/2022

Texas Department of Transportation

Sheet 1 of 4 Sheets

SW3P

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			59
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84SW3P.dgn		

3. DESCRIPTION OF PERMANENT STORM WATER CONTROLS

PERMANENT STORM WATER CONTROLS: A description of controls that will stay in-place after construction is completed must be included in the SW3P.

1. Riprap: concrete riprap can be installed as a permanent stabilization measure at locations where construction is completed must be included in SW3P.
2. Existing Vegetation & Vegetative Buffers: to the extent practicable, existing vegetation will not be disturbed by construction activities; and, where feasible (especially at storm water discharge sites), existing vegetation will remain undisturbed to form a vegetative buffer between construction areas and areas undisturbed by construction.
3. Permanent Sodding/Seeding & Plantings: this is the establishment of permanent perennial vegetation. Permanent vegetation stabilizes soil by holding soil particles in-place. Vegetation filters sediments, helps soil absorb water, improves wildlife habitat, and enhances aesthetics of the site. Permanent vegetation will remain in vegetated channels.

4. OTHER REQUIRED CONTROLS AND BMPs

(a) Tracking and Dust: Off-site tracking and generation of dust must be minimized.
1. Stabilized Construction Exit: a stabilized pad of stone, timber, or other stabilized surface located at points where construction traffic will leave the construction zone to enter a public roadway. The purpose of the stabilized exit is to reduce the tracking of sediment and dirt onto public roadways beyond the construction zone. Stabilized Construction Exits will be placed as needed.
2. Water: water will be used to temporarily suppress dust and compact dirt.
3. Tackifiers: tackifiers such as asphalt emulsion, guar, (and other natural tackifiers), and synthetic tackifiers will be used to control air (dust) & water erosion.
4. Existing Vegetation & Vegetative Buffers: to the extent practicable, existing vegetation will not be disturbed by construction activities; where feasible (especially at storm water discharge sites), existing vegetation will remain undisturbed to form a vegetative buffer between construction areas and areas undisturbed by construction.
5. Cleaning and Sweeping: clean and sweep curb and gutter sections twice a month to reduce dirt and trash or as directed.

(b) On-Site Storage of Construction and Waste Materials:
Storage of construction and waste materials on-site shall be temporary; the contractor shall maintain a clean and orderly construction site; and construction waste such as trash, rubble, litter, scrap, and vegetation shall be stored / disposed of in lidded dumpsters or in a manner approved by the project engineer. Disposal methods must meet federal, state, and local waste management requirements. No construction waste shall be buried or burned on-site. Spoils of disposal, material storage, and waste materials from the demolition of existing roads and structures shall be stored in areas designated by the project engineer, and prevented from becoming a pollutant source with appropriate BMPs. Construction and waste materials that might be temporarily stored on-site include concrete and steel pipe; steel reinforcing bar, forms and frames; sand and gravel; wire, concrete and steel beams; wood and steel building units; and controls, construction signs and barricades. A list of construction and waste materials stored on site and controls will be presented to the Project Engineer.

Contractor shall design and utilize appropriate controls to minimize the offsite transport of suspended sediments and other pollutants, if it is necessary to pump or channel standing water from the site.

Litter, construction debris, and construction material exposed to stormwater shall be managed in a manner that prevents this material from becoming a pollutant. A regular sweep of the project shall be made to pick up litter. No construction material of any kind (including dirt) shall be discharged to a water of the United States (ephemeral streams and playa lakes) without a permit from the Corps of Engineers.

Oil, gasoline, grease, solvents, and other petroleum products are not to be stored on-site. Major vehicle maintenance shall occur on-site only under emergency conditions, and when this maintenance type is necessary, a plastic cover shall be used (and properly disposed of) to prevent petroleum products from contaminating the surrounding soil.

(c) Potential Pollutant Sources from Areas Other than Construction:

oil, grease, and other petroleum fluids construction traffic at concrete plant and field office
sediment laden stormwater disturbed soil from concrete batch plant and field office
litter,motorists driving through the project

All best management practices available to this construction project are available to control non-construction generated pollutants including sand bag berms, silt fence, stabilized construction exits, sedimentation basins, and litter management programs among other controls listed in this document.

Storage tanks that are above ground, regardless of whether they are used to store petroleum products, hazardous waste, or other hazardous material must follow the Summary of Federal Requirements.
Aboveground storage tanks (ASTs) used for the storage of petroleum products is regulated primarily under 40 CFR 112. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce.
A bulk storage container is 55 gal. or greater and may be aboveground, partially buried, bunkered, or completely buried. AST's include mobile storage containers such as trailers and tanked vehicles. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.

All bulk storage container installations must be constructed so a secondary means of containment is provided for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. Diked areas must be sufficiently impervious to contain discharged oil.

Mobile/Portable AST:

Mobile or portable oil bulk storage containers must be positioned or located to prevent a discharge and furnished with a secondary means of containment, such as a dike or catchment basin, sufficient to contain the capacity of the largest single compartment or container with sufficient freeboard to contain precipitation.

5. DOCUMENTATION OF COMPLIANCE WITH APPROVED STATE AND LOCAL PLANS:

SW3P must comply with Part III.F.5 of Construction General Permit.

6. MAINTENANCE REQUIREMENTS

Control measures shall be properly installed and maintained according to the manufacturer's specifications. Sediment must be removed from BMP's as directed by the SW3P plan requirements, and as directed by the manufacturer's recommendations, but no later than the time at which the capacity of the BMP has been reduced by 50 percent. If sediment or other pollutants escape the site, accumulations will be removed to reduce further negative effects. If inspections or other information indicates a control has been installed, used, or is performing inadequately, the contractor must modify or replace the control as soon as practicable after the problem is discovered. Controls shall be maintained in effective operating condition.
If inspections determine that BMPs are not operating effectively, maintenance shall be performed as necessary to continue the effectiveness of the controls. Controls that have been intentionally disabled, run over, removed, or otherwise made ineffective, must be corrected or replaced at discovery.

7. INSPECTION OF CONTROLS

Lubbock District: an informal inspection of controls shall occur every work day; a formal inspection of controls accompanied by an inspection report using Form 2118 shall occur every seven calendar days.

Inspectors must inspect disturbed areas that have not been finally stabilized, areas that are used for storage of materials and that are exposed to rain, discharge locations and structural controls for evidence of, or the potential for, pollutants entering the drainage system.

The SW3P must be modified based on the results of inspections to better control pollutants in runoff. Revisions to the SW3P must be completed within seven calendar days following inspection. If existing BMPs are modified or if additional BMPs are necessary, an implementation schedule must be described in the SW3P and wherever possible those changes implemented before the next storm event.

Determination of Reportable Quantities

A list of each substance designated as hazardous in 40 CFR Part 116 is found in the project's SW3P folder. The 40 CFR 116 registration applies to quantities, when discharged into or upon the Waters of the United States, adjoining shorelines, into or upon the contiguous zone, or beyond the contiguous zone as provided in the Act.

Litter and Construction Debris

The project contractor shall establish a schedule for the regular removal of litter and construction debris; this schedule shall be approved by the project engineer; and, once approved, implemented by the contractor. As needed, the project engineer shall direct the contractor to establish good housekeeping measures consistent with the TCEQ's Construction General Permit.

Concrete Truck Wash-Outs

Concrete truck wash-out is allowed provided:
(a) wash-out of concrete trucks to surface waters in the state, including storm sewer drains and inlets, is prohibited;
(b) wash-out shall be to a structural control;
(c) the direct discharge of wash-out water is prohibited at all times;
(d) the discharge shall not contribute to groundwater contamination;
(e) wash-out areas must be shown on the site map.
(f) wash-out pits shall be bermed and lined with plastic.

404 PERMIT REQUIRED: ___YES _X_NO
401 WATER QUALITY CERTIFICATION AND BMPs REQUIRED: ___YES _X_NO
401 (401) BMPs - INTERIM (ITM) BMPs - PERMANENT (PER) BMPs

EROSION CONTROLS	401	ITM	PER
* temporary vegetation	____	____	____
* blankets / matting	____	____	____
* mulch	____	____	____
* sod	____	____	____
* interceptor swales	____	____	____
* diversion dikes	____	____	____
* erosion control compost	____	____	____
* mulch filter berms & socks	____	____	____
* compost filter berms & socks	____	____	____
* 401 BMP not required	_X__	_X__	_X__

SEDIMENT CONTROLS	401	ITM	PER
* sandbag berm	____	____	____
* silt fence	____	____	____
* triangular filter dikes	____	____	____
* rock berms	____	____	____
* hay bale dikes	____	____	____
* brush berms	____	____	____
* stone outlet sediment trap	____	____	____
* sediment basins	____	____	____
* erosion control compost	____	____	____
* mulch filter berms & socks	____	____	____
* compost filter berms & socks	____	____	____
* 401 BMP not required	_X__	_X__	_X__

POST - CONTSTRUCTION TOTAL SUSPENDED SOLIDS (TSS)

	401	ITM	PER
* retention / irrigation	____	____	____
* vegetation filter strips	____	____	____
* wet basin	____	____	____
* grassy swale	____	____	____
* extended detention basin	____	____	____
* erosion control compost	____	____	____
* 401 BMP not required	_X__	_X__	_X__

	401	ITM	PER
* detention basin	____	____	____
* constructed wetland	____	____	____
* vegetation lined drainage ditch	____	____	____
* sand filter system	____	____	____
* mulch filter berms & socks	____	____	____
* compost filter berms & socks	____	____	____

Note: The best management practices listed in the SW3P may or may not be incorporated into the project design depending on the demands placed by weather and project construction. Should any best management practice not currently listed above be incorporated into the project SW3P design, a description of that best best management practice will be added to the Project SW3P File.

STATE OF TEXAS
NEIL WELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

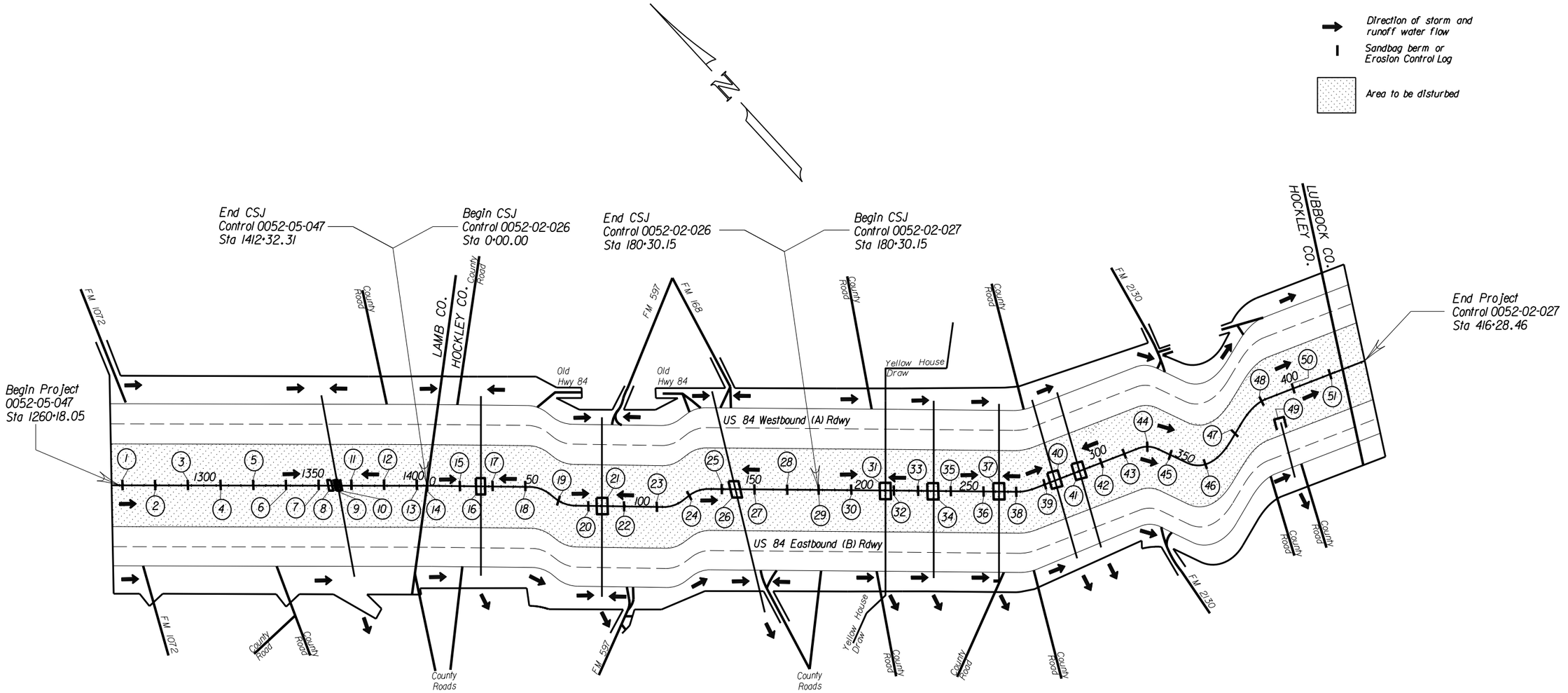
Neil Welch, P.E.
3/3/2022

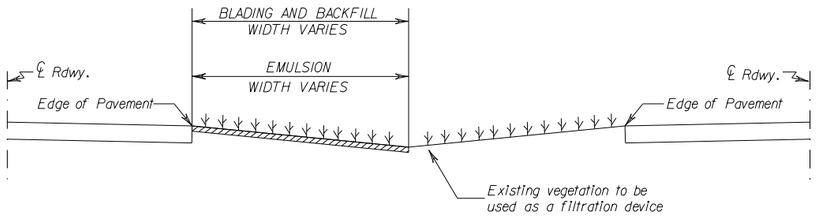
Texas Department of Transportation

Sheet 2 of 4 Sheets

SW3P

FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			60
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84SW3P.dgn		





MEDIAN DETAIL

NOTE:

Sediment basins are not feasible on the project because right-of-way is limited and the construction of a sedimentation basin would be within the boundaries of the roadway's clear zone and for the safety of motorists, sedimentation basins cannot be constructed within the clear zone. Since sediment basins are not feasible due to lack of right-of-way, mathematical calculations have not been developed.

Construction exits shall be approximately 20' wide by 50' long.

STATE OF TEXAS
NEIL NELON
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Nelon, P.E.
3/3/2022

Texas Department of Transportation

Sheet 3 of 4 Sheets

No Scale

SW3P

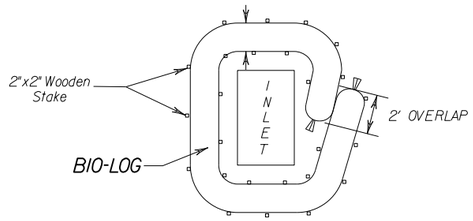
FED. RD. DIV. NO.	PROJECT NO.		SHEET NO.
6			61
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84SW3P.dgn		

SW3P SUMMARY								
CONTROL SECTION	Erosion Control Log No.	APPROX. STATION	LOCATION	DESCRIPTION	LF	INSTALL DATE	REPLACEMENT DATE	REMOVE DATE
0052-05-047	1	1261+09	Median	Ditch	30			
	2	1276+00	Median	Ditch	30			
	3	1291+00	Median	Ditch	30			
	4	1306+00	Median	Ditch	30			
	5	1321+00	Median	Ditch	30			
	6	1336+00	Median	Ditch	30			
	7	1351+00	Median	Ditch	30			
	8	1360+10	Inlet	Ditch	30			
	9	1360+32	Median	Ditch	50			
		1360+32	Inlet	Ditch	210			
	10	1361+32	Median	Ditch	50			
	11	1366+00	Median	Ditch	30			
	12	1381+00	Median	Ditch	30			
	13	1400+00	Median	Ditch	30			
Sub Total:					640			
Replacements:					110			
Sandbags:					70			
CSJ 0052-05-047 Total:					750			

NOTE:
Sandbags are to be used to hold down Erosion control logs at STA 1360+32 on inlets. Wooden stakes cannot be used at this location due to concrete being all around.

SW3P SUMMARY								
CONTROL SECTION	Erosion Control Log No.	APPROX. STATION	LOCATION	DESCRIPTION	LF	INSTALL DATE	REPLACEMENT DATE	REMOVE DATE
0052-06-026	14	0+00	Median	Ditch	30			
	15	15+00	Median	Ditch	30			
	16	23+36	Inlet	Ditch	30			
	17	30+00	Median	Ditch	30			
	18	45+00	Median	Ditch	30			
	19	60+00	Median	Ditch	30			
	20	75+00	Median	Ditch	30			
	21	79+20	Inlet	Ditch	30			
	22	90+00	Median	Ditch	30			
	23	105+00	Median	Ditch	30			
	24	120+00	Median	Ditch	30			
	25	135+00	Median	Ditch	30			
	26	137+59	Inlet	Ditch	30			
	27	150+00	Median	Ditch	30			
	28	165+00	Median	Ditch	30			
	29	179+25	Median	Ditch	30			
Sub Total:					480			
Replacements:					120			
Sandbags:					0			
CSJ 0052-06-026 Total:					600			

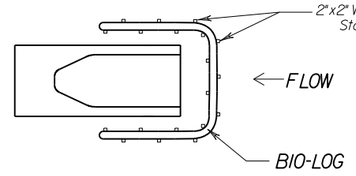
SW3P SUMMARY								
CONTROL SECTION	Erosion Control Log No.	APPROX. STATION	LOCATION	DESCRIPTION	LF	INSTALL DATE	REPLACEMENT DATE	REMOVE DATE
0052-06-027	30	195+00	Median	Ditch	30			
	31	209+44	Inlet	Ditch	30			
	32	210+00	Median	Ditch	30			
	33	225+00	Median	Ditch	30			
	34	232+67	Inlet	Ditch	30			
	35	240+00	Median	Ditch	30			
	36	255+00	Median	Ditch	30			
	37	262+57	Inlet	Ditch	70			
	38	270+00	Median	Ditch	30			
	39	285+00	Median	Ditch	30			
	40	286+42	Inlet	Ditch	40			
	41	298+64	Inlet	Ditch	50			
	42	300+00	Median	Ditch	30			
	43	315+00	Median	Ditch	30			
	44	330+00	Median	Ditch	30			
	45	345+00	Median	Ditch	30			
	46	360+00	Median	Ditch	30			
	47	375+00	Median	Ditch	30			
	48	390+00	Median	Ditch	30			
	49	397+90	SET	Ditch	30			
	50	405+00	Median	Ditch	30			
	51	412+00	Median	Ditch	30			
Sub Total:					730			
Replacements:					180			
Sandbags:					0			
Project Sandbags Total:					70			
CSJ 0052-05-047 Total:					750			
CSJ 0052-06-026 Total:					600			
CSJ 0052-06-027 Total:					910			
Project Total					2260			

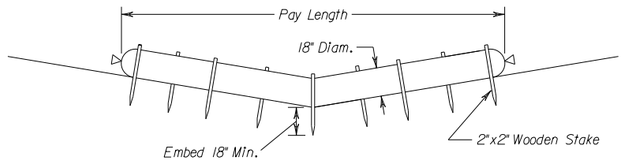


EROSION CONTROL LOG DETAIL
FOR MEDIAN INLETS

Stake as necessary to hold log in place.

PERPENDICULAR S.E.T. DETAIL





BIODEGRADABLE EROSION CONTROL LOG DETAIL

Stake as necessary to hold log in place.

NOTES:
Quantities listed are estimates.

Do not use rebar or other non-degradable material to stake down erosion control logs.

Soak erosion contril log with water at installation to help hold log in place.

STATE OF TEXAS
NEIL MELCH
92644
REGISTERED
PROFESSIONAL ENGINEER

Neil Melch, P.E.
3/3/2022

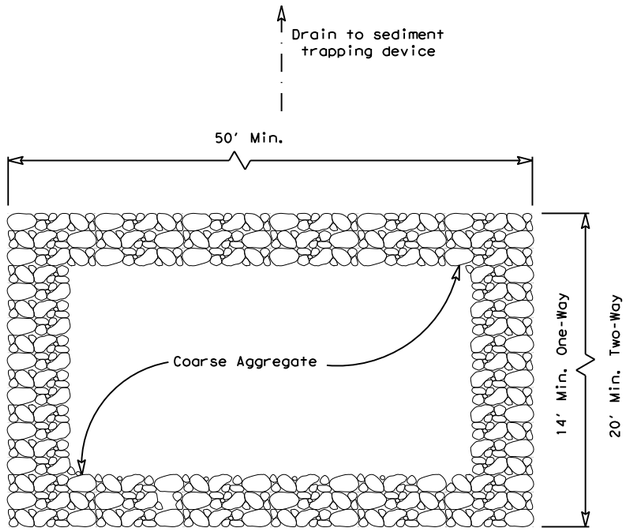
Texas Department of Transportation

Sheet 4 of 4 Sheets

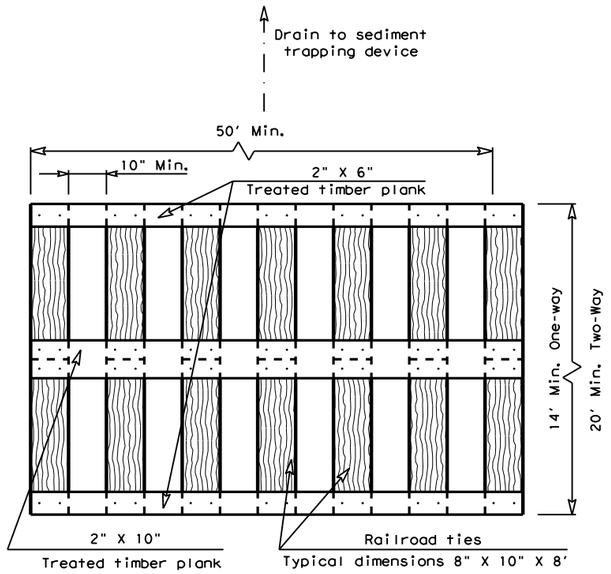
SW3P

FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			62
STATE	STATE DIST. NO.	COUNTY	
TEXAS	LBB	LAMB, etc.	
CONT.	SECT.	JOB	HIGHWAY NO.
0052	05	047	US 84
FILENAME	us84SW3P.dgn		

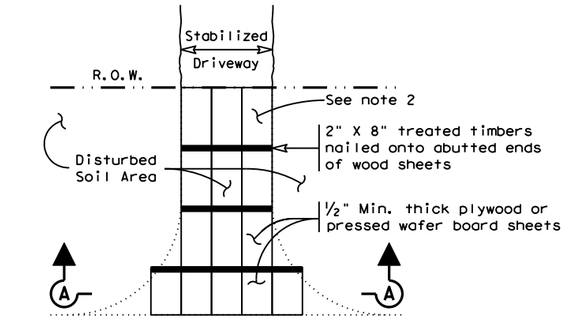
DATE: 3/2/2022
FILE: C:\EF\US 84 Cable Barrier\Standards\ec316.dgn



PLAN VIEW



PLAN VIEW



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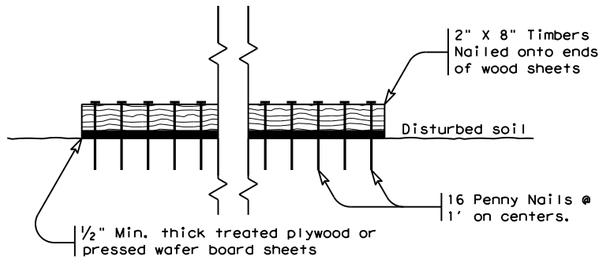
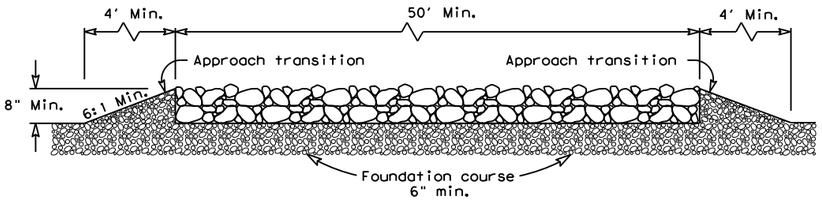


SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

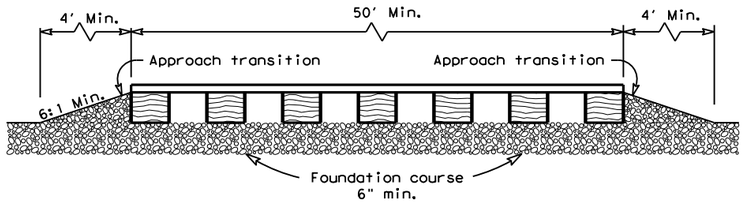
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

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

GENERAL NOTES (TYPE 2)

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

GENERAL NOTES (TYPE 3)

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

Texas Department of Transportation

Design Division Standard

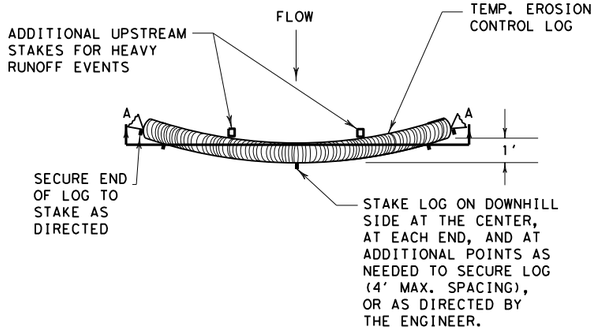
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

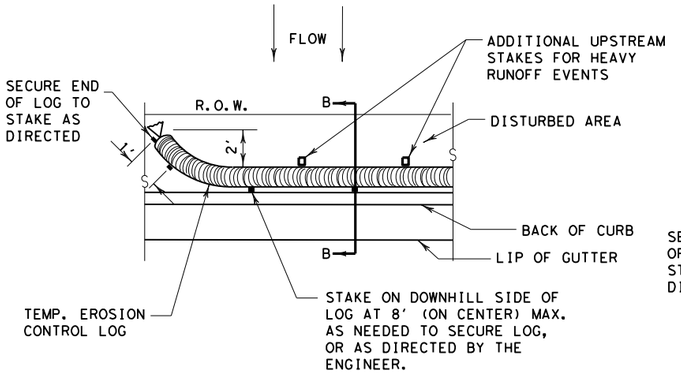
EC(3)-16

FILE: ec316	DN: TxDOT	CK: KM	DW: VP	DN/CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		63

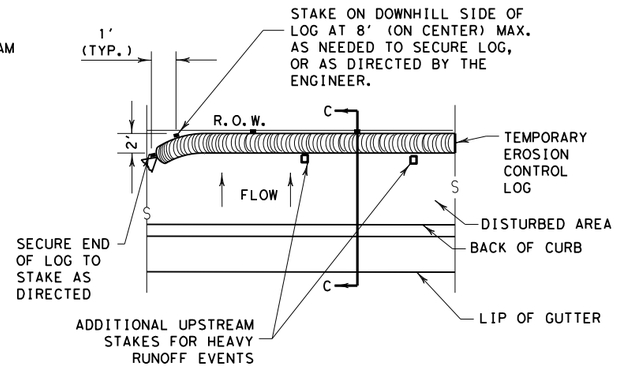
DATE:
FILE:



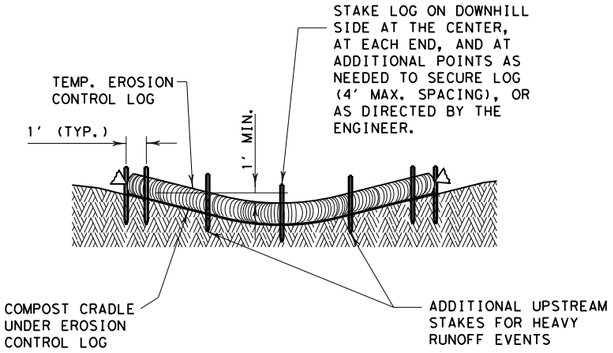
PLAN VIEW



PLAN VIEW



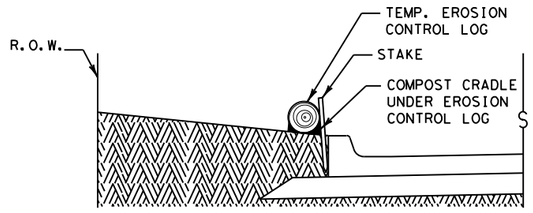
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

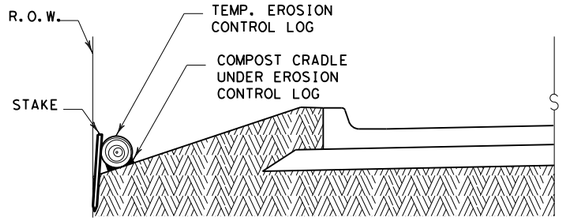
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

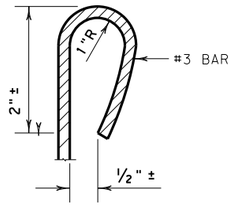
CL-BOC



SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



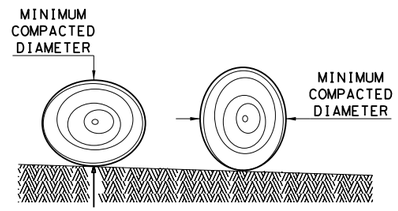
REBAR STAKE DETAIL

LEGEND

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

GENERAL NOTES:

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



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

SEDIMENT BASIN & TRAP USAGE GUIDELINES

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

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

Control logs should be placed in the following locations:

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

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

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

Texas Department of Transportation

Design Division Standard

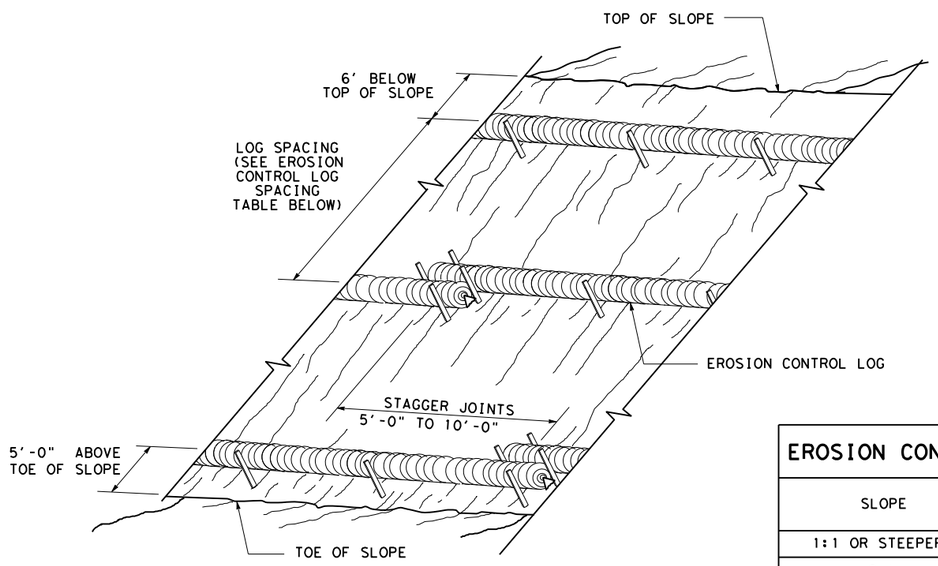
TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

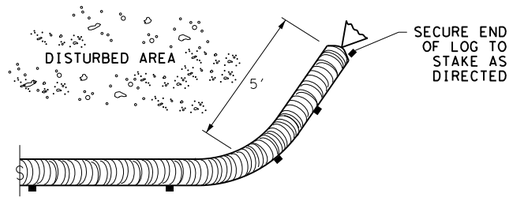
FILE: ec916	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		64

DATE:
FILE:



EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

CL-SST

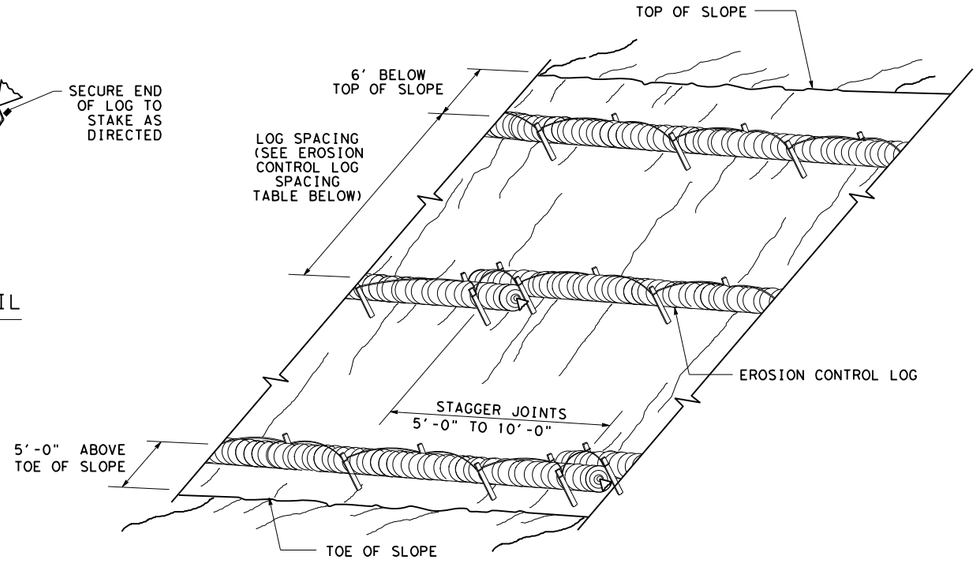


END SECTION RAP DETAIL

EROSION CONTROL LOG SPACING TABLE

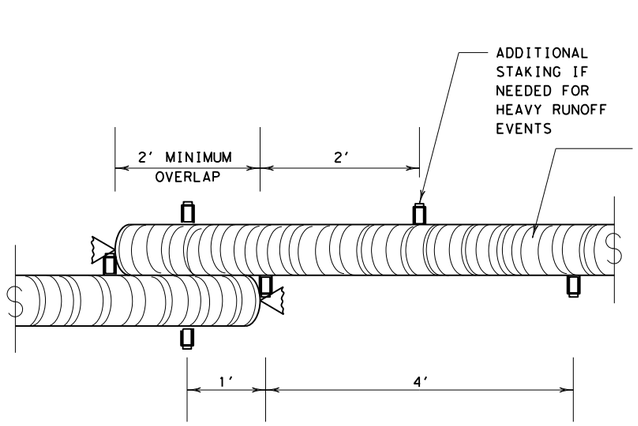
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

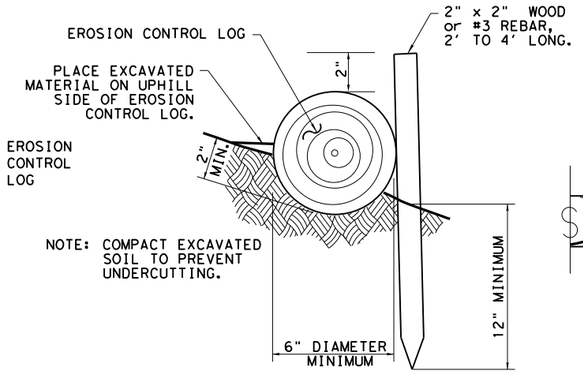
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL



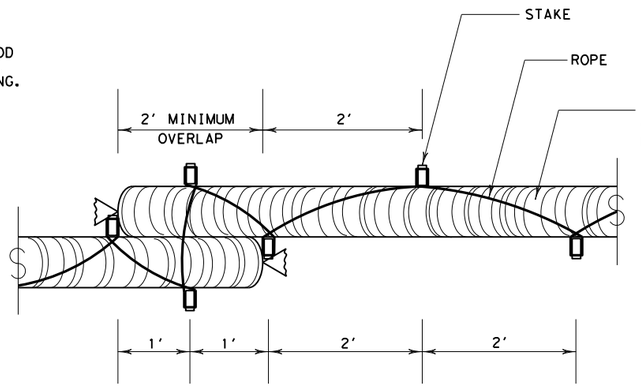


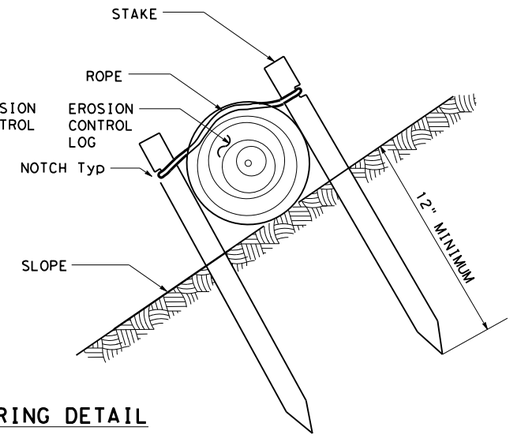
STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

TRENCH DEPTH TABLE

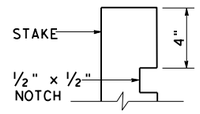
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

FILE: ec116	DN: TxDOT	CK: KM	DW: LS/PT	CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	0052	05	047	US 84
	DIST	COUNTY		SHEET NO.
	05	LAMB, ETC.		65

DATE:
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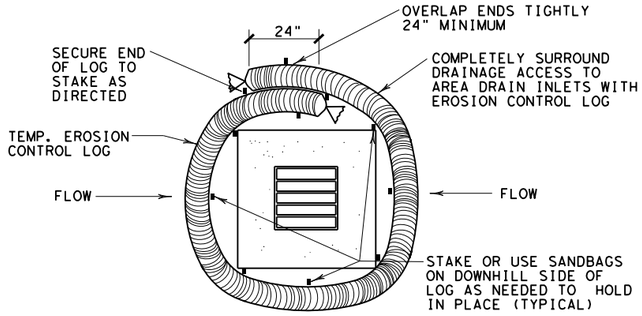
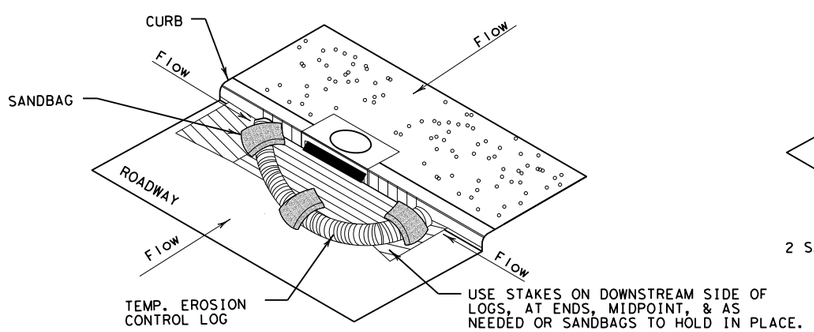


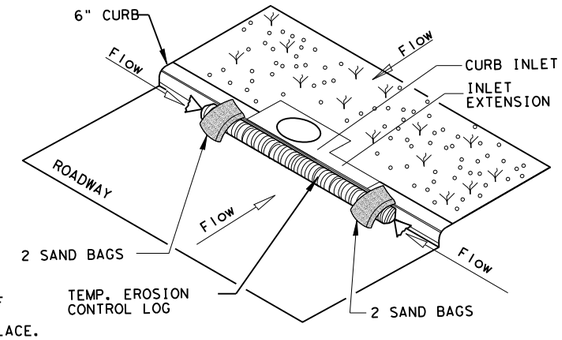
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

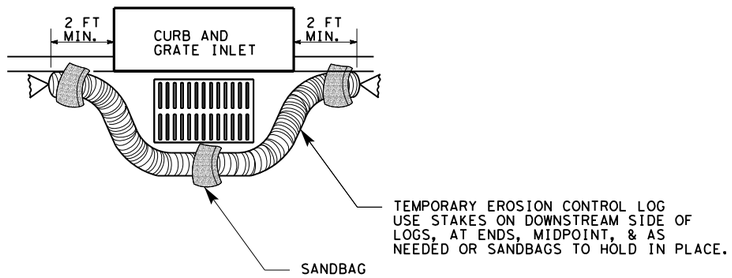
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

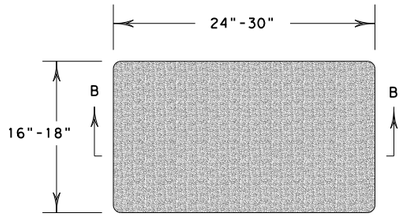
NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI

SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
© TxDOT: JULY 2016	CONT	SECT	JOB		HIGHWAY	
REVISIONS	0052	05	047		US 84	
	DIST	COUNTY			SHEET NO.	
	05	LAMB, ETC.			66	

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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. Anton, TX

2.

☐ No Action Required ☒ Required Action

Action No.

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

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

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

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

☒ No Permit Required
☐ Nationwide Permit 14 - PCN not Required (less than 1/10th acre waters or wetlands affected)
☐ Nationwide Permit 14 - PCN Required (1/10 to <1/2 acre, 1/3 in tidal waters)
☐ Individual 404 Permit Required
☐ Other Nationwide Permit Required: NWP# _____

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

1. NONE

2.

3.

4.

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

Best Management Practices:

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

III. CULTURAL RESOURCES

Refer to TxDOT Standard Specifications in the event historical issues or archeological artifacts are found during construction. Upon discovery of archeological artifacts (bones, burnt rock, flint, pottery, etc.) cease work in the immediate area and contact the Engineer immediately.

☒ No Action Required ☐ Required Action

IV. VEGETATION RESOURCES

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

☐ No Action Required ☒ Required Action

Action No.

1. Comply with Executive Order 13112 on Invasive Plant Species.
2. Comply with TxDOT Executive Memorandum on beneficial landscaping.
3. Comply with temporary and permanent vegetation stabilization protocols of the SW3P

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

☐ No Action Required ☒ Required Action

Action No.

1. Do not handle or harm Texas horned lizards, prairie dogs, barn swallows or burrowing owls.
2. No prairie dog towns can be damaged or crossed with equipment without approval of the Engineer.
3. No nests of burrowing owls (in prairie dog holes) can be disturbed or damaged.
4. No nests of barn swallows (likely on structures such as bridges) can be disturbed or damaged between April 15th and July 15th.

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.

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.

LIST OF ABBREVIATIONS

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

VI. HAZARDOUS MATERIALS OR CONTAMINATION ISSUES

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

VII. OTHER ENVIRONMENTAL ISSUES

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

☐ No Action Required ☒ Required Action

Action No.

1. Maintain equipment muffler system and work hour restriction to reduce traffic noise.
2. No PSL's may be located in the prairie dog town, playa lakes (wet or dry) or streams bed (wet or dry).
3. No dumping of construction material in playa lakes or stream beds regardless of property owner requests.
4. Contractor must obtain historical and archaeological clearances for off-site PSL's.
5. Contractor is responsible for air quality permits for concrete and asphalt batch and similar plants.
6. Contractor is responsible for water appropriation or impoundment TCEP permits.
7. Contractor will protect environmentally sensitive areas with fencing, work sequncing or scheduling as directed.
8. PSL's beyond the project right-of-way have "individual operator" status under the TPDES Construction General Permit and the Contractor is responsible for the SW3P and any TCEP permits.
9. No waste material of any type may be placed at any location where it could be washed into a water of the U.S. or a surface water of Texas.
10. Flood elevations will not be increased to a level that would violate flood plain regulations or ordinances.

Texas Department of Transportation

Design Division Standard

ENVIRONMENTAL PERMITS, ISSUES AND COMMITMENTS

EPIC

FILE: epic.dgn	DN: TxDOT	CK: RG	DW: VP	CK: AR
©TxDOT: February 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-12-2011 (DS)	0052	05	047	US 84
05-07-14 ADDED NOTE SECTION IV.	DIST	COUNTY		SHEET NO.
01-23-2015 SECTION I (CHANGED ITEM 1122 TO ITEM 506, ADDED GRASSY SWALES.	05	LAMB, ETC.		67